
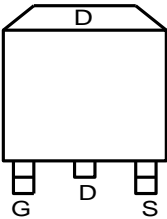


TM150P04T

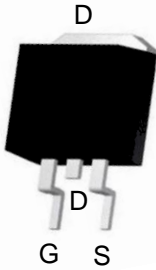
P -Channel Enhancement Mosfet

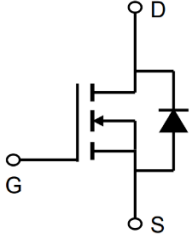
| | |
|--|---|
| <p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM | <p>General Features</p> <p>$V_{DS} = -40V$ $I_D = -150A$</p> <p>$R_{DS(ON)} = 3.0 m\Omega$ (typ.) @ $V_{GS} = -10V$</p> <p>100% UIS Tested 100% R_g Tested</p>  |
|--|---|



Marking: 150P04

T:TO-263-3L





| Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted) | | | |
|--|--------------------|------------|---------------|
| Parameter | Symbol | Limit | Unit |
| Drain-Source Voltage | V_{DS} | -40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | -150 | A |
| Drain Current-Continuous($T_C=100^\circ C$) | $I_D(100^\circ C)$ | - 98 | A |
| Pulsed Drain Current | I_{DM} | -560 | A |
| Maximum Power Dissipation | P_D | 250 | W |
| Derating factor | | 1.67 | W/ $^\circ C$ |
| Single pulse avalanche energy ^(Note 1) | E_{AS} | 612 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | $^\circ C$ |
| Thermal Characteristic | | | |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.5 | $^\circ C/W$ |



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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|---|------|-------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -40 | | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-40V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.0 | -1.6 | -2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-75A$ | - | 3.0 | 4.3 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-75A$ | - | 4.4 | 5.5 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-5V, I_D=-75A$ | - | 30 | - | S |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-20V, V_{GS}=0V,$ $F=1.0MHz$ | - | 14177 | - | PF |
| Output Capacitance | C_{oss} | | - | 1067 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 301 | - | PF |
| Switching Characteristics (Note 2) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-20V, I_D=-75A$ $V_{GS}=-10V, R_G=1.6\Omega$ | - | 18 | - | nS |
| Turn-on Rise Time | t_r | | - | 13 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 90 | - | nS |
| Turn-Off Fall Time | t_f | | - | 15 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-20V, I_D=-75A,$ $V_{GS}=-10V$ | - | 104.4 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 20.8 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 13.5 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=-75A$ | - | | -1.3 | V |
| Diode Forward Current | I_S | | - | - | -150 | A |
| Reverse Recovery Time | t_{rr} | $T_J = 25^\circ\text{C}, I_F = -75A$ | - | | 28 | nS |
| Reverse Recovery Charge | Q_{rr} | $di/dt = 100A/\mu s$ | - | | 26 | nC |

Notes:

1. EAS condition : $T_J=25^\circ\text{C}, V_{DD}=-20V, V_G=-10V, L=0.5mH, R_G=25\Omega$

2. Guaranteed by design, not subject to production

3. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_J(MAX)=175^\circ\text{C}$. The SOA curve provides a single pulse rating.

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Typical Electrical and Thermal Characteristics

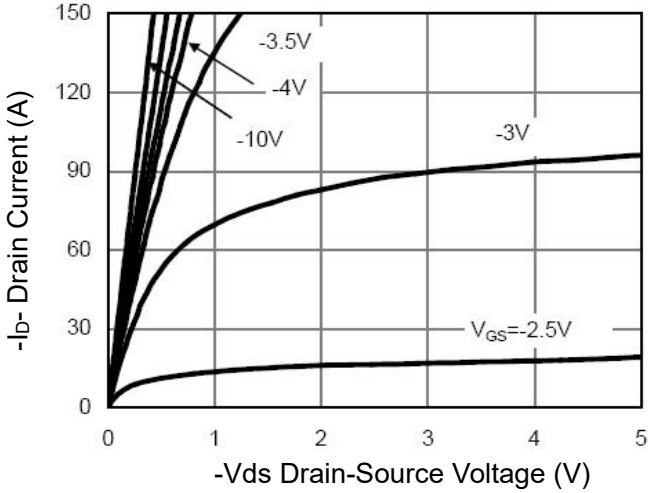


Figure 1 Output Characteristics

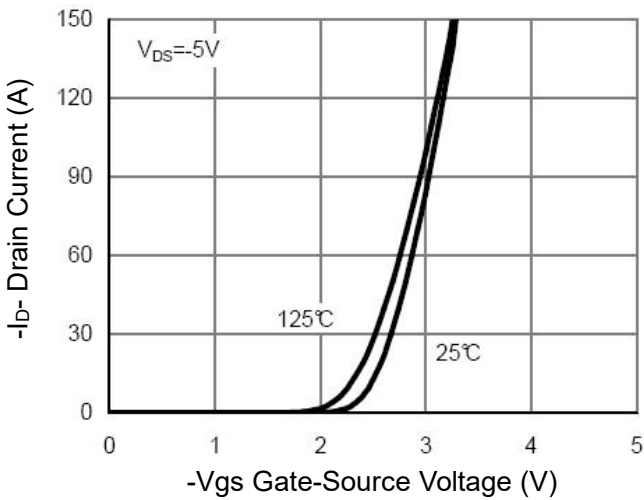


Figure 2 Transfer Characteristics

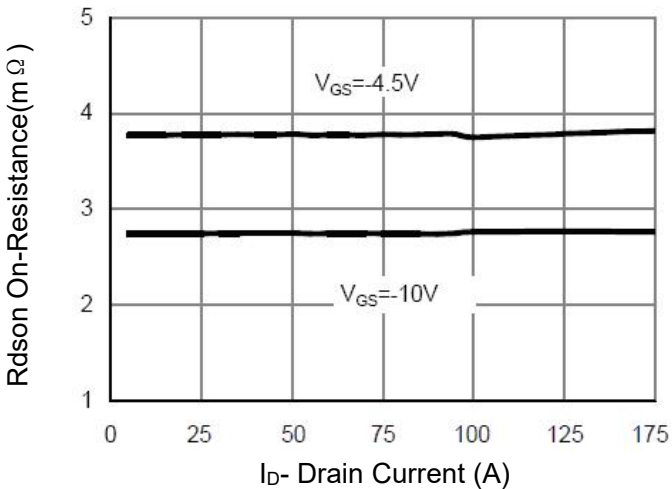


Figure 3 Rdson- Drain Current

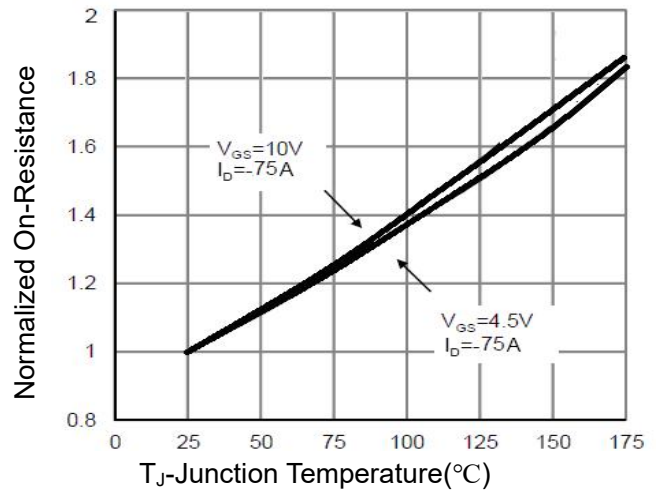


Figure 4 Rdson-Junction Temperature

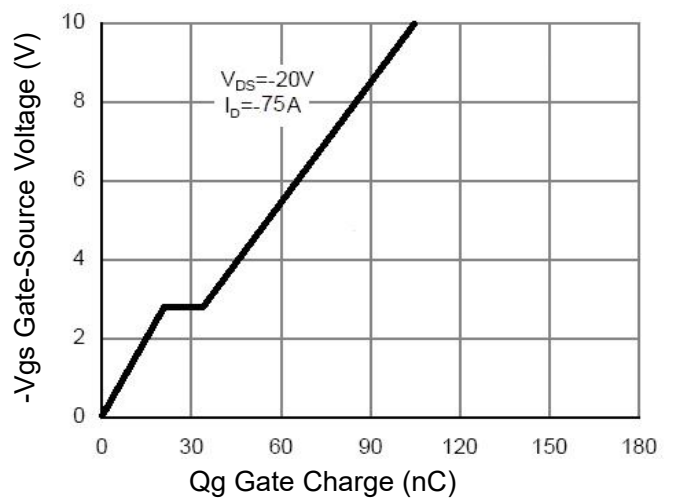


Figure 5 Gate Charge

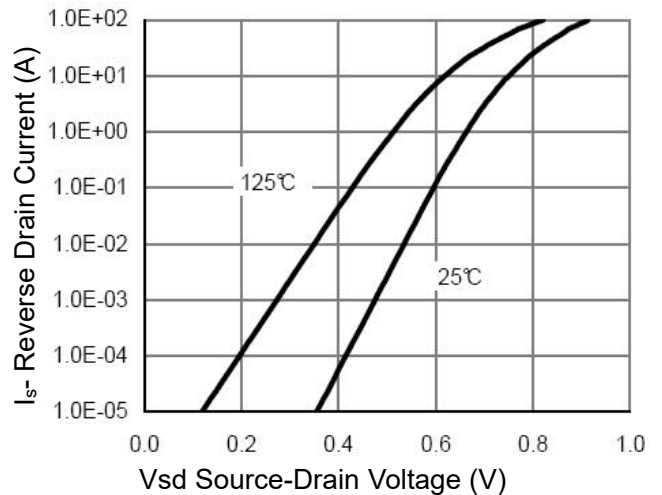


Figure 6 Source- Drain Diode Forward



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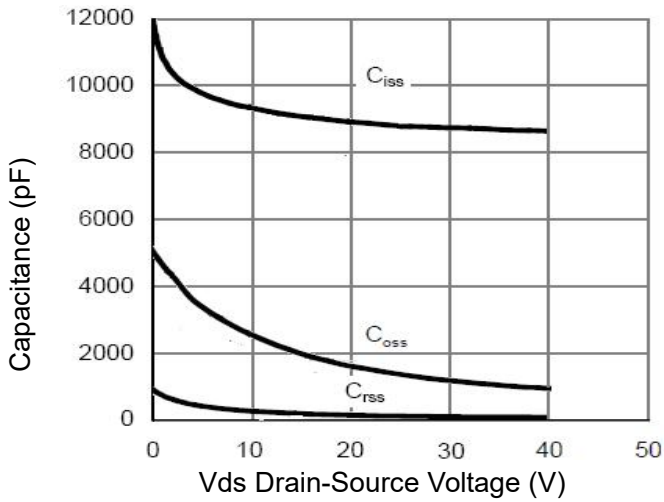


Figure 7 Capacitance vs Vds

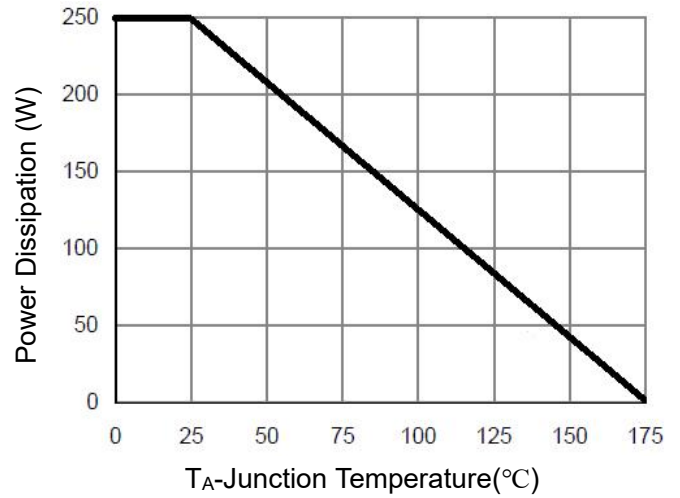


Figure 9 Power De-rating

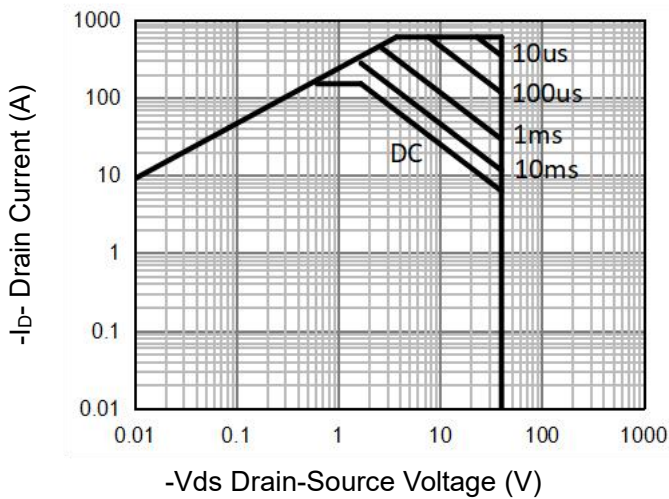


Figure 8 Safe Operation Area (Note 3)

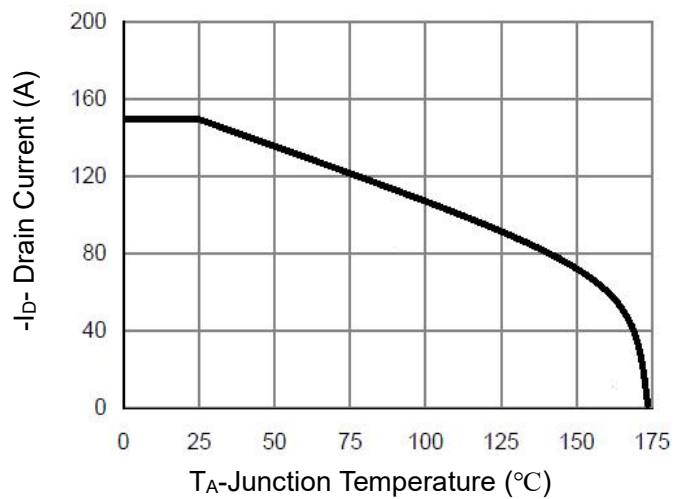


Figure 10 Current De-rating

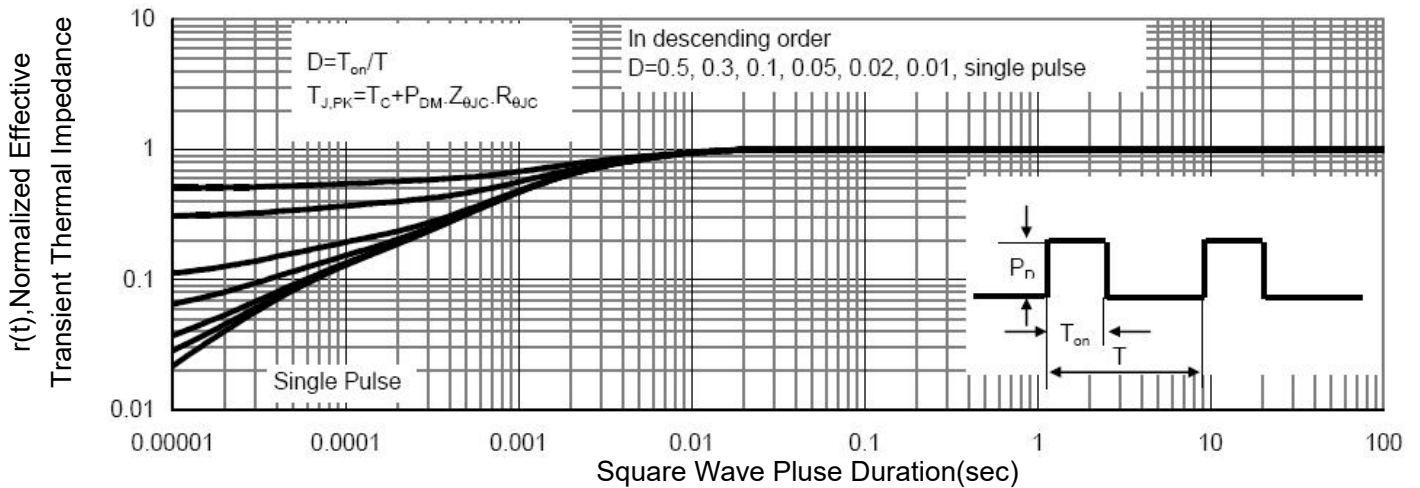
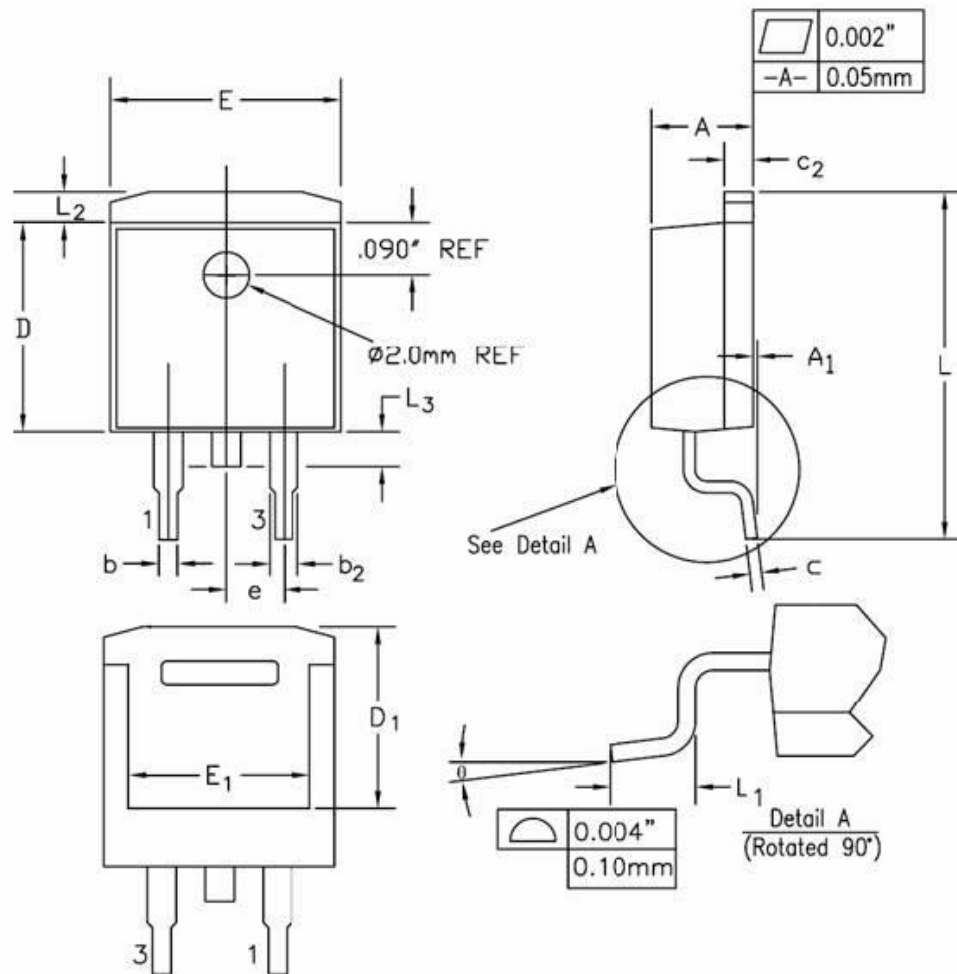


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Information: TO-263-3L



| SYMBOL | INCHES | | MILLIMETERS | | NOTES |
|----------|------------|-------|-------------|-------|-------|
| | MIN | MAX | MIN | MAX | |
| A | 0.170 | 0.180 | 4.32 | 4.57 | |
| A1 | - | 0.010 | - | 0.25 | |
| b | 0.028 | 0.037 | 0.71 | 0.94 | |
| b2 | 0.045 | 0.055 | 1.15 | 1.40 | |
| c | 0.018 | 0.024 | 0.46 | 0.61 | |
| c2 | 0.048 | 0.055 | 1.22 | 1.40 | |
| D | 0.350 | 0.370 | 8.89 | 9.40 | |
| D1 | 0.315 | 0.324 | 8.01 | 8.23 | |
| E | 0.395 | 0.405 | 10.04 | 10.28 | |
| E1 | 0.310 | 0.318 | 7.88 | 8.08 | |
| e | 0.100 BSC. | | 2.54 BSC. | | |
| L | 0.580 | 0.620 | 14.73 | 15.75 | |
| L1 | 0.090 | 0.110 | 2.29 | 2.79 | |
| L2 | 0.045 | 0.055 | 1.15 | 1.39 | |
| L3 | 0.050 | 0.070 | 1.27 | 1.77 | |
| θ | 0° | 8° | 0° | 8° | |