

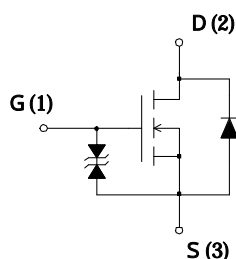
Features

- Low on-state resistance 5.0mΩ VGS=10V
- Built-in gate protection diode
- SMD PKG

Applications

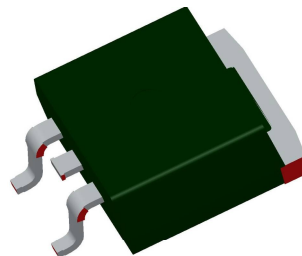
- DC - DC converter
- Mortar drive

Internal Equivalent Circuit



Package

TO220S



Key Specifications

- V(BR)DSS = 60V (ID=100uA)
- RDS(ON) = 5mΩ max (ID=35A / VGS=10V)

Absolute maximum ratings

(Ta=25°C)

| Characteristic | Symbol | Rating | Unit |
|---------------------------------|--------------------------|---------------|------|
| Drain to Source Voltage | V _{DSS} | 60 | V |
| Gate to Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current | I _D | ±85 | A |
| Pulsed Drain Current | I _{D(pulse)} *1 | ±170 | A |
| Maximum Power Dissipation | P _D | 100 (Tc=25°C) | W |
| Single Pulse Avalanche Energy | E _{AS} *2 | 400 | mJ |
| Maximum avalanche current | I _{AS} | 25 | A |
| Channel Temperature | T _{ch} | 150 | °C |
| Storage Temperature | T _{stg} | -55 ~ +150 | °C |
| Maximum Drain to Source dv/dt 1 | dv/dt 1 *2 | 0.5 | V/ns |
| Peak diode recovery dv/dt 2 | dv/dt 2 *3 | 3 | V/ns |
| Peak diode recovery di/dt | di/dt *3 | 100 | A/μs |

*1 PW≤100μsec. duty cycle≤1%

*2 V_{DD}=20V, L=1mH, I_L=25A, unclamped, R_g=50Ω, See Fig.1

*3 I_{SD}=25A, See Fig.2

Electrical characteristics

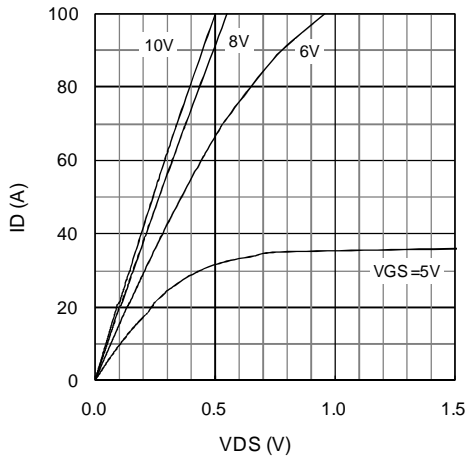
(Ta=25°C)

| Characteristic | Symbol | Test Conditions | Limits | | | Unit |
|--|----------------|---|--------|------|----------|---------------|
| | | | MIN | TYP | MAX | |
| Drain to Source breakdown Voltage | $V_{(BR)DSS}$ | $I_D=100\mu A$ $V_{GS}=0V$ | 60 | | | V |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=\pm 15V$ | | | ± 10 | μA |
| Drain to Source Leakage Current | I_{DSS} | $V_{DS}=60V$ $V_{GS}=0V$ | | | 100 | μA |
| Gate Threshold Voltage | V_{TH} | $V_{DS}=10V$, $I_D=1mA$ | 2.0 | 3.4 | 4.0 | V |
| Forward Transconductance | $Re(yfs)$ | $V_{DS}=10V$ $I_D=35A$ | 30 | 80 | | S |
| Static Drain to Source On-Resistance | $R_{DS(ON)}$ | $I_D=35A$, $V_{GS}=10V$ | | 5.0 | 6.0 | m Ω |
| Input Capacitance | C_{iss} | $V_{DS}=10V$ $V_{GS}=0V$ $f=1MHz$ | | 8400 | | pF |
| Output Capacitance | C_{oss} | | | 1200 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 930 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $I_D=35A$ $V_{DD}=20V$ $R_G=22\Omega$ $R_{GS}=50\Omega$ $R_L=0.57\Omega$ $V_{GS}=10V$ See Fig.3 | | 160 | | ns |
| Rise Time | t_r | | | 170 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 430 | | |
| Fall Time | t_f | | | 185 | | |
| Source-Drain Diode Forward Voltage | V_{SD} | $I_{SD}=50A$ $V_{GS}=0V$ | | 0.9 | 1.5 | V |
| Source-Drain Diode Reverse Recovery Time | t_{rr} | $I_{SD}=25A$ $di/dt=50A/\mu s$ | | 65 | | ns |
| Thermal Resistance Junction to Case | $R_{th(ch-c)}$ | | | | 1.25 | $^{\circ}C/W$ |
| Thermal Resistance Junction to Ambient | $R_{th(ch-a)}$ | | | | 62.5 | $^{\circ}C/W$ |

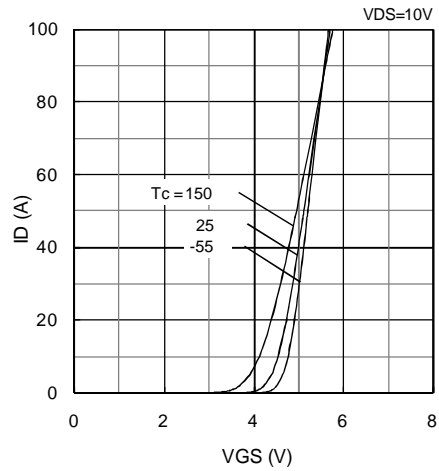
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Characteristic Curves (Tc=25°C)

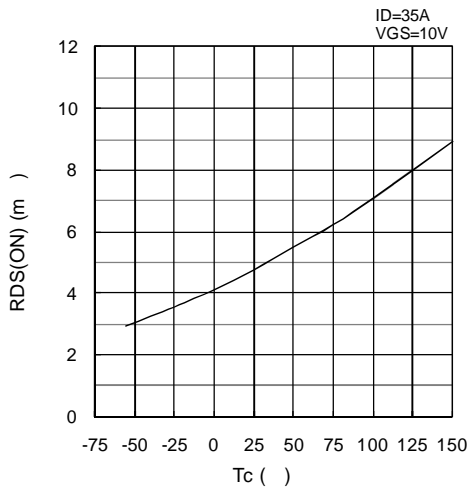
ID-VDS characteristics (typical)



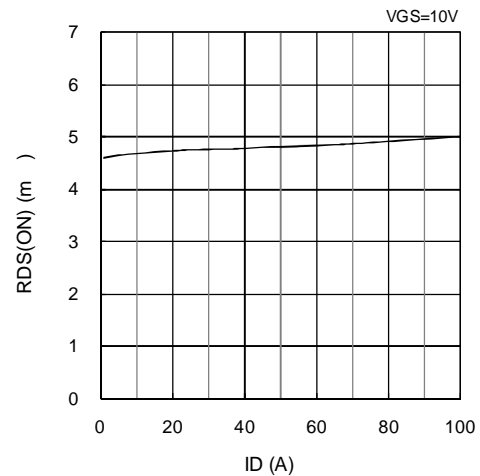
ID-VGS characteristics (typical)



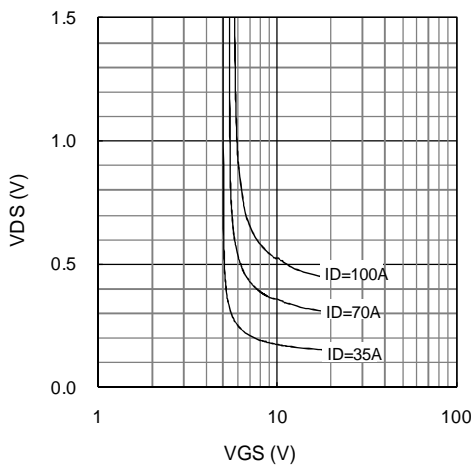
RDS(ON)-Tc characteristics (typical)



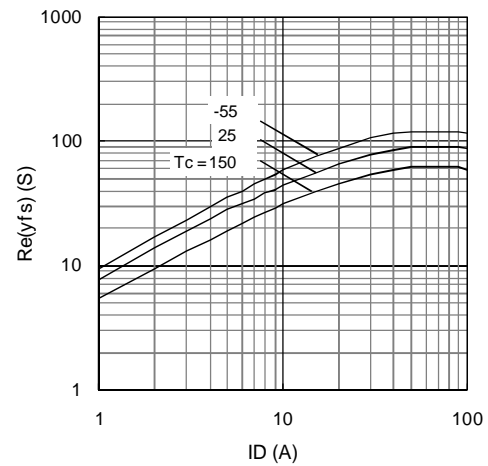
RDS(ON)-ID characteristics (typical)



VDS-VGS characteristics (typical)

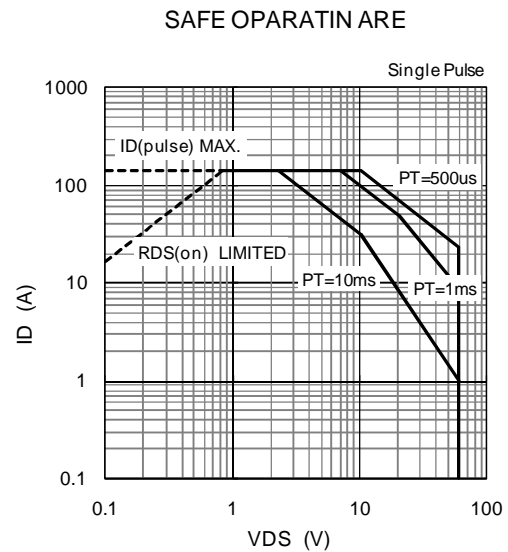
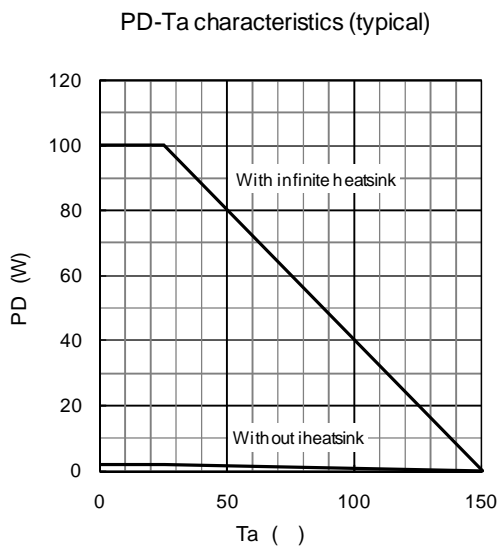
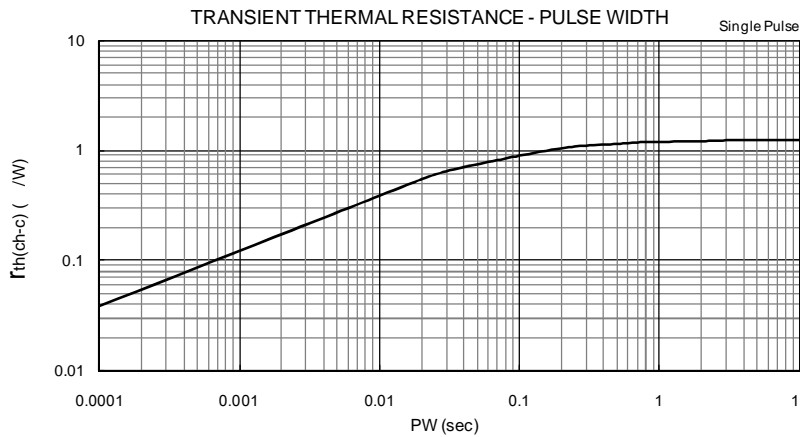
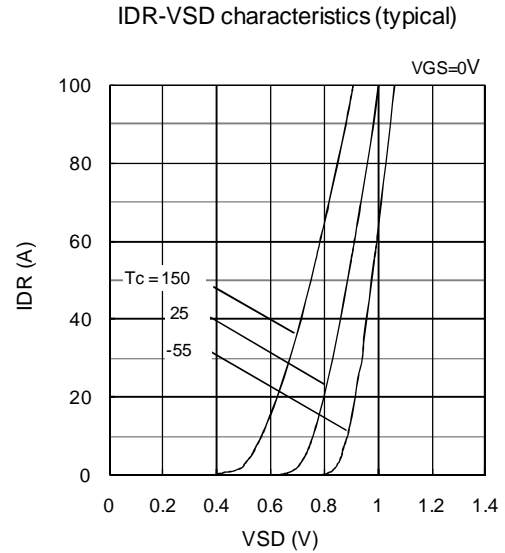
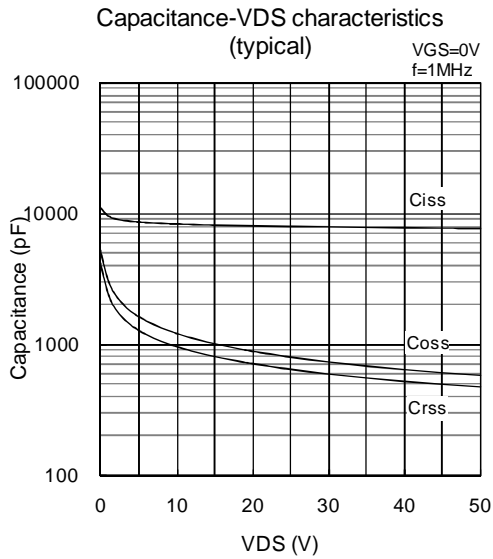


Re(yfs)-ID characteristics (typical)



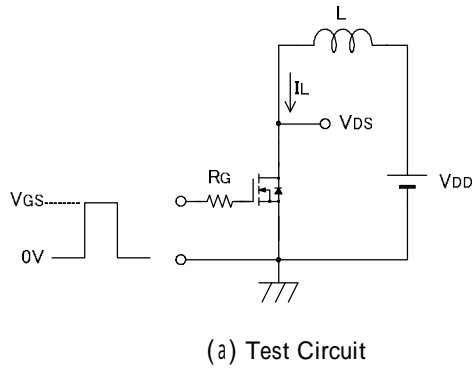
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Characteristic Curves (Tc=25°C)



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Fig.1 Unclamped Inductive Test Method



$$EAS = \frac{1}{2} \cdot L \cdot I_{LP}^2 \cdot \frac{V(BR)DSS}{V(BR)DSS - VDD}$$

Fig.2 Diode Reverse Recovery Time Test Method

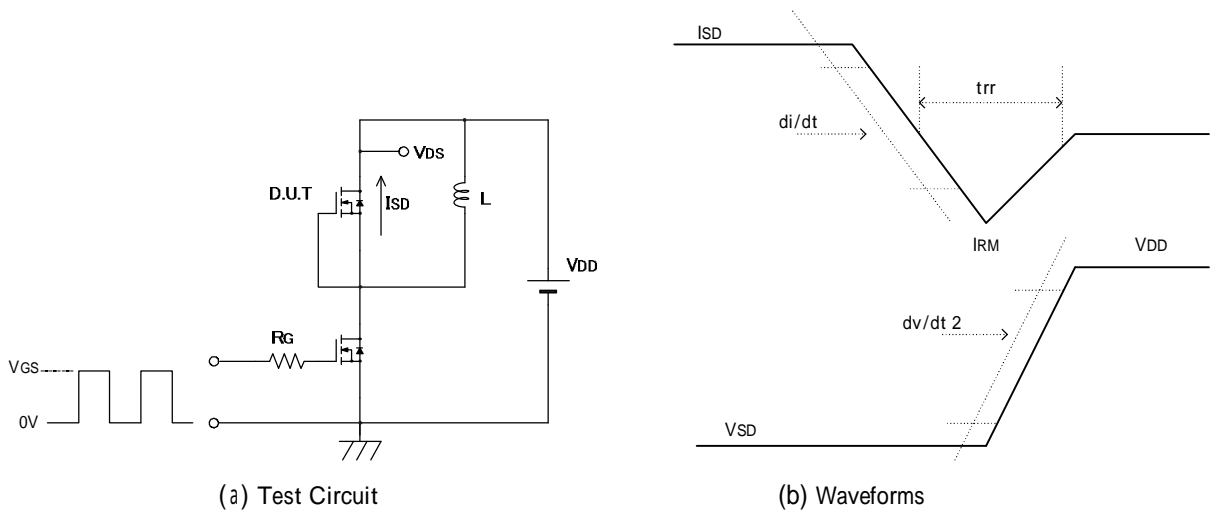
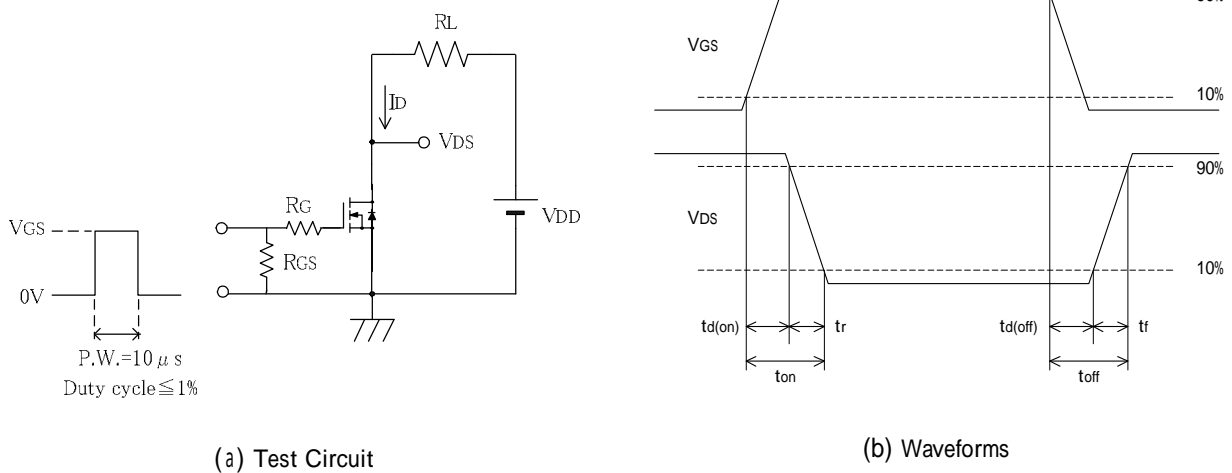


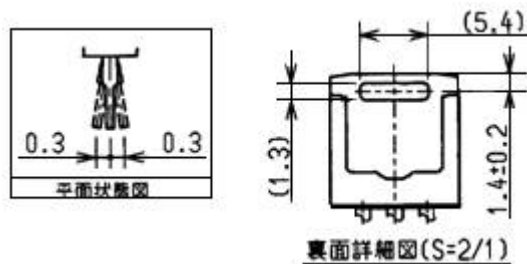
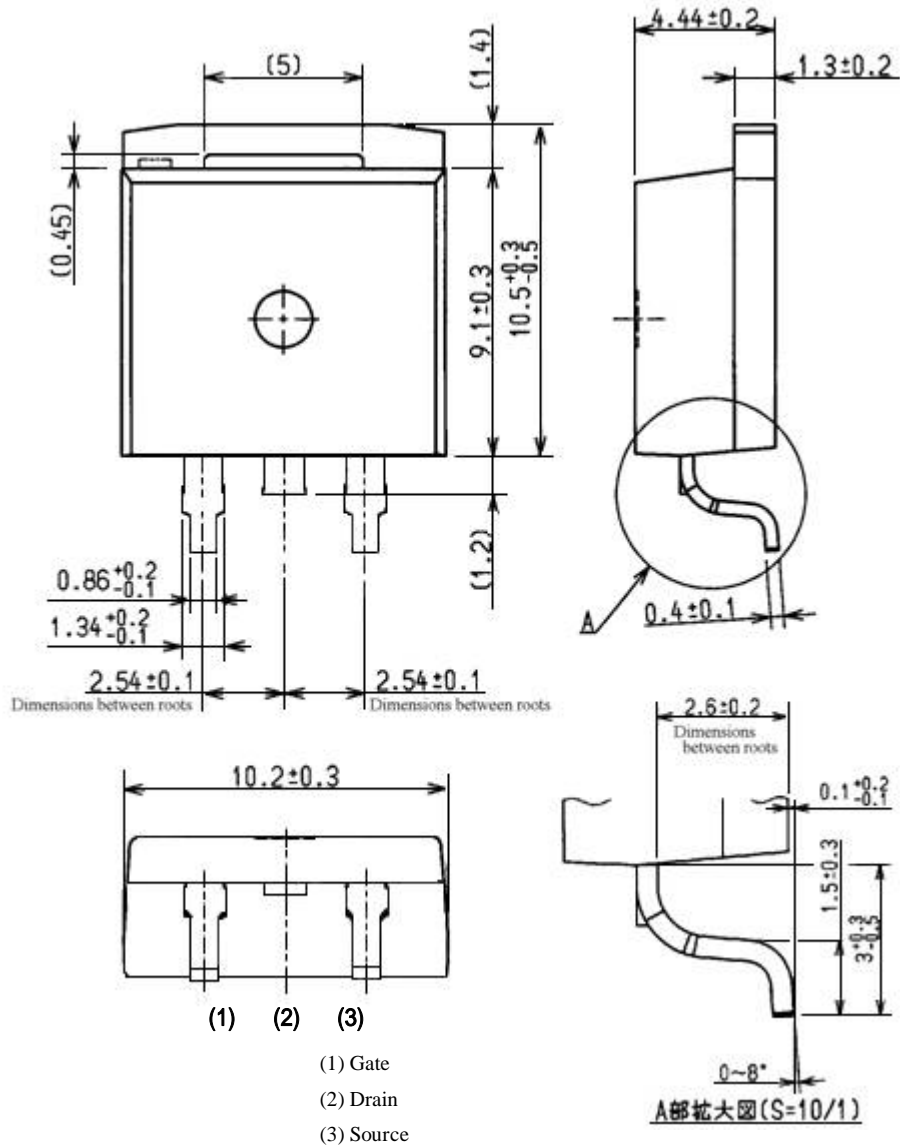
Fig.3 Switching Time Test Method



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Outline

TO220S



Weight Approx. 1.4g

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