

# Transistors

Ordering Information & Standard Packing Quantities .....	150
Application Note .....	152
2-1 Transistors .....	153
<b>Selection Guide</b> .....	153
• $V_{CE0-Ic}$ .....	153
• Audio Transistors .....	154
• Switching Transistors .....	155
<b>Specifications List by Part Number</b> .....	156
2-2 MOS FETs .....	163
<b>Selection Guide</b> .....	163
• By $V_{DSS}$ .....	163
<b>Specifications List by Part Number</b> .....	164
2-3 IGBT .....	167
<b>Selection Guide</b> .....	167
• By $V_{CES}$ .....	167
<b>Specifications List by Part Number</b> .....	168
2-4 Transistor and MOS FET Arrays .....	170
<b>Specifications List by Part Number</b> .....	170
<b>Specifications List by Application</b> .....	172
• Sink Driver Arrays .....	172
• Source Driver Arrays .....	174
• Motor Driver Arrays .....	176
• Partial switching PFC Arrays .....	180
Package Type (Dimensions) .....	185

# Ordering Information

All products listed must be ordered in standard packing increments.

Series Name/ Product Name	Package	Standard Packing Quantities	
		Bulk	Taping
2SA1186	TO3P	500(Box)/1080(Stick)	–
2SA1215	MT200	250(Box)	–
2SA1216	MT200	250(Box)	–
2SA1294	TO3P	500(Box)/1080(Stick)	–
2SA1295	MT200	250(Box)	–
2SA1303	TO3P	500(Box)/1080(Stick)	–
2SA1386	TO3P	500(Box)/1080(Stick)	–
2SA1386A	TO3P	500(Box)/1080(Stick)	–
2SA1488	TO220F	1000(Box)/3750(Stick)	–
2SA1488A	TO220F	1000(Box)/3750(Stick)	–
2SA1492	TO3P	500(Box)/1080(Stick)	–
2SA1493	MT200	250(Box)	–
2SA1494	MT200	250(Box)	–
2SA1567	TO220F	1000(Box)/3750(Stick)	–
2SA1568	TO220F	1000(Box)/3750(Stick)	–
2SA1667	TO220F	1000(Box)/3750(Stick)	–
2SA1668	TO220F	1000(Box)/3750(Stick)	–
2SA1673	TO3PF	500(Box)/1080(Stick)	–
2SA1693	TO3P	500(Box)/1080(Stick)	–
2SA1694	TO3P	500(Box)/1080(Stick)	–
2SA1695	TO3P	500(Box)/1080(Stick)	–
2SA1725	TO220F	1000(Box)/3750(Stick)	–
2SA1746	TO3PF	500(Box)/1080(Stick)	–
2SA1859	TO220F	1000(Box)/3750(Stick)	–
2SA1859A	TO220F	1000(Box)/3750(Stick)	–
2SA1860	TO3PF	500(Box)/1080(Stick)	–
2SA1907	TO3PF	500(Box)/1080(Stick)	–
2SA1908	TO3PF	500(Box)/1080(Stick)	–
2SA1909	TO3PF	500(Box)/1080(Stick)	–
2SA2151	TO3P	500(Box)/1080(Stick)	–
2SA2151A	TO3P	500(Box)/1080(Stick)	–
2SA2223	TO3P	500(Box)/1080(Stick)	–
2SB1257	TO220F	1000(Box)/3750(Stick)	–
2SB1258	TO220F	1000(Box)/3750(Stick)	–
2SB1259	TO220F	1000(Box)/3750(Stick)	–
2SB1351	TO220F	1000(Box)/3750(Stick)	–
2SB1382	TO3PF	500(Box)/1080(Stick)	–
2SB1383	TO3P	500(Box)/1080(Stick)	–
2SB1420	TO3P	500(Box)/1080(Stick)	–
2SB1559	TO3P	500(Box)/1080(Stick)	–
2SB1560	TO3P	500(Box)/1080(Stick)	–
2SB1570	MT200	250(Box)	–
2SB1587	TO3PF	500(Box)/1080(Stick)	–
2SB1588	TO3PF	500(Box)/1080(Stick)	–
2SB1647	TO3P	500(Box)/1080(Stick)	–
2SB1648	MT200	250(Box)	–
2SB1649	TO3PF	500(Box)/1080(Stick)	–
2SC2837	TO3P	500(Box)/1080(Stick)	–
2SC2921	MT200	250(Box)	–
2SC2922	MT200	250(Box)	–
2SC3263	TO3P	500(Box)/1080(Stick)	–
2SC3264	MT200	250(Box)	–

Series Name/ Product Name	Package	Standard Packing Quantities	
		Bulk	Taping
2SC3284	TO3P	500(Box)/1080(Stick)	–
2SC3519	TO3P	500(Box)/1080(Stick)	–
2SC3519A	TO3P	500(Box)/1080(Stick)	–
2SC3835	TO3P	500(Box)/1080(Stick)	–
2SC3851	TO220F	1000(Box)/3750(Stick)	–
2SC3851A	TO220F	1000(Box)/3750(Stick)	–
2SC3852	TO220F	1000(Box)/3750(Stick)	–
2SC3852A	TO220F	1000(Box)/3750(Stick)	–
2SC3856	TO3P	500(Box)/1080(Stick)	–
2SC3857	MT200	250(Box)	–
2SC3858	MT200	250(Box)	–
2SC3927	TO3P	500(Box)/1080(Stick)	–
2SC4024	TO220F	1000(Box)/3750(Stick)	–
2SC4131	TO3PF	500(Box)/1080(Stick)	–
2SC4138	TO3P	500(Box)/1080(Stick)	–
2SC4140	TO3P	500(Box)/1080(Stick)	–
2SC4153	TO220F	1000(Box)/3750(Stick)	–
2SC4300	TO3PF	500(Box)/1080(Stick)	–
2SC4301	TO3PF	500(Box)/1080(Stick)	–
2SC4304	TO220F	1000(Box)/3750(Stick)	–
2SC4381	TO220F	1000(Box)/3750(Stick)	–
2SC4382	TO220F	1000(Box)/3750(Stick)	–
2SC4388	TO3PF	500(Box)/1080(Stick)	–
2SC4445	TO3PF	500(Box)/1080(Stick)	–
2SC4466	TO3P	500(Box)/1080(Stick)	–
2SC4467	TO3P	500(Box)/1080(Stick)	–
2SC4468	TO3P	500(Box)/1080(Stick)	–
2SC4495	TO220F	1000(Box)/3750(Stick)	–
2SC4511	TO220F	1000(Box)/3750(Stick)	–
2SC4518	TO220F	1000(Box)/3750(Stick)	–
2SC4518A	TO220F	1000(Box)/3750(Stick)	–
2SC4546	TO220F	1000(Box)/3750(Stick)	–
2SC4706	TO3P	500(Box)/1080(Stick)	–
2SC4883	TO220F	1000(Box)/3750(Stick)	–
2SC4883A	TO220F	1000(Box)/3750(Stick)	–
2SC4886	TO3PF	500(Box)/1080(Stick)	–
2SC5071	TO3P	500(Box)/1080(Stick)	–
2SC5099	TO3PF	500(Box)/1080(Stick)	–
2SC5100	TO3PF	500(Box)/1080(Stick)	–
2SC5101	TO3PF	500(Box)/1080(Stick)	–
2SC5130	TO220F	1000(Box)/3750(Stick)	–
2SC5287	TO3P	500(Box)/1080(Stick)	–
2SC6011	TO3P	500(Box)/1080(Stick)	–
2SC6011A	TO3P	500(Box)/1080(Stick)	–
2SC6145	TO3P	500(Box)/1080(Stick)	–
2SD1785	TO220F	1000(Box)/3750(Stick)	–
2SD1796	TO220F	1000(Box)/3750(Stick)	–
2SD2014	TO220F	1000(Box)/3750(Stick)	–
2SD2015	TO220F	1000(Box)/3750(Stick)	–
2SD2016	TO220F	1000(Box)/3750(Stick)	–
2SD2017	TO220F	1000(Box)/3750(Stick)	–
2SD2045	TO3PF	500(Box)/1080(Stick)	–

Series Name/ Product Name	Package	Standard Packing Quantities	
		Bulk	Taping
2SD2081	TO220F	1000(Box)/3750(Stick)	–
2SD2082	TO3PF	500(Box)/1080(Stick)	–
2SD2083	TO3P	500(Box)/1080(Stick)	–
2SD2141	TO220F	1000(Box)/3750(Stick)	–
2SD2389	TO3P	500(Box)/1080(Stick)	–
2SD2390	TO3P	500(Box)/1080(Stick)	–
2SD2401	MT200	250(Box)	–
2SD2438	TO220F	1000(Box)/3750(Stick)	–
2SD2439	TO3PF	500(Box)/1080(Stick)	–
2SD2560	TO3P	500(Box)/1080(Stick)	–
2SD2561	MT200	250(Box)	–
2SD2562	TO3PF	500(Box)/1080(Stick)	–
2SD2641	TO3P	500(Box)/1080(Stick)	–
2SD2642	TO220F	1000(Box)/3750(Stick)	–
2SD2643	TO3PF	500(Box)/1080(Stick)	–
2SK2420	TO220F	3750(Stick)	–
2SK2701A	TO220F	3750(Stick)	–
2SK2778	TO220F	3750(Stick)	–
2SK2779	TO220F	3750(Stick)	–
2SK2803	TO220F	3750(Stick)	–
2SK2848	TO220F	3750(Stick)	–
2SK2943	TO220F	3750(Stick)	–
2SK3003	TO220F	3750(Stick)	–
2SK3004	TO220F	3750(Stick)	–
2SK3199	TO220F	3750(Stick)	–
2SK3710A	TO220S(Surface-mount)	–	1000
2SK3711	TO3P	1080(Stick)	–
2SK3800	TO220S(Surface-mount)	–	1000
2SK3801	TO3P	1080(Stick)	–
EKV550	TO220	1000(Stick)	–
FGT312	TO220F	3750(Stick)	–
FGT313	TO220F	3750(Stick)	–
FGT412	TO220F	3750(Stick)	–
FGT612	TO220F	3750(Stick)	–
FGM603	TO3PF	1080(Stick)	–
FKP202	TO220F	3750(Stick)	–
FKP250A	TO3PF	1080(Stick)	–
FKP252	TO220F	3750(Stick)	–
FKP253	TO220F	3750(Stick)	–
FKP280A	TO3PF	1080(Stick)	–
FKP300A	TO3PF	1080(Stick)	–
FKP330C	TO3PF	1080(Stick)	–
FKV460S	TO220S(Surface-mount)	–	1000
FKV550N	TO220F	3750(Stick)	–
FKV550T	TO220F	3750(Stick)	–
FKV575	TO220F	3750(Stick)	–
FKV660S	TO220S(Surface-mount)	–	1000
MGD623N	TO3P	1080(Stick)	–
MGD623S	TO3P	1080(Stick)	–
SDA05	PS16Pin	–	1200
SDC03	PS16Pin	–	1200
SDC04	PS16Pin	–	1200

Series Name/ Product Name	Package	Standard Packing Quantities	
		Bulk	Taping
SDC06	PS16Pin	–	1200
SDC07	PS16Pin	–	1200
SDH02	PS16Pin	–	1200
SKP202	TO263(Surface-mount)	–	800
SKP253	TO263(Surface-mount)	–	800
SLA4xxx	SLA12Pin	250(Box)/1080(Stick)	–
SLA4xxx	SLA21Pin	250(Box)/1080(Stick)	–
SLA5xxx	SLA12Pin	250(Box)/1080(Stick)	–
SLA5xxx	SLA15Pin	250(Box)/1080(Stick)	–
SLA6xxx	SLA12Pin	250(Box)/1080(Stick)	–
SMA4xxx	SMA12Pin	1440(Stick)	–
SMA5xxx	SMA12Pin	1440(Stick)	–
SMA5xxx	SMA15Pin	1440(Stick)	–
SMA6xxx	SMA12Pin	1440(Stick)	–
STAxxx	STA8Pin	1000(Box)/4050(Stick)	–
STAxxx	STA10Pin	3200(Box)/3300(Stick)	–
STD01N	TO3P-5	500(Box)/1080(Stick)	–
STD01P	TO3P-5	500(Box)/1080(Stick)	–
STD03N	TO3P-5	500(Box)/1080(Stick)	–
STD03P	TO3P-5	500(Box)/1080(Stick)	–

# Application Note

Since reliability can be affected adversely by improper storage environment or handling methods during Characteristic tests, please observe the following cautions.

## ■ Cautions for Storage

- Ensure that storage conditions comply with the normal temperature (5 to 35°C) and the normal relative humidity (around 40 to 75%), and avoid storage locations that experience high temperature and humidity, or extreme changes in temperature or humidity.
- Avoid locations where dust or harmful gases are present, and avoid direct sunlight.
- Reinspect the devices for rust in leads and solderability after stored for a long time.

## ■ Cautions for Characteristic Tests and Handling

On characteristics test at incoming inspection, etc, take good care to avoid the surge voltages from the test equipment, the short circuit at terminals, or the wrong connection.

## ■ Silicone Grease

When using a heatsink, please coat thinly and evenly the back surface of the device and both surfaces of the insulating plate with silicone grease to lower the thermal resistance between the device and the heatsink. Please select proper silicone grease carefully since the oil in some grease products may penetrate the device and result in an extremely short device life.

Recommended Silicone Grease

- G-746 (Shin-Etsu Chemical)
- YG6260 (Momentive Performance Materials Inc.)
- SC102 (Dow Corning Toray Silicone)

## ■ Mounting Torque

When mounting torque is insufficient, thermal resistance increases, and so heat radiation effect is decreased. When the torque is excessive, the screw may be broken, the heatsink may be deformed, and the device frame may be distorted, resulting in the device damage. Recommended mounting torque per package is as follows:

### ● Mounting Torque Table

Package	Screw Torque
TO-220 (MT-25)	0.490 to 0.686 N·m (5 to 7kgf·cm)
TO-220F (FM20)	
TO-3P (MT-100)	0.686 to 0.882 N·m (7 to 9kgf·cm)
TO-3PF(FM100)	
MT-200 (fixed at two points)	0.588 to 0.784 N·m (6 to 8kgf·cm)
SIP with Fin (SLA)	

\* When the surface of a heatsink where Full Mold package is to be mounted is not flat due to the burred metal bracket for screwing around the mounting hole of the heatsink, the resin of the package might be cracked even if the torque is lower than the recommended value.

\* When a screw is fastened with an air driver for the Full Mold package, a large impact is generated at the time of stop, and the resin may crack even if the torque is lower than the recommended value. An electric driver, therefore, should be used instead of an air driver.

## ■ Heatsink

A larger contact area between the device and the heatsink is required for more effective heat radiation. To ensure a larger contact area, minimize mounting holes. And select a heatsink with a surface smooth enough and free from burrs and slivers.

## ■ Soldering Temperature

In general, the device mounted on a printed circuit board is subjected to high temperatures from flow solder in a solder bath, or, from a soldering iron at hand soldering.

The testing method and test conditions (JIS-C-7021 standards) for a device's heat resistance to soldering are:

At a distance of 1.5mm from the device's main body, apply 260°C for 10 seconds, and 350°C for 3 seconds.

Please observe these limits and finish soldering in as short a time as possible.

## ■ Antistatic Measure for Power MOS FET Arrays

- When handling the device, body grounding is necessary. Wear a wrist strap with a 1 MΩ resistor close to the body in the wrist strap to prevent electric shock.
- Use a conductive tablemat and a floor mat at the device-handling workbench and ground them properly.
- When using a curve tracer or other measuring equipment, ground them as well.
- In soldering, ground the soldering iron tip and the solder bath to prevent a leakage voltage from damaging the device.
- As an antistatic measure for device containers, use Sanken shipping containers or a conductive containers, or use aluminum foils. Since reliability can be affected adversely by improper storage environment or handling methods during Characteristic tests, please observe the following cautions.

# Selection Guide

$V_{CEO}-I_c$

Collector-Emitter Voltage $V_{CEO}(V)$	800		C4304 C4445		C4300		C4301									
	600										C4706					
	550					C4518 C4518A C5287			C3927							
	400					C5130		C4546		C4138	C5071				C4140	
	380						D2141									
	250						D2017									
	230												A1294 C3263 A2151A C6011A 2SA2223 2SC6145		A1295 C3264	
	200	A1668 C4382	D2016										A1493 C3857 A2151 C6011		A1494 C3858	
	180	A1859A C4883A											A1386A A1492 A1673 C3519A C3856 C4388		A1216 C2922	
	160												A1215 A1386 C2921 C3519			
	150	A1667 A1859 C4381 C4883						B1559 B1587 D2389 D2438	A1186 B1560 B1588 C2837 D2390 D2439	B1570 D2401	A1303 A1860 C3284 C4886		B1647 B1649 D2560 D2562		B1648 D2561	
	140								A1695 A1909 C4468 C5101							
	120			D2015		D1785 D2045	C3835 C4153	A1694 A1908 C4467 C5100	B1259 D2081					B1382 B1420 D2082		B1383 D2083
	110					D2641 D2642 D2643										
	100					B1258										
80		C3852A	A1488A C3851A D2014		A1693 A1725 A1907 C4466 C4511 C5099											
60		C3852	A1488 B1257 C3851 D1796							A1568 B1351						
50		C4495						C4024		A1567 A1746		C4131				
		2	3	4	5	6	7	8	10	12	14	15	16	17	18	25
		Collector Current $I_c(A)$														

## Audio Transistors

### Output Transistors

P <sub>c</sub> (W)	I <sub>c</sub> (A)	V <sub>CE0</sub> (V)	Chip						Package
			Single Transistors				Darlington		
			General		LAPT				
30	6	80	2SA1725	2SC4511					TO-220F (FM20)
60	6	80	2SA1693	2SC4466					TO-3P (MT-100)
	6	80	2SA1907	2SC5099					TO-3PF (FM100)
75	8	120	2SA1908	2SC5100					TO-3PF (FM100)
	8	150					2SB1587	2SD2438	TO-3PF (FM100)
80	8	120	2SA1694	2SC4467					TO-3P (MT-100)
	10	140	2SA1909	2SC5101					TO-3PF (FM100)
	8	150					2SB1559	2SD2389	TO-3P (MT-100)
	10	150					2SB1588	2SD2439	TO-3PF (FM100)
85	14	150			2SA1860	2SC4886			TO-3PF (FM100)
	15	150					2SB1649	2SD2562	TO-3PF (FM100)
	15	180	2SA1673	2SC4388					TO-3PF (FM100)
100	10	140	2SA1695	2SC4468					TO-3P (MT-100)
	10	150			2SA1186	2SC2837			TO-3P (MT-100)
	10	150					2SB1560	2SD2390	TO-3P (MT-100)
125	14	150			2SA1303	2SC3284			TO-3P (MT-100)
130	15	150					2SB1647	2SD2560	TO-3P (MT-100)
	15	160			2SA1386	2SC3519			TO-3P (MT-100)
	15	180	2SA1492	2SC3856					TO-3P (MT-100)
	15	180			2SA1386A	2SC3519A			TO-3P (MT-100)
	15	230			2SA1294	2SC3263			TO-3P (MT-100)
150	12	150					2SB1570	2SD2401	MT-200 (fixed at two points)
	15	160			2SA1215	2SC2921			MT-200 (fixed at two points)
	15	200	2SA1493	2SC3857					MT-200 (fixed at two points)
160	15	200	2SA2151	2SC6011					TO-3P (MT-100)
	15	230	2SA2151A	2SC6011A					TO-3P (MT-100)
	15	230	2SA2223	2SC6145					TO-3P (MT-100)
200	17	150					2SB1648	2SD2561	MT-200 (fixed at two points)
	17	180			2SA1216	2SC2922			MT-200 (fixed at two points)
	17	200	2SA1494	2SC3858					MT-200 (fixed at two points)
	17	230			2SA1295	2SC3264			MT-200 (fixed at two points)

LAPT: Multi-Emitter for High Frequency

### Output Transistors with Temperature Compensating Function (Refer to our Web site for applications)

Part Number	P <sub>c</sub> (W)	I <sub>c</sub> (A)	V <sub>CE0</sub> (V)	Package
STD01P	100	10	150	TO3P-5pin
STD03P	160	15	160	TO3P-5pin

### Driver and Temperature Compensating Transistors

Part Number	P <sub>c</sub> (W)	V <sub>CE0</sub> (V)	I <sub>c</sub> (A)	h <sub>FE</sub> (min)	f <sub>T</sub> (MHz)	Package	Remarks
2SC4495	25	50	3	500	40	TO-220F (FM20)	For temperature compensation
2SA1859	20	150	2	60	60/120	TO-220F (FM20)	Driver
2SA1859A	20	180	2	60	60/120	TO-220F (FM20)	Driver
2SA1667	25	150	2	60	20/15	TO-220F (FM20)	Driver
2SA1668	25	200	2	60	20/15	TO-220F (FM20)	Driver

Refer to our Web site for the h<sub>FE</sub> ranks.

## Switching Transistors

### ■DC-DC Converter

Part Number	V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	I <sub>c</sub> (A)	P <sub>c</sub> (W)	Package
2SC4024	100	50	10	35	TO-220F
2SC4131			15	60	TO-3PF
2SC4153	200	120	7	30	TO-220F
2SC3835				70	TO-3P

### ■For AC100V Input

Part Number	V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	I <sub>c</sub> (A)	P <sub>c</sub> (W)	Package
2SC4138	500	400	10	80	TO-3P
2SC5071			12	100	TO-3P
2SC4140			18	130	TO-3P
2SC5130	600	400	5	30	TO-220F
2SC4546			7	30	TO-220F

### ■For AC200V Input

Part Number	V <sub>CB0</sub> (V)	V <sub>CE0</sub> (V)	I <sub>c</sub> (A)	P <sub>c</sub> (W)	Package	
2SC4518	900	550	5	35	TO-220F	
2SC5287				80	TO-3P	
2SC3927			10	120	TO-3P	
2SC4706		600	14	130	TO-3P	
2SC4304		800	800	3	35	TO-220F
2SC4445				60	TO-3PF	
2SC4300				5	75	TO-3PF
2SC4301				7	80	TO-3PF
2SC4518A		1000	550	5	35	TO-220F

## Specifications List by Part Number

Part Number	Applications	Absolute Maximum Ratings				I <sub>CBO</sub>		h <sub>FE</sub>		Conditions	
		V <sub>CBO</sub>	V <sub>CEO</sub>	I <sub>C</sub>	P <sub>c</sub>	I <sub>CBO</sub> (μA)	Conditions V <sub>CB</sub> (V)	min	max	Conditions	
		(V)	(V)	(A)	(W)					V <sub>CE</sub> (V)	I <sub>C</sub> (A)
2SA1186	Audio, general-purpose	-150	-150	-10	100	-100	-150	50	180	-4	-3
2SA1215	Audio, general-purpose	-160	-160	-15	150	-100	-160	50	180	-4	-5
2SA1216	Audio, general-purpose	-180	-180	-17	200	-100	-180	30	180	-4	-8
2SA1294	Audio, general-purpose	-230	-230	-15	130	-100	-230	50	140	-4	-5
2SA1295	Audio, general-purpose	-230	-230	-17	200	-100	-230	50	140	-4	-5
2SA1303	Audio, general-purpose	-150	-150	-14	125	-100	-150	50	180	-4	-5
2SA1386	Audio, general-purpose	-160	-160	-15	130	-100	-160	50	180	-4	-5
2SA1386A	Audio, general-purpose	-180	-180	-15	130	-100	-180	50	180	-4	-5
2SA1488	Audio, general-purpose	-60	-60	-4	25	-100	-60	40		-4	-1
2SA1488A	Audio, general-purpose	-80	-80	-4	25	-100	-80	40		-4	-1
2SA1492	Audio, general-purpose	-180	-180	-15	130	-100	-180	50	180	-4	-3
2SA1493	Audio, general-purpose	-200	-200	-15	150	-100	-200	50	180	-4	-5
2SA1494	Audio, general-purpose	-200	-200	-17	200	-100	-200	50	180	-4	-8
2SA1567	DC motor driver, chopper regulator, general-purpose	-50	-50	-12	35	-100	-50	50		-1	-6
2SA1568	DC motor driver, chopper regulator, general-purpose	-60	-60	±12	35	-100	-60	50		-1	-6
2SA1667	TV vertical output, audio output driver, general-purpose	-150	-150	-2	25	-10	-150	60		-10	-0.7
2SA1668	TV vertical output, audio output driver, general-purpose	-200	-200	-2	25	-10	-200	60		-10	-0.7
2SA1673	Audio, general-purpose	-180	-180	-15	85	-10	-180	50	180	-4	-3
2SA1693	Audio, general-purpose	-80	-80	-6	60	-10	-80	50	180	-4	-2
2SA1694	Audio, general-purpose	-120	-120	-8	80	-10	-120	50	180	-4	-3
2SA1695	Audio, general-purpose	-140	-140	-10	100	-10	-140	50	180	-4	-3
2SA1725	Audio, general-purpose	-80	-80	-6	30	-10	-80	50	180	-4	-2
2SA1746	Chopper regulator, switch, general-purpose	-70	-50	-12 (Pulse -20)	60	-10	-70	50		-1	-5
2SA1859	Audio output driver, TV velocity modulation	-150	-150	-2	20	-10	-150	60	240	-10	-0.7
2SA1859A	Audio output driver, TV velocity modulation	-180	-180	-2	20	-10	-180	60	240	-10	-0.7
2SA1860	Audio, general-purpose	-150	-150	-14	80	-100	-150	50	180	-4	-5
2SA1907	Audio, general-purpose	-80	-80	-6	60	-10	-80	50	180	-4	-2
2SA1908	Audio, general-purpose	-120	-120	-8	75	-10	-120	50	180	-4	-3
2SA1909	Audio, general-purpose	-140	-140	-10	80	-10	-140	50	180	-4	-3
2SA2151	Audio, general-purpose	-200	-200	-15	160	-10	-200	50	180	-4	-3
2SA2151A	Audio, general-purpose	-230	-230	-15	160	-10	-230	50	180	-4	-3
2SA2223	Audio, general-purpose	-230	-230	-15	160	-10	-230	40	140	-4	-5
2SB1257	Solenoid/relay/motor driver, general-purpose	-60	-60	-4 (Pulse -6)	25	-10	-60	2000		-4	-3
2SB1258	Solenoid/relay/motor driver, general-purpose	-100	-100	-6 (Pulse -10)	30	-10	-100	1000		-2	-3
2SB1259	Solenoid/relay/motor driver, general-purpose	-120	-120	-10 (Pulse -15)	30	-10	-120	2000		-4	-5
2SB1351	Printer head/solenoid/relay/motor driver, general-purpose	-60	-60	-12 (Pulse -20)	30	-10	-60	2000		-4	-10
2SB1382	Chopper regulator, DC motor driver, general-purpose	-120	-120	-16 (Pulse -26)	75	-10	-120	2000		-4	-8
2SB1383	Chopper regulator, DC motor driver, general-purpose	-120	-120	-25 (Pulse -40)	120	-10	-120	2000		-4	-12
2SB1420	Chopper regulator, DC motor driver, general-purpose	-120	-120	-16 (Pulse -26)	80	-10	-120	2000		-4	-8
2SB1559	Audio, series regulator, general-purpose	-160	-150	-8	80	-100	-160	5000	30000	-4	-6
2SB1560	Audio, series regulator, general-purpose	-160	-150	-10	100	-100	-160	5000	30000	-4	-7
2SB1570	Audio, series regulator, general-purpose	-160	-150	-12	150	-100	-160	5000	30000	-4	-7
2SB1587	Audio, series regulator, general-purpose	-160	-150	-8	75	-100	-160	5000	30000	-4	-6
2SB1588	Audio, series regulator, general-purpose	-160	-150	-10	80	-100	-160	5000	30000	-4	-7
2SB1647	Audio, series regulator, general-purpose	-150	-150	-15	130	-100	-150	5000	30000	-4	-10
2SB1648	Audio, series regulator, general-purpose	-150	-150	-17	200	-100	-150	5000	30000	-4	-10
2SB1649	Audio, series regulator, general-purpose	-150	-150	-15	85	-100	-150	5000	30000	-4	-10

Electrical Characteristics													Complementary	Package	Mass (g)
V <sub>CE (sat)</sub> (V) max	V <sub>BE (sat)</sub> (V) max	Conditions		f <sub>T</sub> MHz	Conditions		Switching Time			C <sub>ob</sub> (pF)					
		I <sub>c</sub> (A)	I <sub>B</sub> (A)		V <sub>CE</sub> (V)	I <sub>E</sub> (A)	t <sub>on</sub> (μS)	t <sub>stg</sub> (μS)	t <sub>r</sub> (μS)						
-2.0		-5	-0.5	60	-12	1	0.25typ	0.8typ	0.2typ	110typ	2SC2837	TO-3P (MT-100)			
-2.0		-5	-0.5	50	-12	2	0.25typ	0.85typ	0.2typ	400typ	2SC2921	MT-200	18.4		
-2.0		-8	-0.8	40	-12	2	0.3typ	0.7typ	0.2typ	500typ	2SC2922	MT-200	18.4		
-2.0		-5	-0.5	35	-12	2	0.35typ	1.5typ	0.3typ	500typ	2SC3263	TO-3P (MT-100)	6.0		
-2.0		-5	-0.5	35	-12	2	0.35typ	1.5typ	0.3typ	500typ	2SC3264	MT-200	18.4		
-2.0		-5	-0.5	50	-12	2	0.25typ	0.85typ	0.2typ	400typ	2SC3284	TO-3P (MT-100)	6.0		
-2.0		-5	-0.5	40	-12	2	0.3typ	0.7typ	0.2typ	500typ	2SC3519	TO-3P (MT-100)	6.0		
-2.0		-5	-0.5	40	-12	2	0.3typ	0.7typ	0.2typ	500typ	2SC3519A	TO-3P (MT-100)	6.0		
-0.5		-2	-0.2	15	-12	0.2	0.25typ	0.75typ	0.25typ	90typ	2SC3851	TO-220F (FM20)	2.0		
-0.5		-2	-0.2	15	-12	0.2	0.25typ	0.75typ	0.25typ	90typ	2SC3851A	TO-220F (FM20)	2.0		
-2.0		-5	-0.5	20	-12	0.5	0.6typ	0.9typ	0.2typ	500typ	2SC3856	TO-3P (MT-100)	6.0		
-3.0		-10	-1	20	-12	0.5	0.3typ	0.9typ	0.2typ	400typ	2SC3857	MT-200	18.4		
-2.5		-10	-1	20	-12	1	0.6typ	0.9typ	0.2typ	500typ	2SC3858	MT-200	18.4		
-0.35		-6	-0.3	40	-12	0.5	0.4typ	0.4typ	0.2typ	330typ		TO-220F (FM20)	2.0		
-0.35		-6	-0.3	40	-12	0.5	0.4typ	0.4typ	0.2typ	330typ		TO-220F (FM20)	2.0		
-1.0		-0.7	-0.07	20	-12	0.2	0.4typ	1.5typ	0.5typ	60typ	2SC4381	TO-220F (FM20)	2.0		
-1.0		-0.7	-0.07	20	-12	0.2	0.4typ	1.5typ	0.5typ	60typ	2SC4382	TO-220F (FM20)	2.0		
-2.0		-5	-0.5	20	-12	0.5	0.6typ	0.9typ	0.2typ	500typ	2SC4388	TO-3PF (FM100)	6.5		
-1.5		-2	-0.2	20	-12	0.5	0.18typ	1.1typ	0.21typ	150typ	2SC4466	TO-3P (MT-100)	6.0		
-1.5		-3	-0.3	20	-12	0.5	0.14typ	1.4typ	0.21typ	300typ	2SC4467	TO-3P (MT-100)	6.0		
-0.5		-5	-0.5	20	-12	0.5	0.17typ	1.86typ	0.27typ	400typ	2SC4468	TO-3P (MT-100)	6.0		
-0.5		-2	-0.2	20	-12	0.5	0.18typ	1.1typ	0.21typ	150typ	2SC4511	TO-220F (FM20)	2.0		
-0.5	-1.2	-5	-0.08	25	-12	1	0.5typ	0.6typ	0.3typ	400typ		TO-3PF (FM100)	6.5		
-1.0		-0.7	-0.07	60	-12	0.7	0.5typ	1typ	0.5typ	30typ	2SC4883	TO-220F (FM20)	2.0		
-1.0		-0.7	-0.07	60	-12	0.7	0.5typ	1typ	0.5typ	30typ	2SC4883A	TO-220F (FM20)	2.0		
-2.0		-5	-0.5	50	-12	2	0.25typ	0.85typ	0.2typ	400typ	2SC4886	TO-3PF (FM100)	6.5		
-0.5		-12	-0.2	20	-12	0.5	0.18typ	1.1typ	0.21typ	150typ	2SC5099	TO-3PF (FM100)	6.5		
-0.5		-3	-0.3	20	-12	0.5	0.14typ	1.4typ	0.21typ	300typ	2SC5100	TO-3PF (FM100)	6.5		
-0.5		-5	-0.5	20	-12	0.5	0.17typ	1.86typ	0.27typ	400typ	2SC5101	TO-3PF (FM100)	6.5		
-0.5		-5	-0.5	20	-12	-0.5	-	-	-	450typ	2SC6011	TO-3P (MT-100)	6.0		
-0.5		-5	-0.5	20	-12	-0.5	-	-	-	450typ	2SC6011A	TO-3P (MT-100)	6.0		
-0.5		-5	-0.5	35	-12	2	-	-	-	500typ	2SC6145	TP-3P (MT-100)	6.0		
-1.5	-2.0	-3	-0.006	200	-12	0.2	0.4typ	0.8typ	0.6typ	75typ	2SD2014	TO-220F (FM20)	2.0		
-1.5	-2.0	-3	-0.006	100	-12	0.2	0.6typ	1.6typ	0.5typ	100typ	2SD1785	TO-220F (FM20)	2.0		
-1.5	-2.0	-5	-0.01	100	-12	0.2	0.6typ	1.6typ	0.5typ	145typ	2SD2081	TO-220F (FM20)	2.0		
-1.5	-2.0	-10	-0.02	130	-12	1	0.7typ	1.5typ	0.6typ	170typ		TO-220F (FM20)	2.0		
-1.5	-2.5	-8	-0.016	50	-12	1	0.8typ	1.8typ	1typ	350typ	2SD2082	TO-3PF (FM100)	6.5		
-1.8	-2.5	-12	-0.024	50	-12	1	1typ	3typ	1typ	230typ	2SD2083	TO-3P (MT-100)	6.0		
-1.5	-2.5	-8	-0.016	50	-12	1	1typ	3typ	1typ	350typ		TO-3P (MT-100)	6.0		
-2.5	-3.0	-6	-0.006	65	-12	1	0.7typ	3.6typ	0.9typ	160typ	2SD2389	TO-3P (MT-100)	6.0		
-2.5	-3.0	-7	-0.007	50	-12	2	0.8typ	3typ	1.2typ	230typ	2SD2390	TO-3P (MT-100)	6.0		
-2.5	-3.0	-7	-0.007	50	-12	2	0.8typ	3typ	1.2typ	230typ	2SD2401	MT-200	18.4		
-2.5	-3.0	-6	-0.006	65	-12	1	0.7typ	3.6typ	0.9typ	160typ	2SD2438	TO-3PF (FM100)	6.5		
-2.5	-3.0	-7	-0.007	50	-12	2	0.8typ	3typ	1.2typ	230typ	2SD2439	TO-3PF (FM100)	6.5		
-2.5	-3.0	-10	-0.01	45	-12	2	0.7typ	1.6typ	1.1typ	320typ	2SD2560	TO-3P (MT-100)	6.0		
-2.5	-3.0	-10	-0.01	45	-12	2	0.7typ	1.6typ	1.1typ	320typ	2SD2561	MT-200	18.4		
-2.5	-3.0	-10	-0.01	45	-12	2	0.7typ	1.6typ	1.1typ	320typ	2SD2562	TO-3PF (FM100)	6.5		

Part Number	Applications	Absolute Maximum Ratings						I <sub>CBO</sub>		h <sub>FE</sub>			
		V <sub>CB0</sub>	V <sub>CE0</sub>	I <sub>c</sub>	P <sub>c</sub>	I <sub>CBO</sub> (μA)	Conditions V <sub>CB</sub> (V)	min	max	Conditions			
		(V)	(V)	(A)	(W)					V <sub>CE</sub>	I <sub>c</sub>		
										(V)	(A)		
2SC2837	Audio, general-purpose	150	150	10	100	100	150	50	180	4	3		
2SC2921	Audio, general-purpose	160	160	15	150	100	160	50	180	4	5		
2SC2922	Audio, general-purpose	180	180	17	200	100	180	30	180	4	8		
2SC3263	Audio, general-purpose	230	230	15	130	100	230	50	140	4	5		
2SC3264	Audio, general-purpose	230	230	17	200	100	230	50	140	4	5		
2SC3284	Audio, general-purpose	150	150	14	125	100	150	50	180	4	5		
2SC3519	Audio, general-purpose	160	160	15	130	100	160	50	180	4	5		
2SC3519A	Audio, general-purpose	180	180	15	130	100	180	50	180	4	5		
2SC3835	Humidifier, DC-DC converter, general-purpose	200	120	7 (Pulse 14)	70	100	200	70	220	4	3		
2SC3851	Audio, PPC high voltage power supply, general-purpose	80	60	4	25	100	80	40	320	4	1		
2SC3851A	Audio, PPC high voltage power supply, general-purpose	100	80	4	25	100	100	40	320	4	1		
2SC3852	Solenoid/motor driver/series regulator, general-purpose	80	60	3	25	10	80	500		4	0.5		
2SC3852A	Solenoid/motor driver/series regulator, general-purpose	100	80	3	25	10	100	500		4	0.5		
2SC3856	Audio, general-purpose	200	180	15	130	100	200	80	180	4	3		
2SC3857	Audio, general-purpose	200	200	15	150	100	200	50	180	4	5		
2SC3858	Audio, general-purpose	200	200	17	200	100	200	50	180	4	8		
2SC3927	Switching regulator, general-purpose	900	550	10 (Pulse 15)	120	100	800	10	28	4	5		
2SC4024	DC-DC converter, emergency lamp inverter, general-purpose	100	50	10	35	100	100	300	1600	4	1		
2SC4131	DC-DC converter, emergency lamp inverter, general-purpose	100	50	15 (Pulse 20)	60	10	100	60	360	1	5		
2SC4138	Switching regulator, general-purpose	500	400	10 (Pulse 20)	80	100	500	10	30	4	6		
2SC4140	Switching regulator, general-purpose	500	400	18 (Pulse 36)	130	100	500	10	30	4	10		
2SC4153	Humidifier, DC-DC converter, general-purpose	200	120	7 (Pulse 14)	30	100	200	70	220	4	3		
2SC4300	Switching regulator, general-purpose	900	800	5 (Pulse 10)	75	100	800	10	30	4	2		
2SC4301	Switching regulator, lighting inverter, general-purpose	900	800	7 (Pulse 14)	80	100	800	10	30	4	3		
2SC4304	Switching regulator, general-purpose	900	800	3 (Pulse 6)	35	100	800	10	30	4	0.7		
2SC4381	TV vertical output, audio output driver, general-purpose	150	150	2	25	10	150	60		10	0.7		
2SC4382	TV vertical output, audio output driver, general-purpose	200	200	2	25	10	200	60		10	0.7		
2SC4388	Audio, general-purpose	200	180	15	85	10	200	50	180	4	3		
2SC4445	Switching regulator, general-purpose	900	800	3 (Pulse 6)	60	100	800	10	30	4	0.7		
2SC4466	Audio, general-purpose	120	80	6	60	10	120	50	180	4	2		
2SC4467	Audio, general-purpose	160	120	8	80	10	160	50	180	4	3		
2SC4468	Audio, general-purpose	200	140	10	100	10	200	50	180	4	3		
2SC4495	For audio temperature compensation, general-purpose	80	50	3	25	10	80	500		4	0.5		
2SC4511	Audio, general-purpose	120	80	6	30	10	120	50	180	4	2		
2SC4518	Switching regulator, lighting inverter, general-purpose	900	550	5 (Pulse 10)	35	100	800	10	25	4	1.8		
2SC4518A	Switching regulator, lighting inverter, general-purpose	1000	550	5 (Pulse 10)	35	100	800	10	25	4	1.8		
2SC4546	Switching regulator, lighting inverter, general-purpose	600	400	7 (Pulse 14)	30	100	600	10	25	4	3		
2SC4706	Switching regulator, general-purpose	900	600	14 (Pulse 28)	130	100	800	10	25	4	7		
2SC4883	Audio output driver, TV velocity modulation	150	150	2	20	10	150	60	240	10	0.7		
2SC4883A	Audio output driver, TV velocity modulation	180	180	2	20	10	180	60	240	10	0.7		
2SC4886	Audio, general-purpose	150	150	14	80	100	150	50	180	4	5		
2SC5071	Switching regulator, general-purpose	500	400	12 (Pulse 24)	100	100	500	10	30	4	7		
2SC5099	Audio, general-purpose	120	80	6	60	10	120	50	180	4	2		
2SC5100	Audio, general-purpose	160	120	8	75	10	160	50	180	4	3		
2SC5101	Audio, general-purpose	200	140	10	80	10	200	50	180	4	3		
2SC5130	Switching regulator, general-purpose	600	400	5 (Pulse 10)	30	100	500	10	30	4	1.5		
2SC5287	Switching regulator, general-purpose	900	550	5 (Pulse 10)	80	100	800	10	25	4	1.8		
2SC6011	Audio, general-purpose	200	200	15	160	10	200	50	180	4	3		
2SC6011A	Audio, general-purpose	230	230	15	160	10	230	50	180	4	3		
2SC6145	Audio, general-purpose	230	230	15	160	10	230	40	140	4	5		

Electrical Characteristics												Complementary	Package	Mass (g)
V <sub>CE</sub> (sat)	V <sub>BE</sub> (sat)	Conditions			f <sub>T</sub>		Switching Time			C <sub>ob</sub>				
(V)	(V)	I <sub>c</sub>	I <sub>b</sub>	MHz	V <sub>CE</sub>	I <sub>E</sub>	t <sub>on</sub>	t <sub>stg</sub>	t <sub>f</sub>					
max	max	(A)	(A)		(V)	(A)	(μS)	(μS)	(μS)	(pF)				
2.0		5	0.5	70	12	-1	0.2typ	1.4typ	0.35typ	60typ	2SA1186	TO-3P (MT-100)	6.0	
2.0		5	0.5	60	12	-2	0.2typ	1.5typ	0.35typ	200typ	2SA1215	MT-200	18.4	
2.0		8	0.8	50	12	-2	0.2typ	1.3typ	0.45typ	250typ	2SA1216	MT-200	18.4	
2.0		5	0.5	60	12	-2	0.3typ	2.4typ	0.5typ	250typ	2SA1294	TO-3P (MT-100)	6.0	
2.0		5	0.5	60	12	-2	0.3typ	2.4typ	0.5typ	250typ	2SA1295	MT-200	18.4	
2.0		5	0.5	60	12	-2	0.2typ	1.5typ	0.35typ	200typ	2SA1303	TO-3P (MT-100)	6.0	
2.0		5	0.5	50	12	-2	0.2typ	1.3typ	0.45typ	250typ	2SA1386	TO-3P (MT-100)	6.0	
2.0		5	0.5	50	12	-2	0.2typ	1.3typ	0.45typ	250typ	2SA1386A	TO-3P (MT-100)	6.0	
0.5	1.2	3	0.3	30	12	-0.5	0.5max	3max	0.5max	110typ		TO-3P (MT-100)	6.0	
0.5		2	0.2	15	12	-0.2	0.2typ	1typ	0.3typ	60typ	2SA1488	TO-220F (FM20)	2.0	
0.5		2	0.2	15	12	-0.2	0.2typ	1typ	0.3typ	60typ	2SA1488A	TO-220F (FM20)	2.0	
0.5		2	0.05	15	12	-0.2	0.8typ	3typ	1.2typ	50typ		TO-220F (FM20)	2.0	
0.5		2	0.05	15	12	-0.2	0.8typ	3typ	1.2typ	50typ		TO-220F (FM20)	2.0	
2.0		5	0.5	20	12	-0.5	0.5typ	1.8typ	0.6typ	300typ	2SA1492	TO-3P (MT-100)	6.0	
3.0		10	1	20	12	-0.5	0.3typ	2.4typ	0.4typ	250typ	2SA1493	MT-200	18.4	
2.5		10	1	20	12	-1	0.5typ	1.8typ	0.6typ	300typ	2SA1494	MT-200	18.4	
0.5	1.2	5	1	6	12	-1	1max	5max	0.5max	105typ		TO-3P (MT-100)	6.0	
0.5		5	0.1	24	12	-0.5	0.5typ	2typ	0.5typ	150typ		TO-220F (FM20)	2.0	
0.5	1.2	5	0.08	18	12	-1	0.5typ	2typ	0.4typ	210typ		TO-3PF (FM100)	6.5	
0.5	1.3	6	1.2	10	12	-0.7	1max	3max	0.5max	85typ		TO-3P (MT-100)	6.0	
0.5	1.3	10	2	10	12	-2.0	1max	3max	0.5max	165typ		TO-3P (MT-100)	6.0	
0.5	1.2	3	0.3	30	12	-0.5	0.5max	3max	0.5max	110typ		TO-220F (FM20)	2.0	
0.5	1.2	2	0.4	6	12	-0.5	1max	5max	1max	75typ		TO-3PF (FM100)	6.5	
0.5	1.2	3	0.6	6	12	-1	1max	5max	1max	105typ		TO-3PF (FM100)	6.5	
0.5	1.2	7	0.14	15	12	-0.3	0.7max	4max	0.7max	50typ		TO-220F (FM20)	2.0	
1.0		7	0.07	15	12	-0.2	1typ	3typ	1.5typ	35	2SA1667	TO-220F (FM20)	2.0	
1.0		7	0.07	15	12	-0.2	1typ	3typ	1.5typ	35	2SA1668	TO-220F (FM20)	2.0	
2.0		5	0.5	20	12	-0.5	0.5max	1.8max	0.6max	300	2SA1673	TO-3PF (FM100)	6.5	
0.5	1.2	0.7	0.14	15	12	-0.3	0.7max	4max	0.7max	50		TO-3PF (FM100)	6.5	
1.5		2	0.2	20	12	-0.5	0.16typ	2.6typ	0.34typ	110	2SA1693	TO-3P (MT-100)	6.0	
1.5		3	0.3	20	12	-0.5	0.13typ	3.5typ	0.32typ	200	2SA1694	TO-3P (MT-100)	6.0	
0.5		5	0.5	20	12	-0.5	0.24typ	4.32typ	0.4typ	250	2SA1695	TO-3P (MT-100)	6.0	
0.5		4	0.02	40	12	-0.1	0.45typ	1.6typ	0.85typ	30		TO-220F (FM20)	2.0	
0.5		2	0.2	20	12	-0.5	0.16typ	2.6typ	0.34typ	110	2SA1725	TO-220F (FM20)	2.0	
0.5	1.2	1.8	0.36	6	12	-0.35	0.7max	4max	0.5max	50		TO-220F (FM20)	2.0	
0.5	1.2	1.8	0.36	6	12	-0.35	0.7max	4max	0.5max	50		TO-220F (FM20)	2.0	
0.7	1.3	3	0.6	10	12	-0.5	0.5max	2max	0.15max	55		TO-220F (FM20)	2.0	
0.5	1.2	7	1.4	6	12	-1.5	1max	5max	0.7max	160		TO-3P (MT-100)	6.0	
1.0		0.7	0.07	120	12	-0.7	0.5typ	1.5typ	0.5typ	30	2SA1859	TO-220F (FM20)	2.0	
1.0		0.7	0.07	120	12	-0.7	0.5typ	1.5typ	0.5typ	30	2SA1859A	TO-220F (FM20)	2.0	
2.0		5	0.5	60	12	-2	0.26typ	1.5typ	0.35typ	200	2SA1860	TO-3PF (FM100)	6.5	
0.5	1.3	7	1.4	10	12	-1	1max	3max	0.5max	105		TO-3P (MT-100)	6.0	
0.5		2	0.2	20	12	-0.5	0.16typ	2.6typ	0.34typ	110	2SA1907	TO-3PF (FM100)	6.5	
0.5		3	0.3	20	12	-0.5	0.13typ	3.5typ	0.32typ	200	2SA1908	TO-3PF (FM100)	6.5	
0.5		5	0.5	20	12	-0.5	0.24typ	4.32typ	0.4typ	250	2SA1909	TO-3PF (FM100)	6.5	
0.5	1.3	1.5	0.3	20	12	-0.3	1max	2max	0.3max	30		TO-220F (FM20)	2.0	
0.5	1.2	1.8	0.36	6	12	-0.35	0.7max	4max	0.5max	50		TO-3P (MT-100)	6.0	
0.5		5	0.5	20	12	-0.5	-	-	-	270	2SA2151	TO-3P (MT-100)	6.0	
0.5		5	0.5	20	12	-0.5	-	-	-	270	2SA2151A	TO-3P (MT-100)	6.0	
0.5		5	0.5	60	12	-2	-	-	-	250	2SA2223	TP-3P (MT-100)	6.0	

Part Number	Applications	Absolute Maximum Ratings				I <sub>CBO</sub>		h <sub>FE</sub>		Conditions	
		V <sub>CB0</sub>	V <sub>CE0</sub>	I <sub>c</sub>	P <sub>c</sub>	I <sub>CBO</sub> ( $\mu$ A)	Conditions V <sub>CB</sub> (V)	min	max	Conditions	
		(V)	(V)	(A)	(W)					V <sub>CE</sub>	I <sub>c</sub>
										(V)	(A)
2SD1785	Solenoid/relay/motor driver/series regulator, general-purpose	120	120	6 (Pulse 10)	30	10	120	2000		2	3
2SD1796	Solenoid/relay/motor driver, general-purpose	60 $\pm$ 10	60 $\pm$ 10	4	25	10	50	2000		4	3
2SD2014	Solenoid/relay/motor driver/series regulator, general-purpose	120	80	4	25	10	120	2000		2	3
2SD2015	Solenoid/relay/motor driver, general-purpose	150	120	4	25	10	150	2000		2	2
2SD2016	Igniter, relay, general-purpose	200	200	3	25	10	200	1000	15000	4	1
2SD2017	Solenoid/relay/motor driver, general-purpose	300	250	6	35	100	300	2000		2	2
2SD2045	Solenoid/motor driver, general-purpose	120	120	6 (Pulse 10)	50	10	120	2000		2	3
2SD2081	Solenoid/motor driver, general-purpose	120	120	10 (Pulse 15)	30	10	120	2000		4	5
2SD2082	Solenoid/motor driver, general-purpose	120	120	16 (Pulse 26)	75	10	120	2000		4	8
2SD2083	Solenoid/motor driver, general-purpose	120	120	25 (Pulse 40)	120	10	120	2000		4	12
2SD2141	Igniter, solenoid, motor driver, general-purpose	380 $\pm$ 50	380 $\pm$ 50	6 (Pulse 10)	35	10	330	1500		2	3
2SD2389	Audio, series regulator, general-purpose	160	150	8	80	100	160	5000	30000	4	6
2SD2390	Audio, series regulator, general-purpose	160	150	10	100	100	160	5000	30000	4	7
2SD2401	Audio, series regulator, general-purpose	160	150	12	150	100	160	5000	30000	4	7
2SD2438	Audio, series regulator, general-purpose	160	150	8	75	100	160	5000	30000	4	6
2SD2439	Audio, series regulator, general-purpose	160	150	10	80	100	160	5000	30000	4	7
2SD2560	Audio, series regulator, general-purpose	150	150	15	130	100	150	5000	30000	4	10
2SD2561	Audio, series regulator, general-purpose	150	150	17	200	100	150	5000	30000	4	10
2SD2562	Audio, series regulator, general-purpose	150	150	15	85	100	150	5000	30000	4	10
2SD2641	Series regulator, general-purpose	110	110	6	60	100	110	5000	30000	4	5
2SD2642	Series regulator, general-purpose	110	110	6	30	100	110	5000	30000	4	5
2SD2643	Series regulator, general-purpose	110	110	6	60	100	110	5000	30000	4	5
STD01N	Audio	150	150	10	100	100	150	5000	20000	4	6
STD01P	Audio	-150	-150	-10	100	-100	-150	5000	20000	-4	-6
STD03N	Audio	160	160	15	160	100	160	5000	20000	4	10
STD03P	Audio	-160	-160	-15	160	-100	-160	5000	20000	-4	-10

Electrical Characteristics													Complementary	Package	Mass (g)
V <sub>CE (sat)</sub> (V) max	V <sub>BE (sat)</sub> (V) max	Conditions		f <sub>T</sub> MHz	Conditions		Switching Time			C <sub>ob</sub> (pF)					
		I <sub>c</sub> (A)	I <sub>B</sub> (A)		V <sub>CE</sub> (V)	I <sub>E</sub> (A)	t <sub>on</sub> (μS)	t <sub>stg</sub> (μS)	t <sub>r</sub> (μS)						
1.5		2	3mA	100	12	-0.1	0.5typ	5.5typ	1.5typ	70	2SB1258	TO-220F (FM20)			
1.5		3	10mA	60	12	-0.2	1typ	4typ	1.5typ	45		TO-220F (FM20)	2.0		
1.5	2.0	3	3mA	75	12	-0.1	1typ	4typ	1.5typ	45	2SB1257	TO-220F (FM20)	2.0		
1.5	2.0	2	2mA	40	12	-0.1	0.6typ	5typ	2typ	40		TO-220F (FM20)	2.0		
1.5	2.0	1	1.5mA	90	12	-0.1				40		TO-220F (FM20)	2.0		
1.5	2.0	2	2mA	20	12	-1	0.6typ	16typ	3typ	65		TO-220F (FM20)	2.0		
1.5	2.0	3	3mA	50	12	-1	0.5typ	5.5typ	1.5typ	70		TO-3PF (FM100)	6.5		
1.5	2.0	5	5mA	60	12	-0.5				95	2SB1259	TO-220F (FM20)	2.0		
1.5	2.5	8	16mA	20	12	-1	0.6typ	7typ	1.5typ	210	2SB1382	TO-3PF (FM100)	6.5		
1.8	2.5	12	24mA	20	12	-1	1typ	6typ	1typ	340	2SB1383	TO-3P (MT-100)	6.0		
1.5		4	20mA	20	12	-0.5				95		TO-220F (FM20)	2.0		
2.5	3.0	6	6mA	80	12	-1	0.6typ	10typ	0.9typ	85	2SB1559	TO-3P (MT-100)	6.0		
2.5	3.0	7	7mA	55	12	-2	0.5typ	10typ	1.1typ	95	2SB1560	TO-3P (MT-100)	6.0		
2.5	3.0	7	7mA	55	12	-2	0.5typ	10typ	1.1typ	95	2SB1570	MT-200	18.4		
2.5	3.0	6	6mA	80	12	-1	0.6typ	10typ	0.9typ	85	2SB1587	TO-3PF (FM100)	6.5		
2.5	3.0	7	7mA	55	12	-2	0.5typ	10typ	1.1typ	95	2SB1588	TO-3PF (FM100)	6.5		
2.5	3.0	10	10mA	70	12	-2	0.8typ	4typ	1.2typ	120	2SB1647	TO-3P (MT-100)	6.0		
2.5	3.0	10	10mA	70	12	-2	0.8typ	4typ	1.2typ	120	2SB1648	MT-200	18.4		
2.5	3.0	10	10mA	70	12	-2	0.8typ	4typ	1.2typ	120	2SB1649	TO-3PF (FM100)	6.5		
2.5	3.0	5	5mA	60	12	-2	0.8typ	6.2typ	1.1typ	55		TO-3P (MT-100)	6.0		
2.5	3.0	5	5mA	60	12	-0.5	0.8typ	6.2typ	1.1typ	55		TO-220F (FM20)	2.0		
2.5	3.0	5	5mA	60	12	-0.5	0.8typ	6.2typ	1.1typ	55		TO-3PF (FM100)	6.5		
2.0	2.5	6	6mA								STD01P	TO3P-5Pin	6.2		
-2.0	-2.5	-6	-6mA								STD01N	TO3P-5Pin	6.2		
2.0	2.5	10	10mA								STD03P	TO-3P-5pin	6.2		
-2.0	-2.5	-10	-10mA								STD03N	TO-3P-5pin	6.2		



# Selection Guide

## By $V_{DSS}$

$V_{DSS}$ (V)	$R_{DS(ON)}$ ( $\Omega$ ) max	$I_D$ (A)	$P_D$ (W)	Part Number	Package
40	6.0m	$\pm 70$	80	2SK3800	TO220S (Surface-mount)
	6.0m	$\pm 70$	100	2SK3801	TO3P(MT100)
	9m	$\pm 60$	60	FKV460S	TO220S (Surface-mount)
50	10m	$\pm 75$	40	FKV575	TO220F(FM20)
	13m	$\pm 50$	35	FKV550T	TO220F(FM20)
	15m	$\pm 50$	35	FKV550N	TO220F(FM20)
	15m	$\pm 50$	85	EKV550	TO220
60	6.0m	$\pm 70$	90	2SK3710A	TO220S (Surface-mount)
	6.0m	$\pm 70$	130	2SK3711	TO3P(MT100)
	14m	$\pm 60$	60	FKV660S	TO220S (Surface-mount)
	28m	$\pm 30$	40	2SK2420	TO220F(FM20)
100	80m	$\pm 20$	35	2SK2779	TO220F(FM20)
	0.175	$\pm 12$	30	2SK2778	TO220F(FM20)
200	53m	$\pm 45$	40	FKP202	TO220F(FM20)
	53m	$\pm 45$	95	SKP202	TO263 (Surface-mount)
	0.175	$\pm 18$	35	2SK3003	TO220F(FM20)
250	43m	$\pm 50$	85	FKP250A	TO3PF(FM100)
	75m	$\pm 25$	40	FKP252	TO220F(FM20)
	95m	$\pm 20$	40	FKP253	TO220F(FM20)
	95m	$\pm 20$	40	SKP253	TO263 (Surface-mount)
	0.25	$\pm 18$	35	2SK3004	TO220F(FM20)
280	53m	$\pm 40$	85	FKP280A	TO3PF(FM100)
300	65m	$\pm 30$	85	FKP300A	TO3PF(FM100)
330	63m	$\pm 30$	85	FKP330C	TO3PF(FM100)
450	1.1	$\pm 7$	35	2SK2701A	TO220F(FM20)
	2.8	$\pm 3$	30	2SK2803	TO220F(FM20)
500	1.5	$\pm 5$	30	2SK3199	TO220F(FM20)
600	3.8	$\pm 2$	30	2SK2848	TO220F(FM20)
900	5.0	$\pm 3$	30	2SK2943	TO220F(FM20)

## Specifications List by Part Number

Part Number	Absolute Maximum Ratings						I <sub>gss</sub>		I <sub>oss</sub>		V <sub>TH</sub>				
	V <sub>DSS</sub>	V <sub>GSS</sub>	I <sub>D</sub>	I <sub>D (pulse)</sub>	P <sub>D</sub>	E <sub>AS</sub>	Conditions	Conditions	min	max	min	max	Conditions		
	(V)	(V)	(A)	(A)	(W)	(mJ)							(nA)	(V <sub>GS</sub> )	(V)
							max	(V)	(μA)					(V)	(μA)
2SK2420	60	±20	±30	±120	40	38	±100	±20		100	60	2.0	4.0	10	250
2SK2701A	450	±30	±7	±28	35	130	±100	±30		100	450	2.0	4.0	10	1m
2SK2778	100	±20	±12	±48	30	70	±100	±20		100	100	1.0	2.0	10	250
2SK2779	100	±20	±20	±80	35	200	±100	±20		100	100	1.0	2.0	10	250
2SK2803	450	±30	±3	±12	30	30	±100	±30		100	450	2.0	4.0	10	1m
2SK2848	600	±30	±2	±8	30	10	±100	±30		100	600	2.0	4.0	10	250
2SK2943	900	±30	±3	±12	30	60	±100	±30		100	900	2.0	4.0	10	1m
2SK3003	200	±20	±18	±72	35	120	±100	±20		100	200	2.0	4.0	10	1m
2SK3004	250	±20	±18	±72	35	120	±100	±20		100	250	2.0	4.0	10	1m
2SK3199	500	±30	±5	±20	30	35	±100	±30		100	500	2.0	4.0	10	1m
2SK3710A	60	±20	±70	±140	90	468	±10μ	±15		100	60	2.0	4.0	10	1m
2SK3711	60	±20	±70	±140	130		±10μ	+15		100	60	2.0	4.0	10	1m
2SK3800	40	±20	±70	±140	80	400	±10	±15		100	40	2.0	4.0	10	1m
2SK3801	40	±20	±70	±140	100	400	±10	±15		100	40	2.0	4.0	10	1m
EKV550	50	±20	±50	±150	85	150	±10μ	±20		100	50	3.0	4.2	10	250
FKP202	200	±30	±45	±180	40	200	±100	±30		100	200	3.0	4.5	10	1m
FKP250A	250	±30	±50	±200	85	400	±100	±30		100	250	3.0	4.5	10	1m
FKP252	250	±30	±25	±100	40	200	±100	±30		100	250	3.0	4.5	10	1m
FKP253	250	±30	±20	±80	40	160	±100	±30		100	250	3.0	4.5	10	1m
FKP280A	280	±30	±40	±160	85	400	±100	±30		100	280	3.0	4.5	10	1m
FKP300A	300	±30	±30	±120	85	400	±100	±30		100	300	3.0	4.5	10	1m
FKP330C	330	±30	±30	±120	85	500	±100	±30		100	330	3.0	4.5	10	1m
FKV460S	40	+20, -10	±60	±180	60		+10, -5μ	+20, -10		100	40	1.0	2.5	10	250
FKV550T	50	±20	±50	±150	35	150	±10μ	±20		100	50	1.0	2.5	10	250
FKV550N	50	±20	±50	±150	35	150	±10μ	±20		100	50	3.0	4.2	10	250
FKV575	50	±20	±75	±200	40	300	±100	±20		100	50	3.0	4.5	10	250
FKV660S	60	+20, -10	±60	±180	60		+10, -5μ	+20, -10		100	60	1.0	2.5	10	250
SKP202	200	±30	±45	±180	95	200	±100	±30		100	200	3.0	4.5	10	1m
SKP253	250	±30	±20	±80	40	160	±100	±30		100	250	3.0	4.5	10	1m

Electrical Characteristics																	Package	Mass (g)
R <sub>e</sub> (y/s)		Conditions		C <sub>iss</sub> (pF)	C <sub>rss</sub> (pF)	Conditions		R <sub>DS(ON)</sub>										
		V <sub>DS</sub> (V)	I <sub>D</sub> (A)			V <sub>GS</sub> (V)	V <sub>DS</sub> (V)	(Ω)		Conditions		(Ω)		Conditions				
(S)								typ	max	V <sub>GS</sub> (V)	I <sub>D</sub> (A)	typ	max	V <sub>GS</sub> (V)	I <sub>D</sub> (A)			
min	typ			typ	typ													
13	20	10	15	2200		0	25	21m	28m	10	15					TO220F(FM20)	2.0	
3.5	5	20	3.5	720	62	0	10	0.84	1.1	10	3.5					TO220F(FM20)	2.0	
7	11	10	6	740	75	0	10	105m	175m	10	6	130m	220m	4	6	TO220F(FM20)	2.0	
12	20	10	10	1630	180	0	10	60m	80m	10	10	75m	95m	4	10	TO220F(FM20)	2.0	
1.5	2.1	20	1.5	340	26	0	10	2.1	2.8	10	1.5					TO220F(FM20)	2.0	
1.2	1.7	20	1	290	30	0	10	3	3.8	10	1					TO220F(FM20)	2.0	
1.8	2.8	20	1.5	600	40	0	10	4	5	10	1.5					TO220F(FM20)	2.0	
7	11	10	9	850	250	0	10	130m	175m	10	9					TO220F(FM20)	2.0	
7	11	10	9	850	250	0	10	0.2	0.25	10	9					TO220F(FM20)	2.0	
3.5	5.2	20	2.5	650	110	0	10	1.2	1.5	10	2.5					TO220F(FM20)	2.0	
30	80	10	35	8000	1000	0	10	5m	6m	10	35					TO220S(Surface-mount)	1.5	
30	80	10	35	8000	1000	0	10	5m	6m	10	35					TO3P(MT100)	6.0	
30	50	10	35	5100	860	0	10	5m	6m	10	35					TO220S(Surface-mount)	1.5	
30	50	10	35	5100	860	0	10	5m	6m	10	35					TO3P(MT100)	6.0	
17		10	25	2000	500	0	10	12m	15m	10	25					TO220	2.0	
18	28	10	22	2000	80	0	25	45m	53m	10	22					TO220F(FM20)	2.0	
30	42	10	25	3800	210	0	25	37m	43m	10	25					TO3PF(FM100)	6.5	
13	21	10	12	2000	70	0	25	68m	75m	10	12					TO220F(FM20)	2.0	
8	17	10	10	1600	50	0	25	86m	95m	10	10					TO220F(FM20)	2.0	
25	38	10	20	3800	190	0	25	46m	53m	10	20					TO3PF(FM100)	6.5	
20	33	10	15	3800	180	0	25	57m	65m	10	15					TO3PF(FM100)	6.5	
23	37	10	15	4600	220	0	25	50m	63m	10	15					TO3PF(FM100)	6.5	
20		10	25	2800	600	0	10	7m	9m	10	25					TO220S(Surface-mount)	1.5	
20		10	25	2700	500	0	10	10m	13m	10	25					TO220F(FM20)	2.0	
17		10	25	2000	500	0	10	12m	15m	10	25					TO220F(FM20)	2.0	
30		10	37	3200	750	0	10	7m	10m	10	37					TO220F(FM20)	2.0	
20		10	25	2500	150	0	10	11m	14m	10	25					TO220S(Surface-mount)	1.5	
18	28	10	22	2000	80	0	25	45m	53m	10	22					TO263(Surface-mount)	1.5	
8	17	10	10	1600	50	0	25	86m	95m	10	10					TO263(Surface-mount)	1.5	



## Selection Guide

### By $V_{CES}$

$V_{CES}$ (V)	$I_C$ (A)	$P_C$ (W)	Part Number	Package
330	20	35	FGT312	TO220F(FM20)
330	30	35	FGT313	TO220F(FM20)
400	20	35	FGT412	TO220F(FM20)
600	20	35	FGT612	TO220F(FM20)
600	30	60	FGM603	TO3PF(FM100)
600	30	60	FGM623S	TO3PF(FM100)
600	50	150	MGD623N	TO3P(MT100)
600	50	150	MGD623S	TO3P(MT100)

**Specifications List by Part Number**

Part Number	Absolute Maximum Ratings (Ta=25°C)																						
	V <sub>CE(s)</sub> (V)	V <sub>GE</sub> (V)	I <sub>c</sub> (A)	I <sub>c(pulse)</sub> (A)	P <sub>c</sub> (Ta=25°C) (W)	I <sub>GES</sub>		I <sub>CES</sub>		V <sub>GE(th)</sub>				V <sub>CE(sat)</sub>				C <sub>ies</sub>	C <sub>oes</sub>	C <sub>res</sub>			
						(nA)	V <sub>GE</sub> (V)	(μA)	V <sub>CE</sub> (V)	(V)	I <sub>c</sub> (mA)	V <sub>CE</sub> (V)	(V)	I <sub>c</sub> (A)	V <sub>GE</sub> (V)	(pF)	(pF)	(pF)	Conditions				
																			V <sub>CE</sub> (V)	V <sub>GE</sub> (V)	V <sub>CE</sub> (V)	V <sub>GE</sub> (V)	
max	max	max	max	max	max	max	max	min	max	max	max	max	max	max	max	max	max	max	max	max	max	max	
FGM603	600	±20	30	90	60	±100	±20	100	600	4	7	1	10	1.6	2.0	30	15	4600	110	80	20	0	
FGM623S	600	±30	30	100	60	±500	±30	100	600	3	6	1	10	1.5	1.7	30	15	2500	150	80	20	0	
FGT312	330	±30	20	120	35	±100	±30	100	330	3	6	1	10	1.3	1.7	20	15	1200	130	65	20	0	
FGT313	330	±30	30	200	35	±100	±30	100	330	3	6	1	10	1.3	1.7	30	15	2400	110	60	30	0	
FGT412	400	±30	20	120	35	±100	±30	100	400	3	6	1	10	1.4	1.8	20	15	1200	120	65	20	0	
FGT612	600	±30	20	120	35	±100	±30	100	600	3	6	1	10	1.6	2.0	20	15	1200	80	40	20	0	
MGD623N	600	±30	50	100	150	±100	±30	100	600	3	6	1	10	1.7	2.3	50	15	2500	150	80	20	0	
MGD623S	600	±30	50	100	150	±100	±30	100	600	3	6	1	10	1.8	2.4	50	15	2500	150	80	20	0	

Electrical Characteristics (Ta=25°C)																				Package	Mass (g)	
td(on)	tr	td(off)	tf	Conditions			Qg	Qge	Qgc	Conditions			VF		Conditions	trr	Conditions					
(ns)	(ns)	(ns)	(ns)	Ic	VCE		(nC)	(nC)	(nC)	Ic	VCE	VGE	(V)				IF	(μs)	IF			di/dt
typ	typ	typ	typ	(A)	(V)		typ	typ	typ	(A)	(V)	(V)	typ	max	(A)	typ	(A)	(A/μs)				
130	70	340	200	30	300	L Load	120	30	30	30	300	15								TO3PF(FM100)	6.5	
100	80	300	120	30	300	L Load	65	20	20	30	300	15								TO3PF(FM100)	6.5	
15	30	55	210	20	150	R Load	35	8	10	20	150	15								TO220F(FM20)	2.0	
20	90	90	180	60	250	R Load	65	10	20	60	250	15								TO220F(FM20)	2.0	
15	35	55	220	20	200	R Load	35	8	10	20	200	15								TO220F(FM20)	2.0	
25	60	70	190	20	300	R Load	35	6	9	20	300	15								TO220F(FM20)	2.0	
75	70	250	200	50	300	L Load	65	15	20	50	300	15	1.2	1.6	30	0.3	30	100		TO3P(MT100)	6.0	Built-in Di
75	70	250	120	50	300	L Load	65	15	20	50	300	15	1.2	1.6	30	0.3	30	100		TO3P(MT100)	6.0	Built-in Di

## 2-4 Transistor and MOS FET Arrays

### Specifications List by Part Number

Part Number	Category	Circuit Count	$V_{CE0} \cdot V_{DSS} \cdot V_{CES}$ (V)	$I_C \cdot I_D$ (A)	hFE (min)	$R_{DS(ON)}$ max( $\Omega$ )	Package	Mass (g)
SDA05	For 3-phase motor driver	3	-60	-4	2000		PS16 (Surface-Mount)	1.1
SDC03	For sink driver	4	60 $\pm$ 10	1.5	2000		PS16 (Surface-Mount)	1.1
SDC04	For sink driver	4	100 $\pm$ 15	1.5	2000		PS16 (Surface-Mount)	1.1
SDC06	For sink driver	4	30 to 45	2	400		PS16 (Surface-Mount)	1.1
SDC07	For 3-phase motor driver	3	60	4	2000		PS16 (Surface-Mount)	1.1
SDH02	For sink driver	4	100	1.5	2000		PS16 (Surface-Mount)	1.1
SLA4030	For sink driver	4	100	4	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA4031	For sink driver	4	120	4	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA4036	For sink driver	6	120	2	2000		SIP15 with Fin (SLA15Pin)	6.0
SLA4041	For sink driver	4	200	3	1000		SIP12 with Fin (SLA15Pin)	6.0
SLA4051	For sink driver	9	120	2	2000		SIP21 with Fin (SLA21Pin)	6.0
SLA4052	For sink driver	9	120	3	2000		SIP21 with Fin (SLA21Pin)	6.0
SLA4060	For sink driver	4	120	5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA4061	For sink driver	4	120	5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA4070	For source driver	4	-100	-5	1000		SIP12 with Fin (SLA12Pin)	6.0
SLA4071	For source driver	4	-100	-5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA4390	H bridge	4	$\pm$ 100	$\pm$ 5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA5022	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 6	2000	0.22	SIP12 with Fin (SLA12Pin)	6.0
SLA5037	For sink driver	4	100	10		0.08	SIP12 with Fin (SLA12Pin)	6.0
SLA5041	For sink driver	4	200	10		0.175	SIP12 with Fin (SLA12Pin)	6.0
SLA5059	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 4		0.55	SIP12 with Fin (SLA12Pin)	6.0
SLA5060	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 6		0.22	SIP12 with Fin (SLA12Pin)	6.0
SLA5061	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 10		0.14	SIP12 with Fin (SLA12Pin)	6.0
SLA5064	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 10		0.14	SIP12 with Fin (SLA12Pin)	6.0
SLA5065	For 5-phase motor driver	4	60	7		0.1	SIP15 with Fin (SLA15Pin)	6.0
SLA5068	For 5-phase motor driver	6	60	7		0.1	SIP15 with Fin (SLA15Pin)	6.0
SLA5073	For 5-phase motor driver	6	60	5		0.3	SIP15 with Fin (SLA15Pin)	6.0
SLA5074	For 5-phase motor driver	4	60	5		0.3	SIP15 with Fin (SLA15Pin)	6.0
SLA5075	For 3-phase motor driver	6	500	$\pm$ 5		1.4	SIP15 with Fin (SLA15Pin)	6.0
SLA5085	For sink driver	5	60	5		0.22	SIP12 with Fin (SLA12Pin)	6.0
SLA5086	For source driver	5	-60	-5		0.22	SIP12 with Fin (SLA12Pin)	6.0
SLA5096	For 3-phase motor driver	6	55	8		0.08	SIP15 with Fin (SLA15Pin)	6.0
SLA5201	For 3-phase motor driver	6	600	7		1.85typ( $V_{CE(sat)}$ )	SIP15 with Fin (SLA15Pin)	6.0
SLA5212	For 3-phase motor driver	6	35	$\pm$ 8		0.07	SIP15 with Fin (SLA15Pin)	6.0
SLA5222	For Partial switching PFC	1+Di $\times$ 4	600	30		1.3typ( $V_{CE(sat)}$ )	SIP12 with Fin (SLA12Pin)	6.0
SLA5227	For Partial switching PFC	1+Di $\times$ 4	600	30		1.3typ( $V_{CE(sat)}$ )	SIP12 with Fin (SLA12Pin)	6.0
SLA6012	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 4	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA6020	For 3-phase motor driver	6	$\pm$ 100	$\pm$ 5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA6022	For 3-phase motor driver	6	$\pm$ 80	$\pm$ 5	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA6023	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 6	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA6024	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 8	2000		SIP12 with Fin (SLA12Pin)	6.0
SLA6026	For 3-phase motor driver	6	$\pm$ 60	$\pm$ 10	2000		SIP12 with Fin (SLA12Pin)	6.0

Part Number	Category	Circuit Count	$V_{CE0} \cdot V_{DSS} \cdot V_{CES}$ (V)	$I_C \cdot I_D$ (A)	hFE (min)	$R_{DS(ON)}$ max( $\Omega$ )	Package	Mass (g)
SMA4020	For source driver	4	-60	-4	2000		SIP12 (SMA12Pin)	4.0
SMA4021	For source driver	4	-60	-3	2000		SIP12 (SMA12Pin)	4.0
SMA4030	For sink driver	4	100	3	2000		SIP12 (SMA12Pin)	4.0
SMA4032	For sink driver	4	100	3	2000		SIP12 (SMA12Pin)	4.0
SMA4033	For sink driver	4	100	2	2000		SIP12 (SMA12Pin)	4.0
SMA4036	For sink driver	6	120	2	2000		SIP15 (SMA15Pin)	4.0
SMA4038	For sink driver	6	120	3	2000		SIP15 (SMA15Pin)	4.0
SMA5106	For sink driver	4	100	4		0.55	SIP12 (SMA12Pin)	4.0
SMA5112	For 3-phase motor driver	6	250	7		0.5	SIP12 (SMA12Pin)	4.0
SMA5117	For 3-phase motor driver	6	250	7		0.25	SIP12 (SMA12Pin)	4.0
SMA5118	For 3-phase motor driver	6	500	$\pm 5$		1.4	SIP12 (SMA12Pin)	4.0
SMA5125	For 3-phase motor driver	6	$\pm 60$	$\pm 10$		0.14	SIP12 (SMA12Pin)	4.0
SMA5127	For 3-phase motor driver	6	$\pm 60$	$\pm 4$		0.55	SIP12 (SMA12Pin)	4.0
SMA5130	For 3-phase motor driver	6	250	2.5	2000	0.9	SIP15 (SMA15Pin)	4.0
SMA5131	For 3-phase motor driver	6	250	2		1.8	SIP12 (SMA12Pin)	4.0
SMA5132	For 3-phase motor driver	6	500	1.5		4	SIP12 (SMA12Pin)	4.0
SMA5133	For 3-phase motor driver	6	500	2.5		2	SIP12 (SMA12Pin)	4.0
SMA6010	For 3-phase motor driver	6	$\pm 60$	$\pm 4$	2000		SIP12 (SMA12Pin)	4.0
SMA6080	For 3-phase motor driver	6	$\pm 60$	$\pm 2$	2000		SIP12 (SMA12Pin)	4.0
SMA6511	For driving stepping motor with two supplies	5	100 $\pm$ 15/-60	1.5/-3	2000		SIP12 (SMA12Pin)	4.0
STA301A	For sink driver	3	60 $\pm$ 10	4	1000		SIP8 (STA8Pin)	2.0
STA302A	For source driver/3-phase motor driver	3	-50	-4	1000		SIP8 (STA8Pin)	2.0
STA303A	For sink driver/3-phase motor driver	3	100	4	1000		SIP8 (STA8Pin)	2.0
STA322A	For source driver	3	-50	-3	100		SIP8 (STA8Pin)	2.0
STA401A	For sink driver	4	60 $\pm$ 10	4	1000		SIP10 (STA10Pin)	2.6
STA402A	For source driver	4	-50	-4	1000		SIP10 (STA10Pin)	2.6
STA403A	For sink driver	4	100	4	1000		SIP10 (STA10Pin)	2.6
STA404A	For sink driver	4	200	3	1000		SIP10 (STA10Pin)	2.6
STA406A	For sink driver	4	60 $\pm$ 10	6	2000		SIP10 (STA10Pin)	2.6
STA408A	For source driver	4	-120	-4	2000		SIP10 (STA10Pin)	2.6
STA412A	For sink driver	4	60	3	300		SIP10 (STA10Pin)	2.6
STA413A	For sink driver	4	35 $\pm$ 5	3	500		SIP10 (STA10Pin)	2.6
STA421A	For source driver	4	-60	-3	40		SIP10 (STA10Pin)	2.6
STA431A	H bridge	4	$\pm 60$	$\pm 3$	40		SIP10 (STA10Pin)	2.6
STA434A	H bridge	4	$\pm 60$	$\pm 4$	1000		SIP10 (STA10Pin)	2.6
STA457C	H bridge	4	$\pm 60$	$\pm 4$	2000		SIP10 (STA10Pin)	2.6
STA460C	For sink driver	2	60 $\pm$ 10	6	700		SIP10 (STA10Pin)	2.6
STA471A	For sink driver	4	60 $\pm$ 10	2	2000		SIP10 (STA10Pin)	2.6
STA472A	For source driver	4	-60	-2	2000		SIP10 (STA10Pin)	2.6
STA473A	For sink driver	4	100	2	2000		SIP10 (STA10Pin)	2.6
STA475A	For sink driver	4	100 $\pm$ 15	2	2000		SIP10 (STA10Pin)	2.6
STA481A	For sink driver	4	60 $\pm$ 10	1	2000		SIP10 (STA10Pin)	2.6
STA485A	For sink driver	4	100 $\pm$ 15	1	2000		SIP10 (STA10Pin)	2.6

## Specifications List by Application Sink Driver Arrays

### ● Built-in Avalanche Diodes, between Collector and Base

Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)	I <sub>C</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>DS(ON)</sub> max (Ω)	Equivalent Circuit	Package
STA460C	2	60±10	6	700		1	SIP10 (STA10Pin)
STA301A	3	60±10	4	1000		2	SIP8 (STA8Pin)
SDC06	4	30 to 45	2	400		3	PS16 (Surface-Mount)
STA413A	4	35±5	3	500		4	SIP10 (STA10Pin)
STA481A	4	60±10	1	2000		5	SIP10 (STA10Pin)
SDC03	4	60±10	1.5	2000		6	PS16 (Surface-Mount)
STA471A	4	60±10	2	2000		5	SIP10 (STA10Pin)
STA401A	4	60±10	4	1000		5	SIP10 (STA10Pin)
STA406A	4	60±10	6	2000		5	SIP10 (STA10Pin)
STA485A	4	100±15	1	2000		5	SIP10 (STA10Pin)
SDC04	4	100±15	1.5	2000		6	PS16 (Surface-Mount)
STA475A	4	100±15	2	2000		5	SIP10 (STA10Pin)

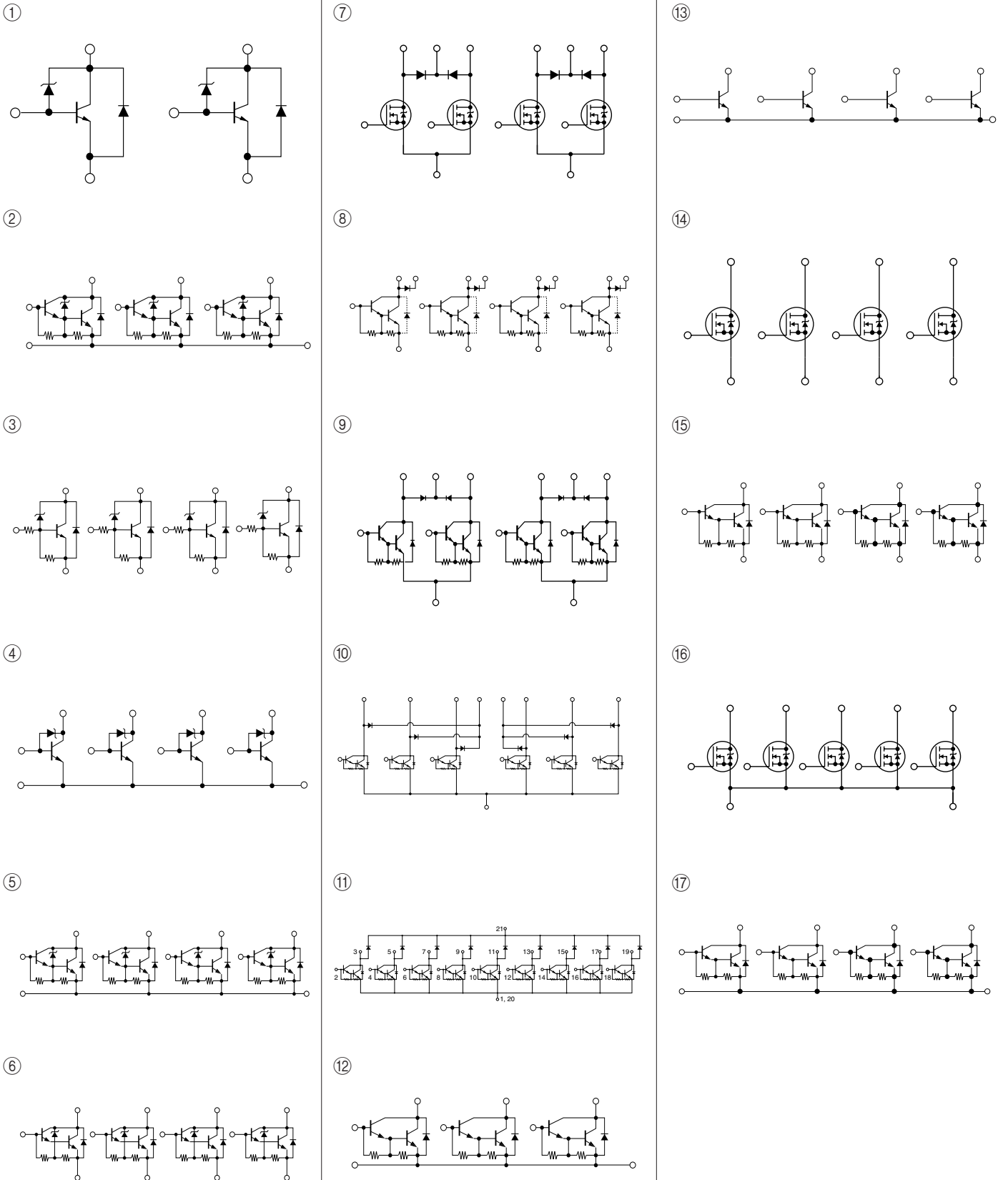
### ● Built-in Flywheel Diodes

Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)	I <sub>C</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>DS(ON)</sub> max (Ω)	Equivalent Circuit	Package
SDH02	4	100	1.5	2000		8	PS16 (Surface-Mount)
SMA4033	4	100	2	2000		9	SIP12 (SMA12Pin)
SMA4032	4	100	3	2000		9	SIP12 (SMA12Pin)
SMA5106	4	100	4		0.55	7	SIP12 (SMA12Pin)
SLA4031	4	120	4	2000		9	SIP12 with Fin (SLA12Pin)
SLA4061	4	120	5	2000		9	SIP12 with Fin (SLA12Pin)
SLA4041	4	200	3	1000		9	SIP12 with Fin (SLA12Pin)
SMA4036	6	120	2	2000		10	SIP15 (SMA15Pin)
SLA4036	6	120	2	2000		10	SIP15 with Fin (SLA15Pin)
SMA4038	6	120	3	2000		10	SIP15 (SMA15Pin)
SLA4051	9	120	2	2000		11	SIP12 with Fin (SLA12Pin)
SLA4052	9	120	3	2000		11	SIP12 with Fin (SLA12Pin)

### ● General-Purpose

Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)	I <sub>C</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>DS(ON)</sub> max (Ω)	Equivalent Circuit	Package
STA303A	3	100	4	100		12	SIP8 (STA8Pin)
STA412A	4	60	3	300		13	SIP10 (STA10Pin)
STA473A	4	100	2	2000		17	SIP10 (STA10Pin)
SMA4030	4	100	3	2000		15	SIP12 (SMA12Pin)
STA403A	4	100	4	1000		17	SIP10 (STA10Pin)
SLA4030	4	100	4	2000		15	SIP12 with Fin (SLA12Pin)
SLA5037	4	100	10		0.08	14	SIP12 with Fin (SLA12Pin)
SLA4060	4	120	5	2000		15	SIP12 with Fin (SLA12Pin)
STA404A	4	200	3	1000		17	SIP10 (STA10Pin)
SLA5041	4	200	10		0.175	14	SIP12 with Fin (SLA12Pin)
SLA5085	5	60	5		0.22	16	SIP12 with Fin (SLA12Pin)

●Equivalent Circuit (for Sink Driver)



**Specifications List by Application** Source Driver Arrays

**● Built-in Flywheel Diodes**

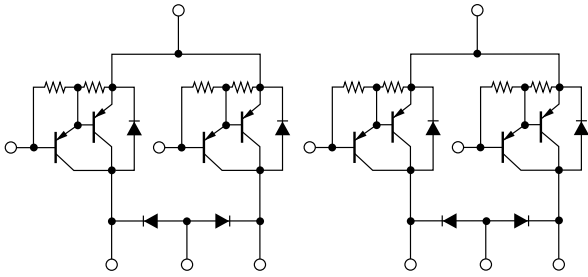
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SMA4021	4	-60	-3	2000		1	SIP12 (SMA12Pin)
SLA4071	4	-100	-5	2000		1	SIP12 with Fin (SLA12Pin)

**● General-Purpose**

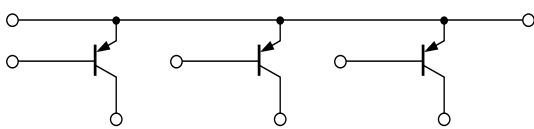
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STA322A	3	-50	-3	100		2	SIP8 (STA8Pin)
STA302A	3	-50	-4	1000		3	SIP8 (STA8Pin)
STA402A	4	-50	-4	1000		4	SIP10 (STA10Pin)
STA472A	4	-60	-2	2000		4	SIP10 (STA10Pin)
STA421A	4	-60	-3	40		6	SIP10 (STA10Pin)
SMA4020	4	-60	-4	2000		5	SIP12 (SMA12Pin)
SLA4070	4	-100	-5	1000		5	SIP12 with Fin (SLA12Pin)
STA408A	4	-120	-4	2000		7	SIP10 (STA10Pin)
SLA5086	5	-60	-5		0.22	8	SIP12 with Fin (SLA12Pin)

●Equivalent Circuit (for Source Driver)

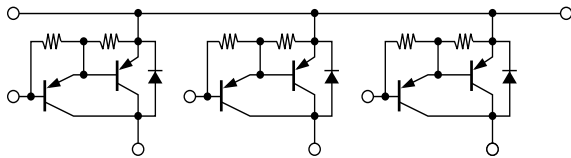
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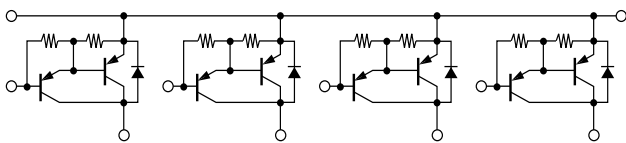
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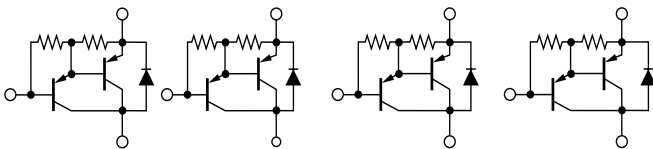
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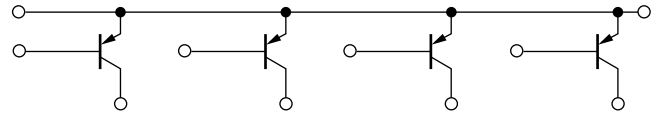
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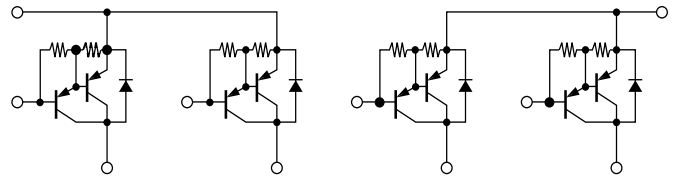
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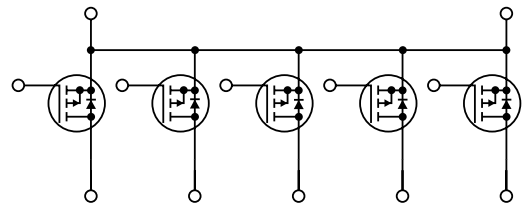
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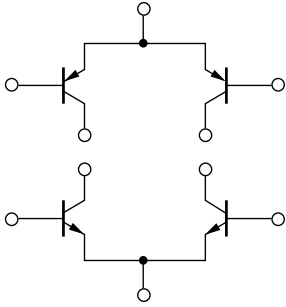


**Specifications List by Application** *Motor Driver Arrays*
**●H Bridge**

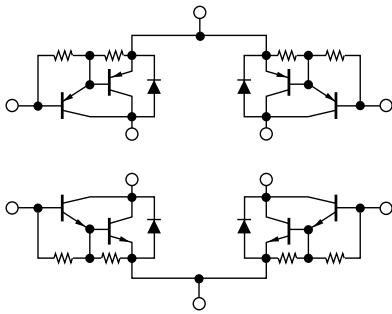
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STA431A	4	±60	±3	40		1	SIP10 (STA10Pin)
STA434A	4	±60	±4	1000		2	SIP10 (STA10Pin)
STA457C	4	±60	±4	2000		3	SIP10 (STA10Pin)
SLA4390	4	±100	±5	2000		2	SIP12 with Fin (SLA12Pin)

●Equivalent Circuit (for Motor Driver)

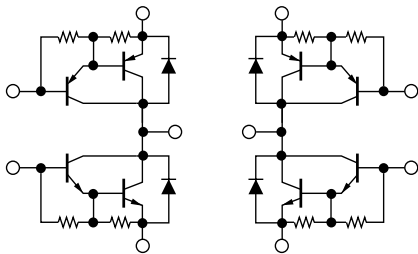
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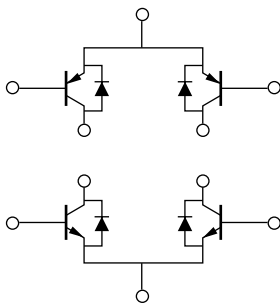
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④



### ●For 3-Phase Motor Drivers

Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)/ V <sub>CEs</sub> (V)	I <sub>c</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>Ds(ON)</sub> max (Ω)	Equivalent Circuit	Package
SDC07	3	60	4	2000		6	PS16 (Surface-Mount)
STA303A	3	100	4	1000		7	SIP8 (STA8Pin)
STA302A	3	-50	-4	1000		8	SIP8 (STA8Pin)
SDA05	3	-60	-4	2000		9	PS16 (Surface-Mount)
SLA5212	6	35	±8		70m	18	SIP15 with Fin (SLA15Pin)
SLA5096	6	55	±8		80m	18	SIP15 with Fin (SLA15Pin)
SLA5059	6	60	±4		0.55	10	SIP12 with Fin (SLA12Pin)
SLA5060	6	60	±6		0.22	10	SIP12 with Fin (SLA12Pin)
SLA5061	6	60	±10		0.14	10	SIP12 with Fin (SLA12Pin)
SLA5064	6	60	±10		0.14	11	SIP12 with Fin (SLA12Pin)
SMA6080	6	±60	±2	2000		13	SIP12 (SMA12Pin)
SMA6010	6	±60	±4	2000		13	SIP12 (SMA12Pin)
SLA6012	6	±60	±4	2000		12	SIP12 with Fin (SLA12Pin)
SMA5127	6	±60	±4		0.55	14	SIP12 (SMA12Pin)
SLA5022	6	±60	±6	2000	0.22	15	SIP12 with Fin (SLA12Pin)
SLA6023	6	±60	±6	2000		12	SIP12 with Fin (SLA12Pin)
SLA6024	6	±60	±8	2000		12	SIP12 with Fin (SLA12Pin)
SLA6026	6	±60	±10	2000		12	SIP12 with Fin (SLA12Pin)
SMA5125	6	±60	±10		0.14	11	SIP12 (SMA12Pin)
SLA6022	6	±80	±5	2000		12	SIP12 with Fin (SLA12Pin)
SLA6020	6	±100	±5	2000		13	SIP12 with Fin (SLA12Pin)
SMA5130	6	±250	±2.5	2000	0.9	20	SIP15 (SMA15Pin)
SMA5131	6	250	2		1.8	17	SIP12 (SMA12Pin)
SMA5112	6	250	7		0.5	17	SIP12 (SMA12Pin)
SMA5117	6	250	7		0.25	17	SIP12 (SMA12Pin)
SMA5132	6	500	1.5		4	17	SIP12 (SMA12Pin)
SMA5133	6	500	2.5		2	17	SIP12 (SMA12Pin)
SLA5075	6	500	±5		1.4	16	SIP15 with Fin (SLA15Pin)
SMA5118	6	500	±5		1.4	17	SIP12 (SMA12Pin)
SLA5201	6	600	7			19	SIP15 with Fin (SLA15Pin)

### ●For Driving Stepping Motor with Two Supplies

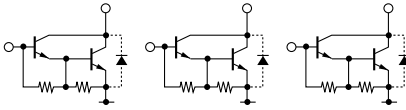
Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)	I <sub>c</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>Ds(ON)</sub> max (Ω)	Equivalent Circuit	Package
SMA6511	5	100±15/-60	1.5/-3	2000		27	SIP12 (SMA12Pin)

### ●For 5-Phase Motor Drive

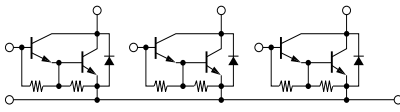
Part Number	Circuit Count	V <sub>CE0</sub> (V)/ V <sub>DSS</sub> (V)	I <sub>c</sub> (A)/ I <sub>D</sub> (A)	h <sub>FE</sub> (min)	R <sub>Ds(ON)</sub> max (Ω)	Equivalent Circuit	Package
SLA5074	4	60	5		0.3	22	SIP15 with Fin (SLA15Pin)
SLA5065	4	60	7		0.1	22	SIP15 with Fin (SLA15Pin)
SLA5073	6	60	5		0.3	18	SIP15 with Fin (SLA15Pin)
SLA5068	6	60	7		0.1	16	SIP15 with Fin (SLA15Pin)

●Equivalent Circuit (for Motor Driver)

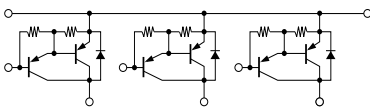
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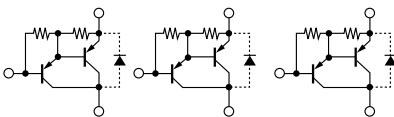
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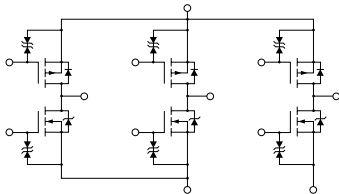
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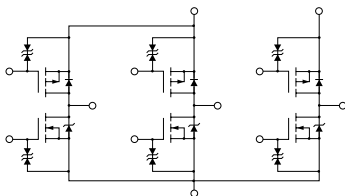
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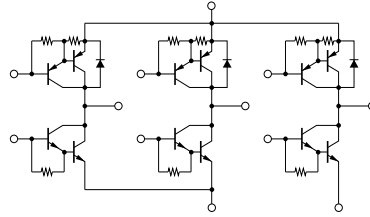
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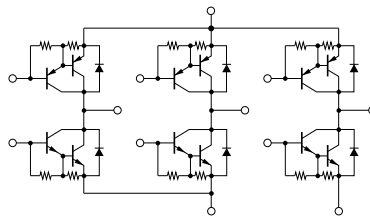
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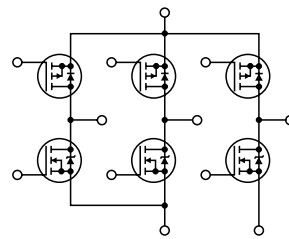
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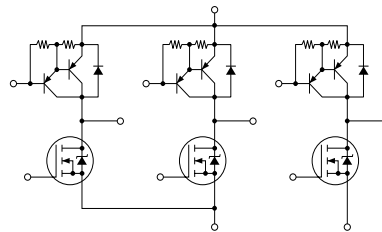
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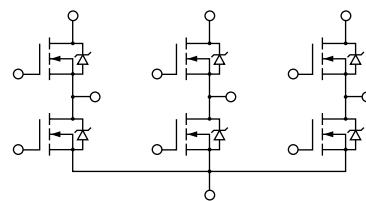
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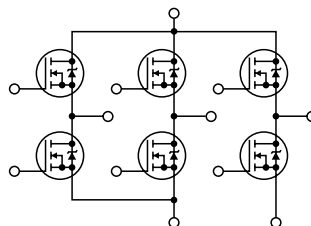
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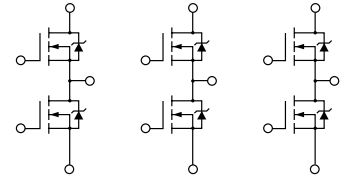
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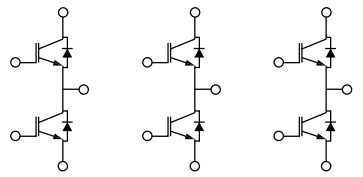
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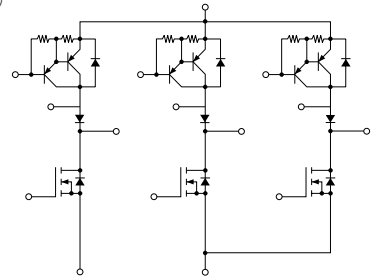
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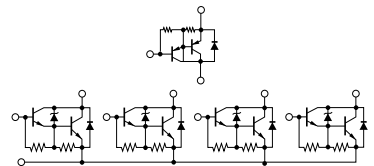
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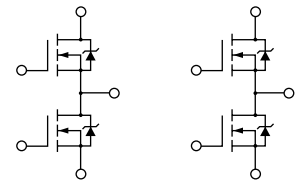
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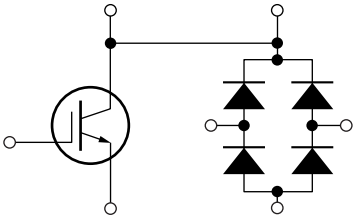
**Specification List by Application** Partial switching PFC Arrays

## ●For Partial switching PFC

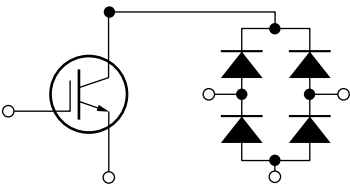
Part Number	Circuit Count	V <sub>CE(S)</sub> (V)	I <sub>C</sub> (A)	V <sub>CE(sat)</sub> (V)	R <sub>DS(ON)</sub> max(Ω)	Equivalent Circuit	Package
SLA5222	1+Di X 4	600	30	1.3typ		1	SIP12 with Fin (SLA12Pin)
SLA5227	1+Di X 4	600	30	1.3typ		2	SIP12 with Fin (SLA12Pin)

**●Equivalent Circuit (for Partial switching PFC)**

①



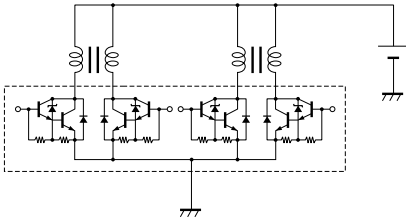
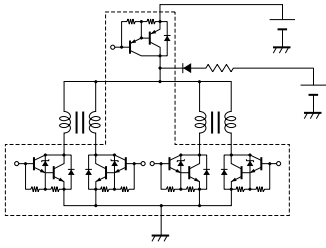
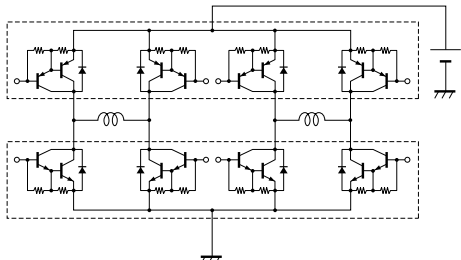
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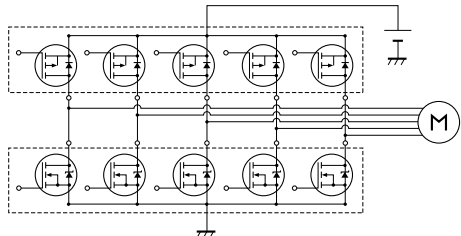


**Specifications List by Application**

Applications	Typical Connection Diagram	Part Number		
		Transistors		MOS FETs
		Darlington	Single	
<ul style="list-style-type: none"> <li>● Solenoid</li> <li>● Relay</li> </ul>		STA301A STA401A STA406A STA471A STA475A STA481A STA485A SDC04 SDC03	STA460C STA413A SDC06	
		SLA4031 SLA4041 SLA4060 SMA4032 SMA4033 SMA4036 SDH02		SMA5106
		SLA4071 SMA4021		
		STA302A STA402A STA408A STA472A SLA4070 SMA4020	STA322A STA421A	

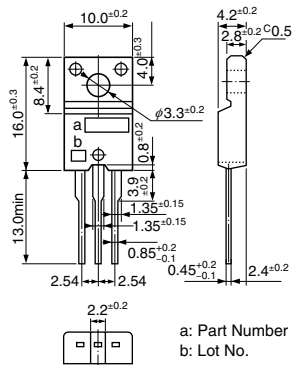
Applications		Typical Connection Diagram	Part Number		
			Transistors		MOS FETs
			Darlington	Single	
●DC Motor	Normal/Reverse Rotation Control		STA434A STA457C STA4390	STA431A STA474A	
●3-Phase DC Brushless Motor	AC100V Direct Driver		STA302A+STA303A SMA6010 SLA6020 SDA05+SDC07 SMA6080		
	PWM Control		SLA6012 SLA6022 SLA6023 SLA6024 SLA6026		
			SLA5022 SMA5130		
					SLA5059 SLA5060 SLA5061 SLA5064 SMA5125 SMA5127

Applications		Typical Connection Diagram	Part Number		
			Transistors		MOS FETs
			Darlington	Single	
●Stepping Motor	Constant Voltage Driver		STA401A STA406A STA435A STA471A STA475A STA481A STA485A SLA4010 SDC04 SDC03	STA460C STA413A SDC06	
	Two Supplies Driver		SMA6511		
	Bipolar Driver		STA473A STA472A STA408A STA404A STA403A STA402A SMA4030 SMA4020 SLA4070 SLA4060 SLA4030	STA421A STA412A SDC01	

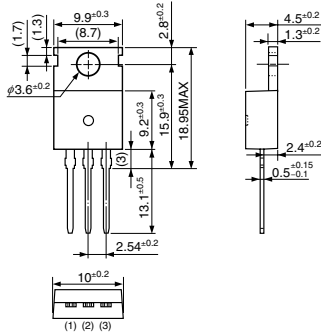
Applications	Typical Connection Diagram	Part Number	
		N-CH	P-CH
●5-Phase Motor		SLA5065+SLA5068 SLA5073+SLA5074 SLA5085	SLA5086

# Package Type (Dimensions)

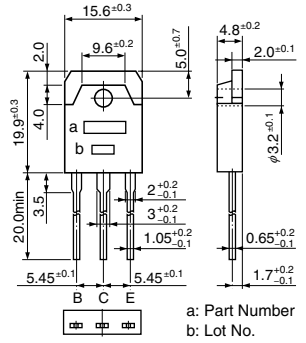
• TO-220F (FM20)



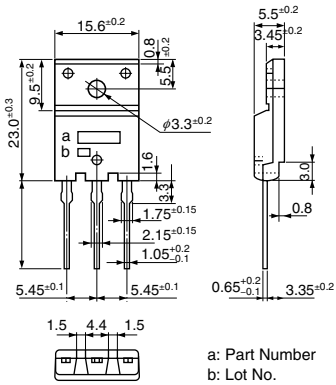
• TO-220 (MT-25)



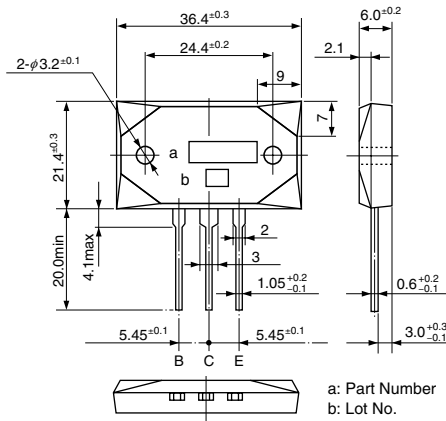
• TO-3P (MT-100)



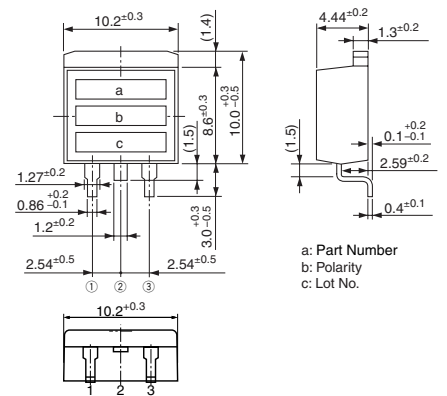
• TO-3PF (FM100)



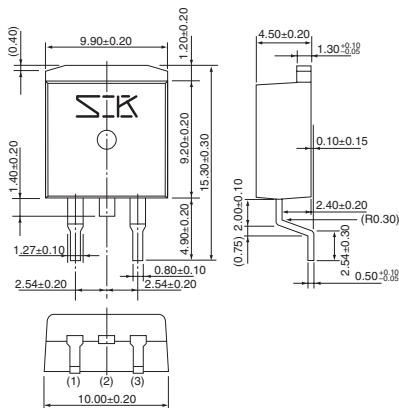
• MT-200



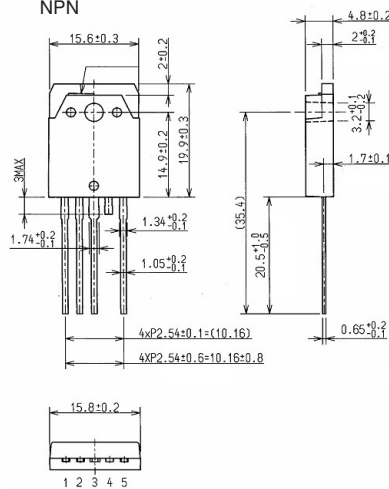
• TO-220S



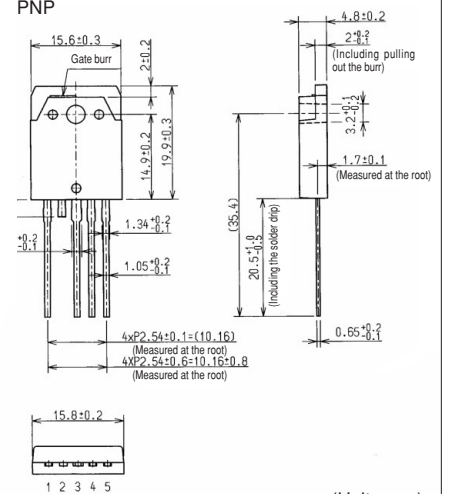
• TO-263



• TO3P-5Pin  
NPN

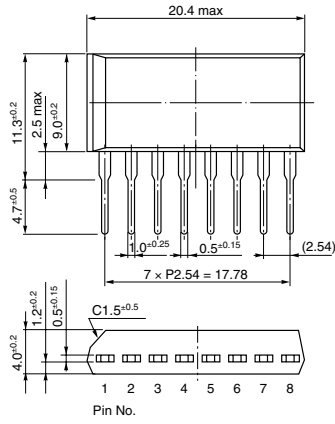


PNP

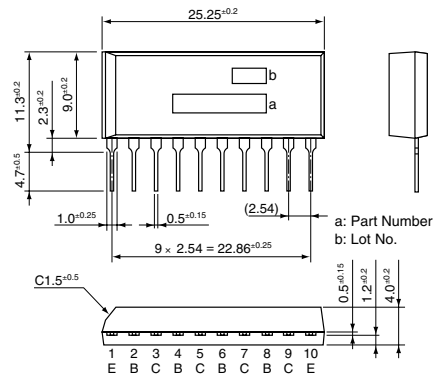


(Unit : mm)

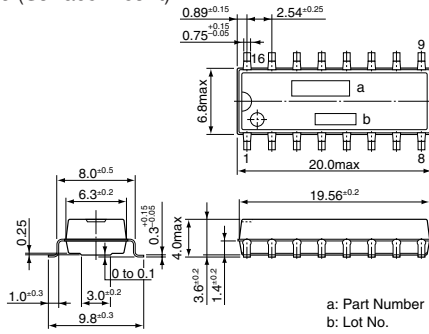
• SIP 8 (STA8Pin)



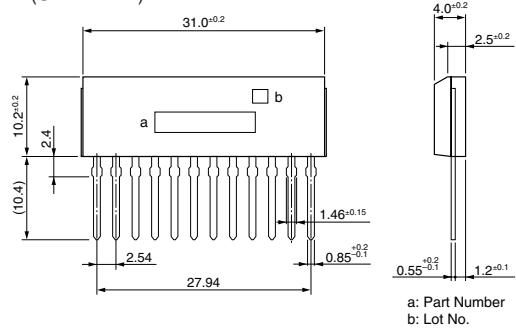
• SIP 10 (STA10Pin)



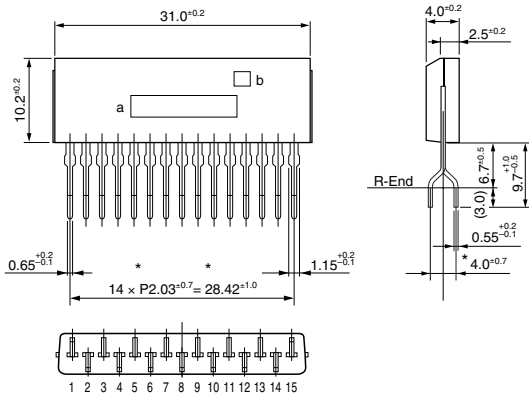
• PS 16 (Surface-Mount)



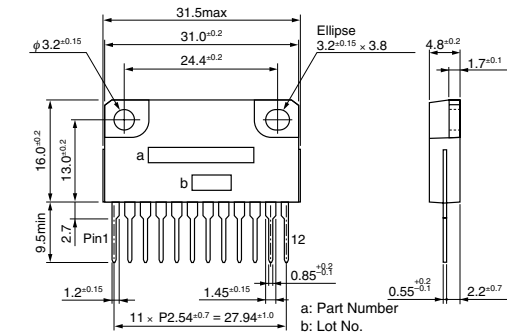
• SIP 12 (SMA12Pin)



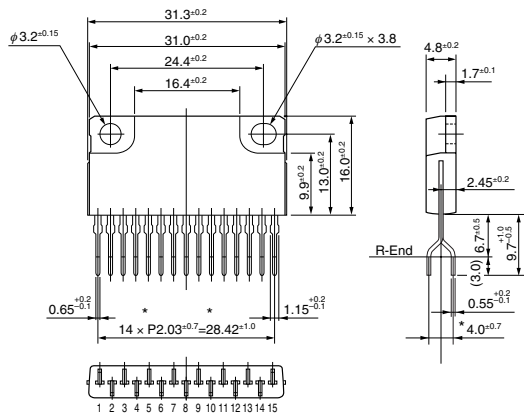
• SIP 15 (SMA15Pin)



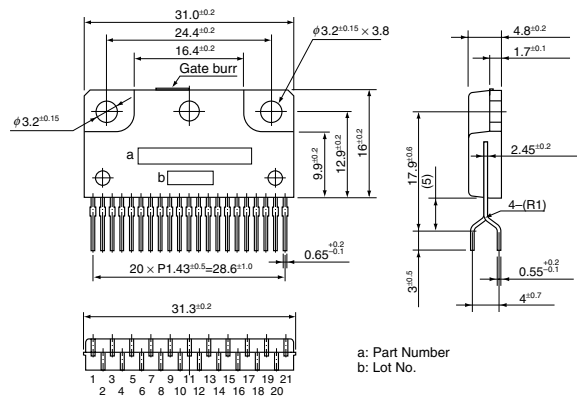
• SIP 12 with Fin (SLA12Pin)



• SIP 15 with Fin (SLA15Pin)



• SIP 21 with Fin (SLA21Pin)



(Unit:mm)