

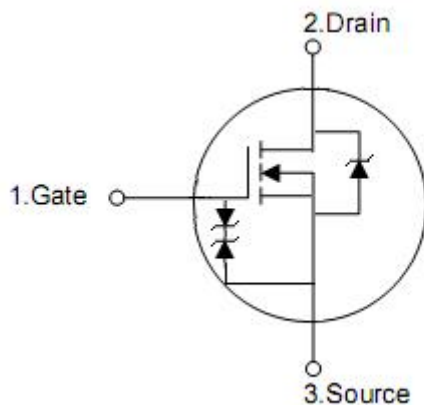
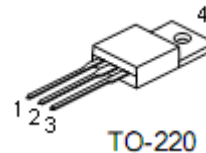
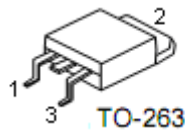
1. Features

- n $R_{DS(ON)}=0.7\Omega$ (typ) @ $V_{GS}=10V$
- n RoHS compliant
- n Low on resistance
- n Low gate charge
- n Peak current vs pulse width curve

2. Applications

- n Adaptor
- n TV main power
- n SMPS power supply
- n LCD panel power

3. Symbol



| Pin | Function |
|-----|----------|
| 1 | Gate |
| 2 | Drain |
| 3 | Source |
| 4 | Drain |

4. Absolute maximum ratings

($T_C=25^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Rating | | Units |
|--|----------------|---------------|-------------------|---------------------|
| | | TO-220 | TO-252, TO-263 | |
| Drain-source voltage | V_{DSS} | 500 | | V |
| Continuous drain current | I_D | 8.0 | | A |
| Continuous drain current $T_C=100^\circ\text{C}$ | | 5.5 | | A |
| Pulsed drain current | I_{DM}^{a1} | 28 | | A |
| Power dissipation | P_D | 160 | 100 | W |
| Derating factor above 25°C | | 1.28 | 0.8 | W/ $^\circ\text{C}$ |
| Gate-source voltage | V_{GS} | ± 20 | | V |
| Single pulse avalanche energy | E_{AS}^{a2} | 400 | | mJ |
| Avalanche energy, repetitive | E_{AR}^{a1} | 30 | | mJ |
| Avalanche current | I_{AR}^{a1} | 7.0 | | A |
| Peak diode recovery dv/dt | dv/dt^{a3} | 5.5 | | V/ns |
| Gate-source ESD(HBM-C=100pF,R=1.5K Ω) | $VE_{SD(G-S)}$ | 4000 | | V |
| Operating junction and storage temperature range | T_J, T_{STG} | 150,-55 to150 | | $^\circ\text{C}$ |
| Maximum temperature for soldering | T_L | 300 | | $^\circ\text{C}$ |

*Drain current limited by maximum junction temperature

Caution: Stresses greater than those listed in the "Absolute maximum ratings" table may cause permanent Damage to the device

5. Thermal characteristics

| Parameter | Symbol | Rating | Unit | Test condition |
|------------------|-----------------|--------|--------------------|--|
| Junction-case | $R_{\theta JC}$ | 1.04 | $^\circ\text{C/W}$ | Drain lead soldered to water cooled heatsink, P_D adjusted for a peak junction temperature of $+150^\circ\text{C}$ |
| Junction-ambient | $R_{\theta JA}$ | 100 | $^\circ\text{C/W}$ | 1 cubic foot chamber, free air |

6. Electrical characteristics

(T_C=25°C, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|--|-------------------------------------|--|-----|------|-----|-------|
| Drain-source breakdown voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 500 | - | - | V |
| Bvdss temperature coefficient | ΔBV _{DSS} /ΔT _J | Reference 25°C I _D =250uA | - | 0.74 | - | V/°C |
| Drain-source leakage current | I _{DSS} | V _{DS} =500V, V _{GS} =0V T _A =25°C | - | - | 25 | μA |
| | | V _{DS} =400V, V _{GS} =0V T _A =125°C | - | - | 250 | |
| Gate source breakdown voltage | V _{GSO} | I _{GS} =±1mA (open drain) | ±20 | - | - | V |
| Gate-source forward leakage | I _{GSS(F)} | V _{GS} =20V | - | - | 10 | uA |
| Gate-source reverse leakage | I _{GSS(R)} | V _{GS} =-20V | - | - | -10 | |
| Drain-source on-resistance | R _{DS(on)} | V _{GS} =10V, I _D =4A | - | 0.7 | 0.9 | Ω |
| Gate threshold voltage | V _{GS(TH)} | V _{DS} = V _{GS} , I _D =250uA | 2 | 3 | 4 | V |
| Pulse width tp≤380μs, δ≤2% | | | | | | |
| Forward transconductance | g _{fs} | V _{DS} =15V, I _D =3A | - | 8.5 | - | S |
| Input capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V f=1MHz | - | 960 | - | pF |
| Output capacitance | C _{oss} | | - | 110 | - | |
| Reverse transfer capacitance | C _{rss} | | - | 10 | - | |
| Turn-on delay time | t _{d(on)} | V _{DD} =250V, I _D =8A, R _G =12Ω, V _{GS} =10V | - | 11 | - | ns |
| Rise time | t _r | | - | 17 | - | |
| Turn-off delay time | t _{d(off)} | | - | 46 | - | |
| Fall time | t _f | | - | 22 | - | |
| Total gate charge | Q _g | V _{DD} =250V, I _D =8A, V _{GS} =10V | - | 24 | - | nC |
| Gate-source charge | Q _{gs} | | - | 4.0 | - | |
| Gate-drain charge | Q _{gd} | | - | 10 | - | |
| Continuous source current (body biode) | I _S | | - | - | 8 | A |
| Maximum pulsed current (body biode) | I _{SM} | | - | - | 32 | |
| Diode forward voltage | V _{SD} | I _S =8A, V _{GS} =0V | - | - | 1.5 | V |
| Reverse recovery time | t _{rr} | I _S =8A, V _{GS} =0V di _F /dt=100A/μs T _J =25°C | - | 175 | - | ns |
| Reverse recovery charge | Q _{rr} | | - | 0.75 | - | nC |
| Reverse recovery current | I _{RRM} | | - | 8.57 | - | A |
| Pulse width tp≤380μs, δ≤2% | | | | | | |

Note:a1.Repetitive rating;pulse width limited by maximum junction temperature

a2.L=10.0mH,Start T_J=25°C.

a3. I_{SD}=8A di/dt≤100A/μs, V_{DD}≤ BV_{DS}, Start T_J=25°C.

7. Typical operating characteristics

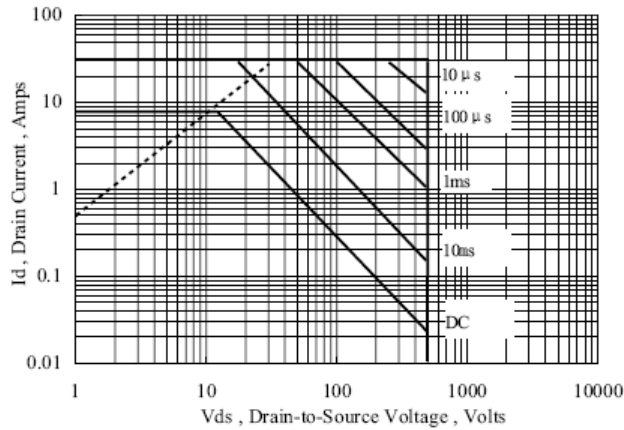


Figure 1 Maximum Forward Bias Safe Operating Area

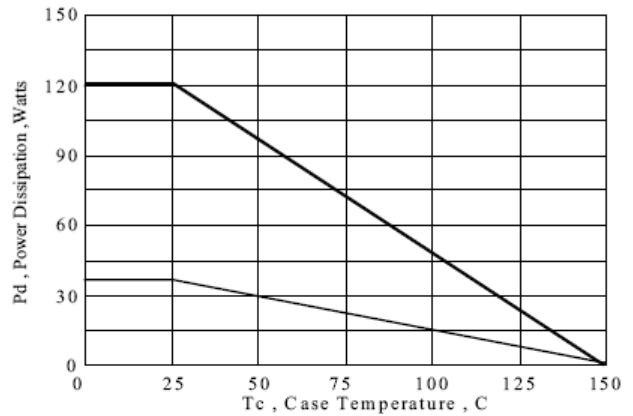


Figure 2 Maximum Power Dissipation vs Case Temperature

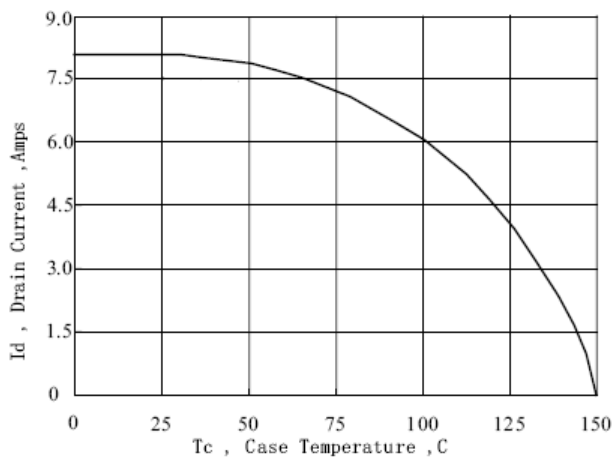


Figure 3 Maximum Continuous Drain Current vs Case Temperature

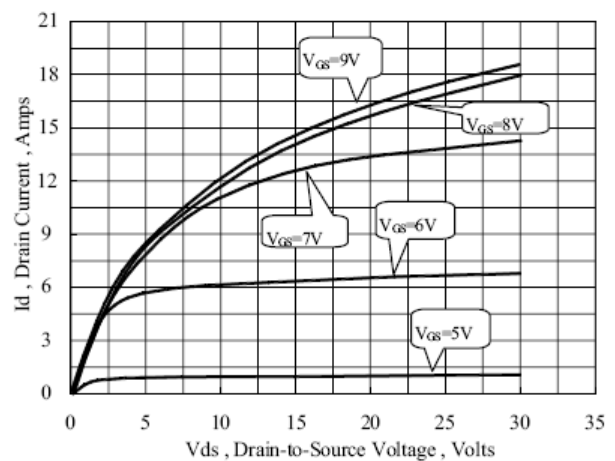


Figure 4 Typical Output Characteristics

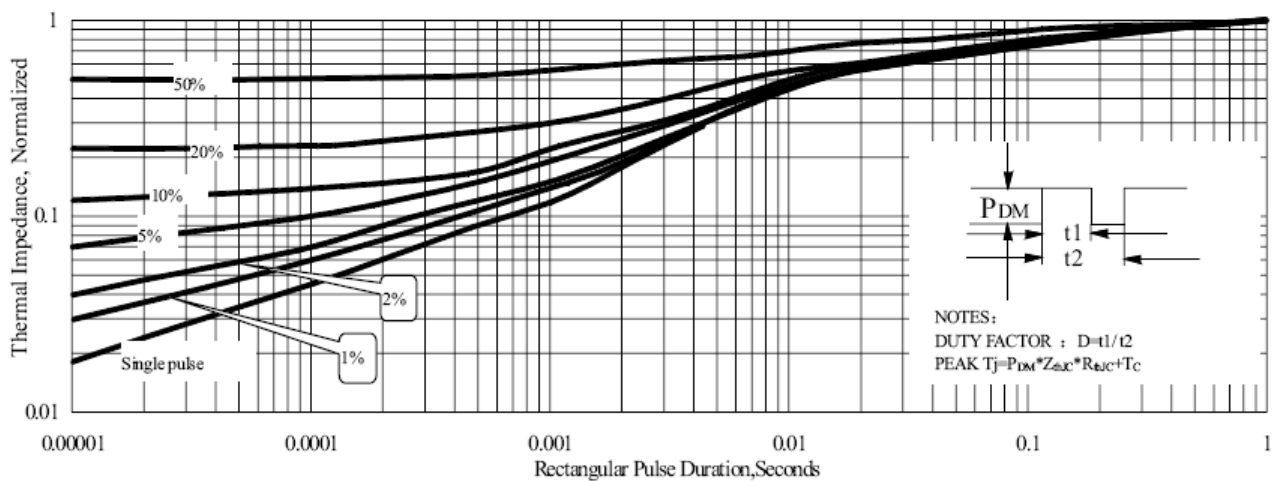


Figure 5 Maximum Effective Thermal Impedance, Junction to Case

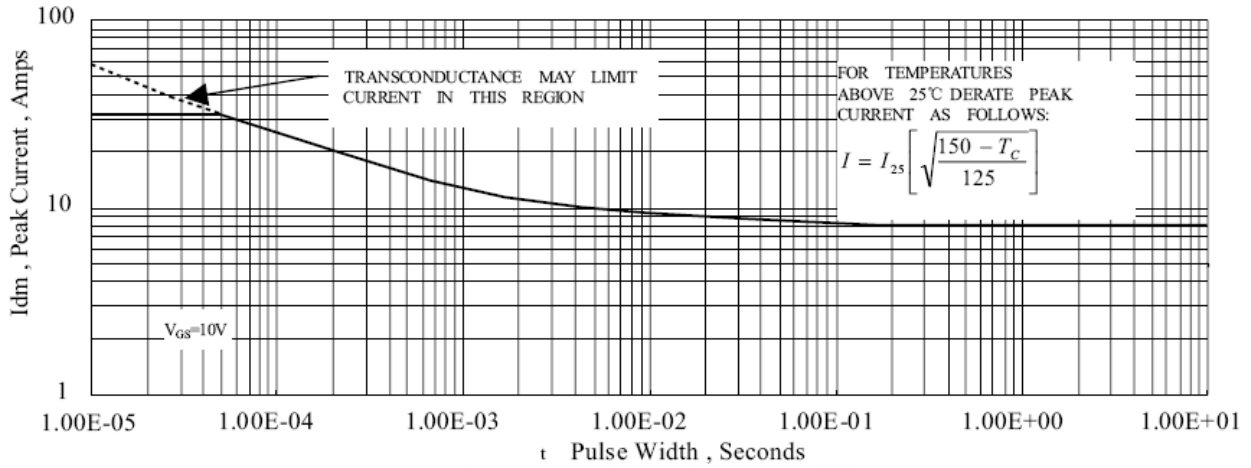


Figure 6 Maximum Peak Current Capability

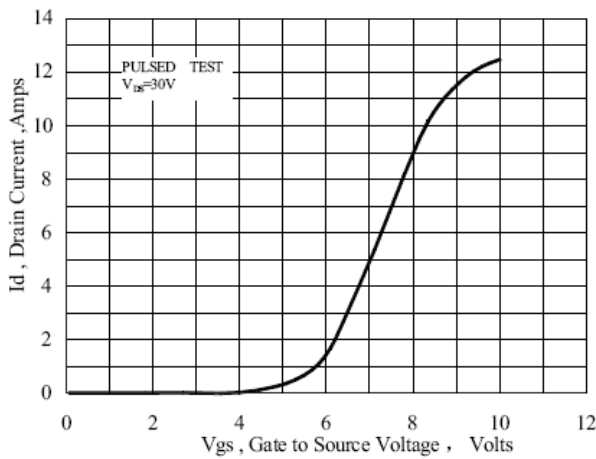


Figure 7 Typical Transfer Characteristics

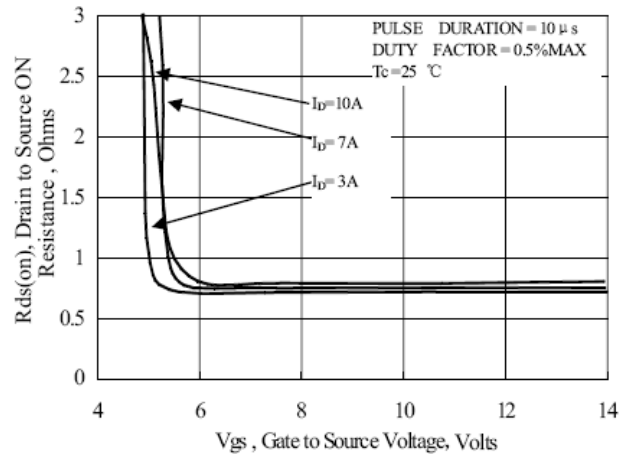


Figure 8 Typical Drain to Source ON Resistance vs Gate Voltage and Drain Current

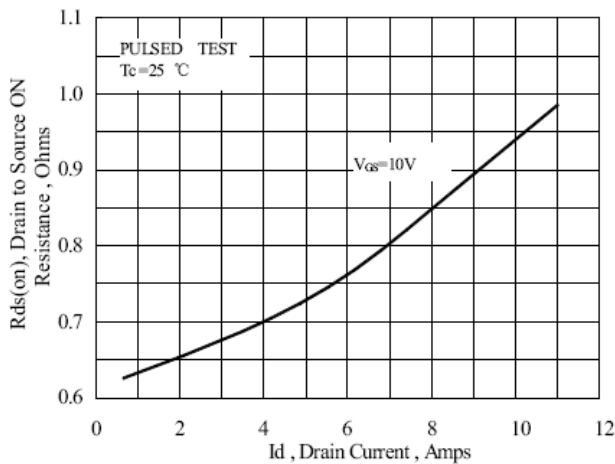


Figure 9 Typical Drain to Source ON Resistance vs Drain Current

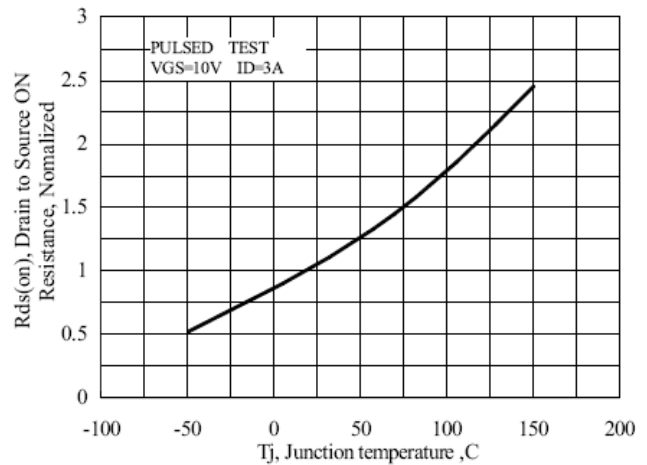


Figure 10 Typical Drain to Source ON Resistance vs Junction Temperature

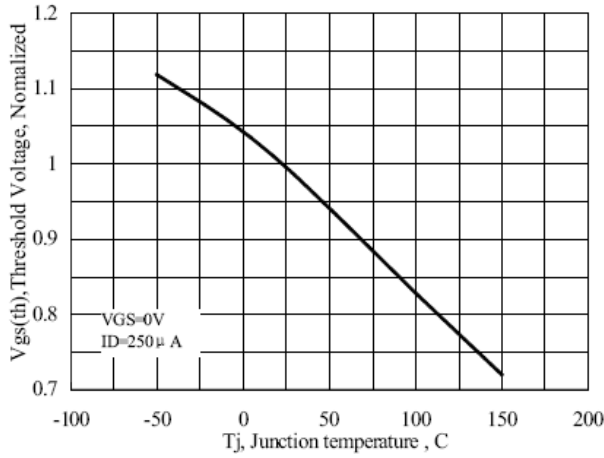


Figure 11 Typical Theshold Voltage vs Junction Temperature

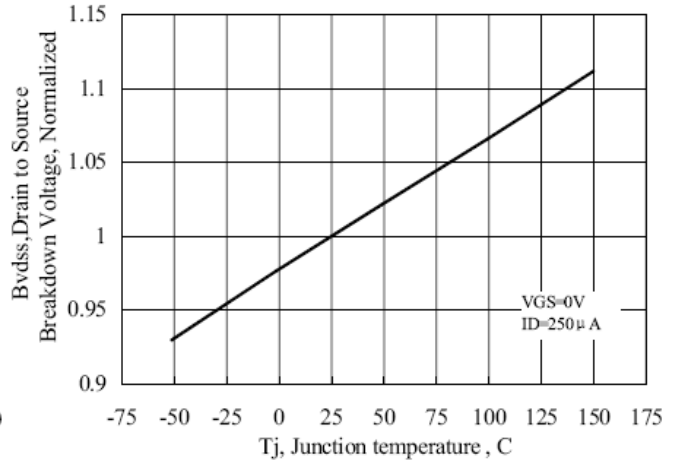


Figure 12 Typical Breakdown Voltage vs Junction Temperature

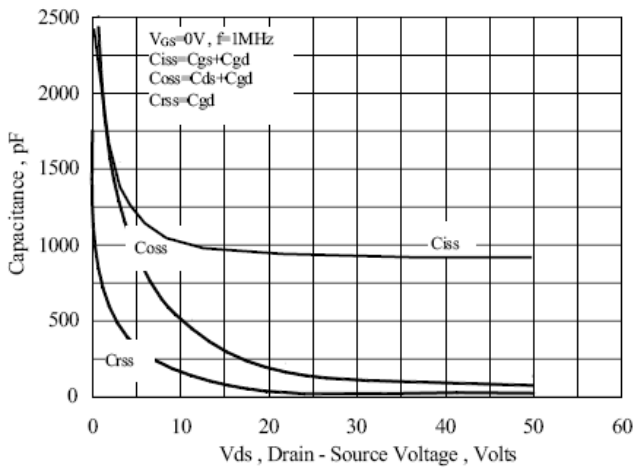


Figure 13 Typical Capacitance vs Drain to Source Voltage

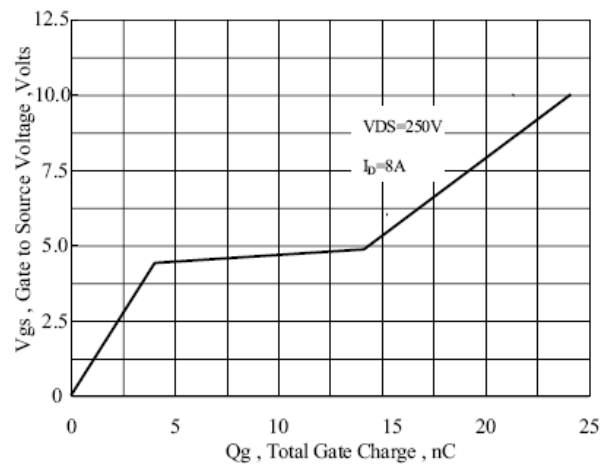


Figure 14 Typical Gate Charge vs Gate to Source Voltage

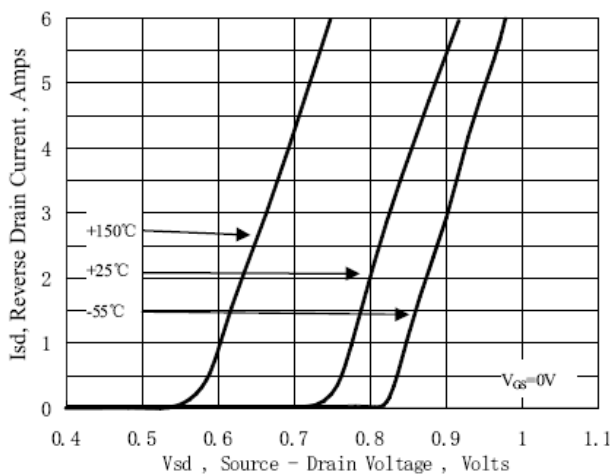


Figure 15 Typical Body Diode Transfer Characteristics

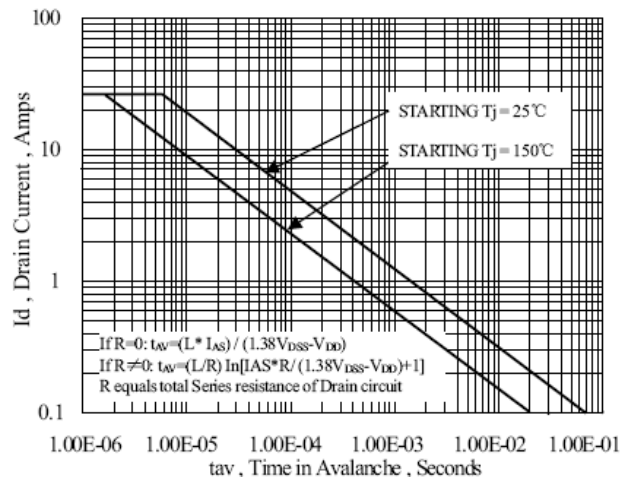


Figure 16 Unclamped Inductive Switching Capability

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