

Features

- High-Side Switching
- Low Threshold
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

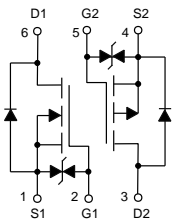
Maximum Ratings

- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 833°C/W Junction to Ambient^(Note 1)

| Parameter | Symbol | Rating | Unit |
|--|-----------------|--------|------|
| Total Power Dissipation | P _D | 150 | mW |
| N-Channel MOSFET | | | |
| Drain-Source Voltage | V _{DS} | 60 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | 0.34 | A |
| Pulsed Drain Current ^(Note 2) | I _{DM} | 1.36 | A |
| P-Channel MOSFET | | | |
| Drain-Source Voltage | V _{DS} | -50 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | -0.18 | A |
| Pulsed Drain Current ^(Note 2) | I _{DM} | -0.7 | A |

- Note 1. Surface Mounted on FR-4 Board Using Minimum Pad Size, 1oz Copper.
 2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

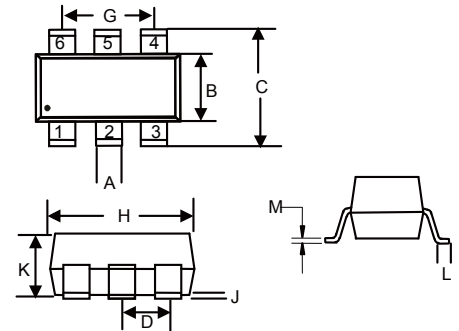
Internal Structure



Marking: +)

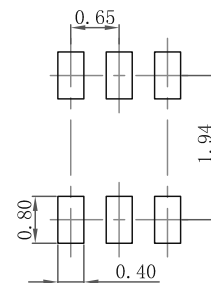
**Dual
N&P-Channel
MOSFET**

SOT-363



| DIM | DIMENSIONS | | | | NOTE |
|-----|------------|-------|-------|------|------|
| | INCHES | | MM | | |
| | MIN | MAX | MIN | MAX | |
| A | 0.006 | 0.014 | 0.15 | 0.35 | |
| B | 0.045 | 0.053 | 1.15 | 1.35 | |
| C | 0.079 | 0.096 | 2.00 | 2.45 | |
| D | 0.026 | | 0.65 | | TYP. |
| G | 0.047 | 0.055 | 1.20 | 1.40 | |
| H | 0.071 | 0.087 | 1.80 | 2.20 | |
| J | ----- | 0.004 | ----- | 0.10 | |
| K | 0.031 | 0.043 | 0.80 | 1.10 | |
| L | 0.010 | 0.018 | 0.26 | 0.46 | |
| M | 0.003 | 0.006 | 0.08 | 0.15 | |

Suggested Solder Pad Layout



Electrical Characteristics @ 25°C (Unless Otherwise Specified)
N-Channel

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---------------|--|-----|-----|-----------|----------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 60 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 10 | μA |
| | | $V_{DS}=0V, V_{GS}=\pm 10V$ | | | ± 200 | nA |
| | | $V_{DS}=0V, V_{GS}=\pm 5V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=48V, V_{GS}=0V$ | | | 1 | μA |
| Gate-Threshold Voltage ^(Note 3) | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=1mA$ | 1 | 1.3 | 2.5 | V |
| Drain-Source On-Resistance ^(Note 3) | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=0.2A$ | | 1.1 | 5.3 | Ω |
| | | $V_{GS}=10V, I_D=0.5A$ | | 0.9 | 5 | |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=0.3A$ | | | 1.5 | V |
| Dynamic Characteristics^(Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=10V, V_{GS}=0V, f=1MHz$ | | | 40 | μF |
| Output Capacitance | C_{oss} | | | | 30 | |
| Reverse Transfer Capacitance | C_{rss} | | | | 10 | |
| Switching Characteristics^(Note 4) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}=10V, V_{DS}=50V, R_L=250\Omega,$ $R_{GEN}=10\Omega$ | | | 10 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | | 15 | |
| Reverse recovery time | t_{rr} | $I_S=300mA, di/dt=-100A/s, V_{GS}=0V,$ $V_R=25V$ | | 30 | | ns |
| Recovered charge | Q_r | | | 30 | | nC |

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

P-Channel

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---------------|--|------|-------|----------|----------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$ | -50 | | | V |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 10 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-50V, V_{GS}=0V$ | | | -15 | μA |
| | | $V_{DS}=-25V, V_{GS}=0V$ | | | -0.1 | μA |
| Gate-Threshold Voltage ^(Note 3) | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.9 | -1.62 | -2 | V |
| Drain-Source On-Resistance ^(Note 3) | $R_{DS(on)}$ | $V_{GS}=-5V, I_D=-0.1A$ | | 5.5 | 10 | Ω |
| | | $V_{GS}=-10V, I_D=-0.1A$ | | 4.1 | 8 | |
| Forward Transconductance ^(Note 3) | g_{FS} | $V_{DS}=-25V, I_D=-0.1A$ | 0.05 | | | S |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=-0.18A$ | | | -2.2 | V |
| Dynamic Characteristics^(Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-5V, V_{GS}=0V, f=1MHz$ | | 30 | | pF |
| Output Capacitance | C_{oss} | | | 10 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 5 | | |
| Switching Characteristics^(Note 4) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=-15V, I_D=-2.5A, R_L=50\Omega$ | | 2.5 | | ns |
| Turn-On Rise Time | t_r | | | 1 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 16 | | |
| Turn-Off Fall Time | t_f | | | 8 | | |

Note: 3. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

4. Guaranteed by Design, Not Subject to Production Testing.

Curve Characteristics(N-Channel)

Fig. 1 - Output Characteristics

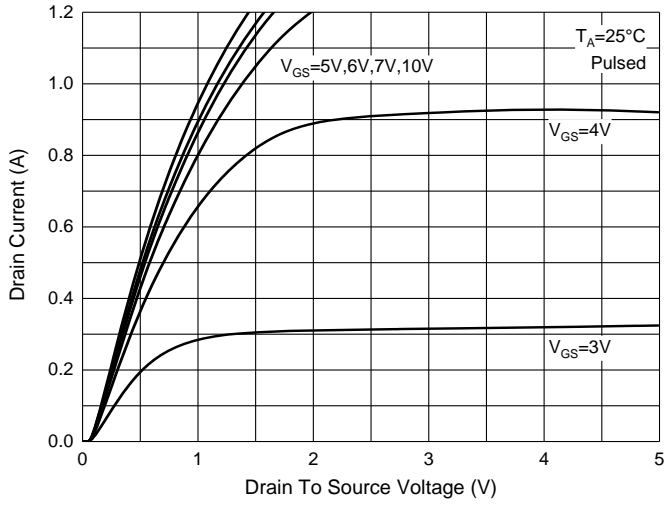


Fig. 2 - Transfer Characteristics

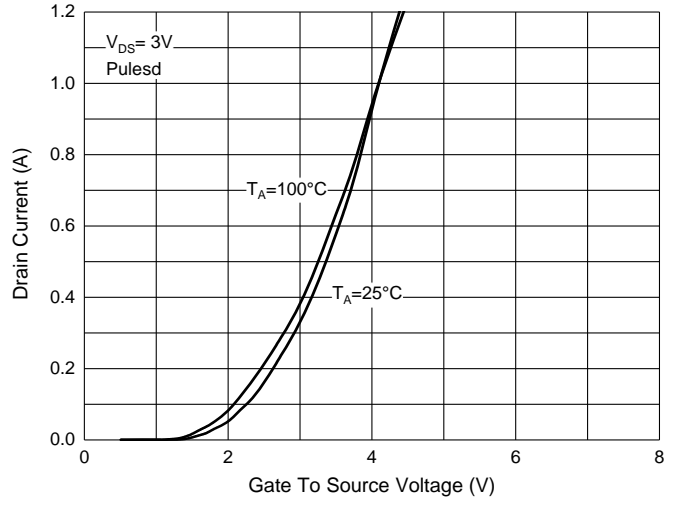


Fig. 3 - $R_{DS(ON)} - I_D$

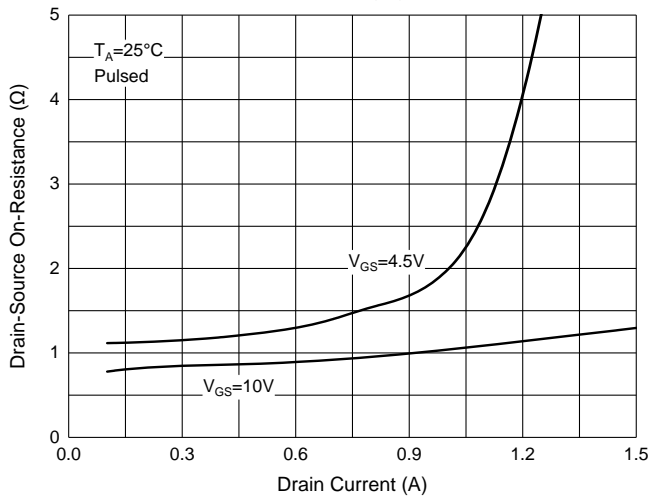


Fig. 4 - $R_{DS(ON)} - V_{GS}$

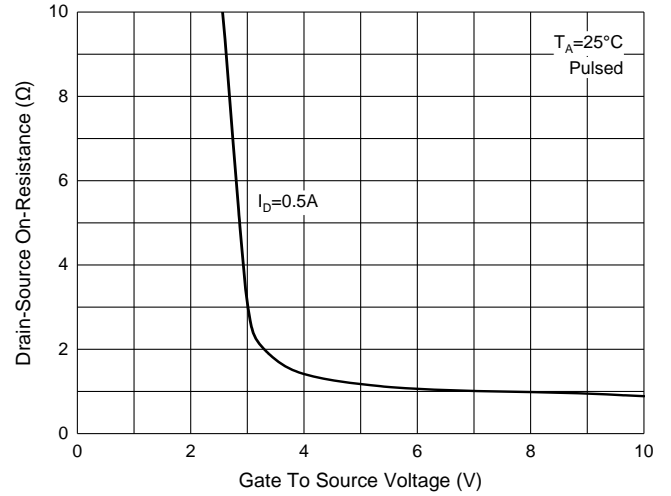


Fig. 5 - $I_S - V_{SD}$

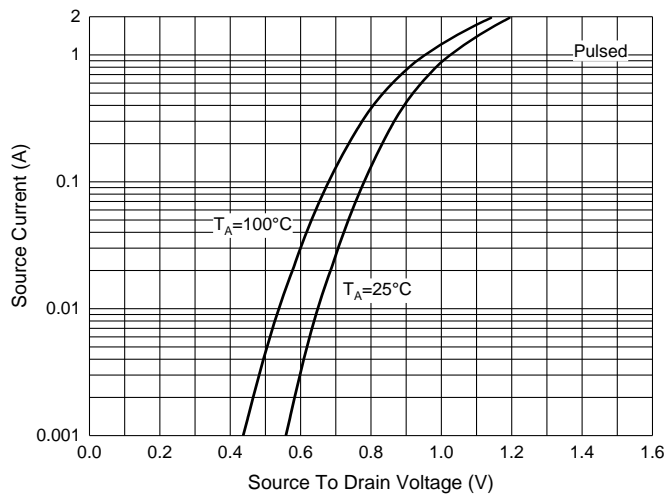
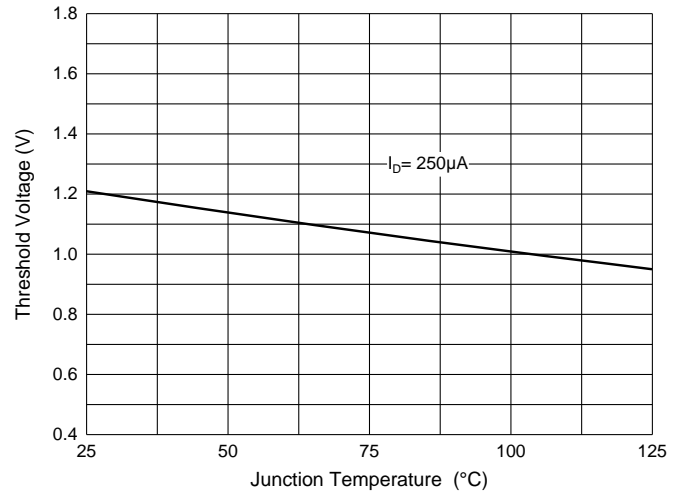


Fig. 6 - Threshold Voltage



Curve Characteristics(P-Channel)

Fig. 1 - Output Characteristics

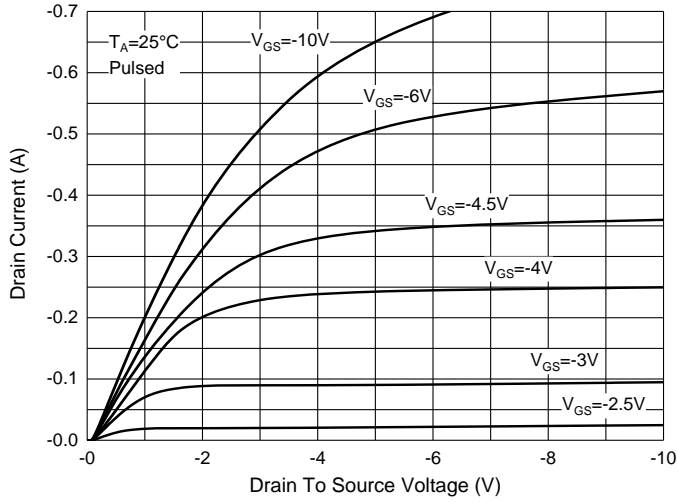


Fig. 2 - Transfer Characteristics

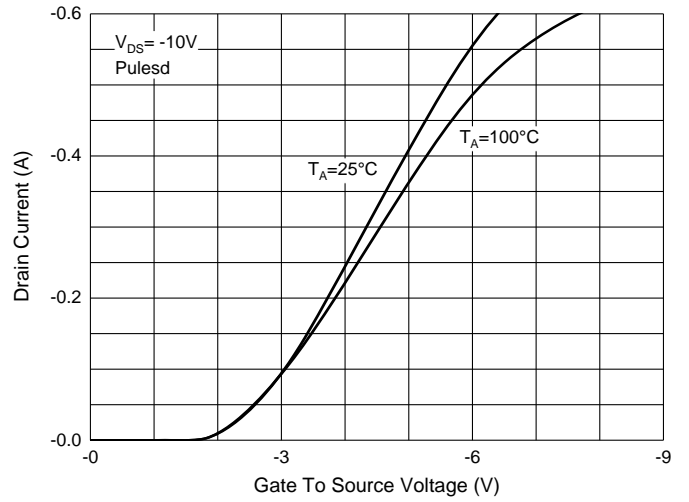


Fig. 3 - $R_{DS(ON)} - I_D$

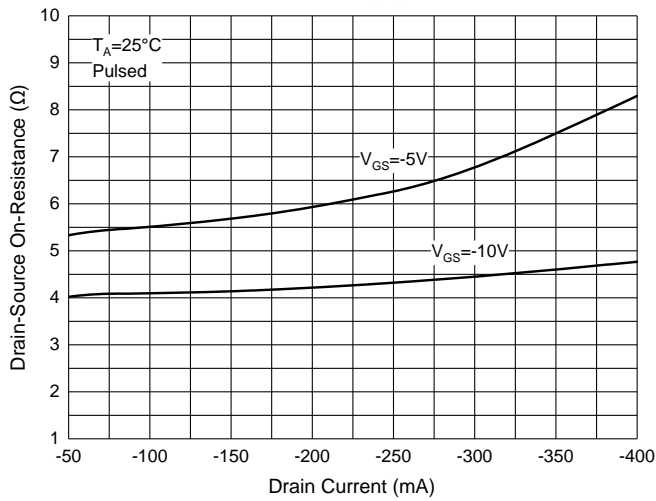


Fig. 4 - $R_{DS(ON)} - V_{GS}$

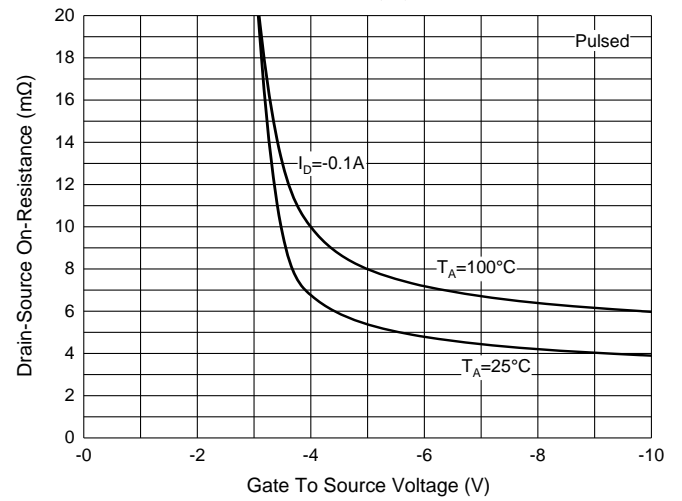


Fig. 5 - $I_S - V_{SD}$

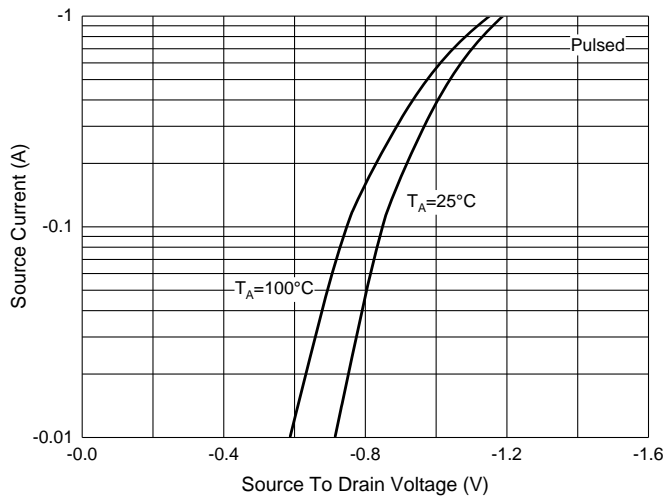
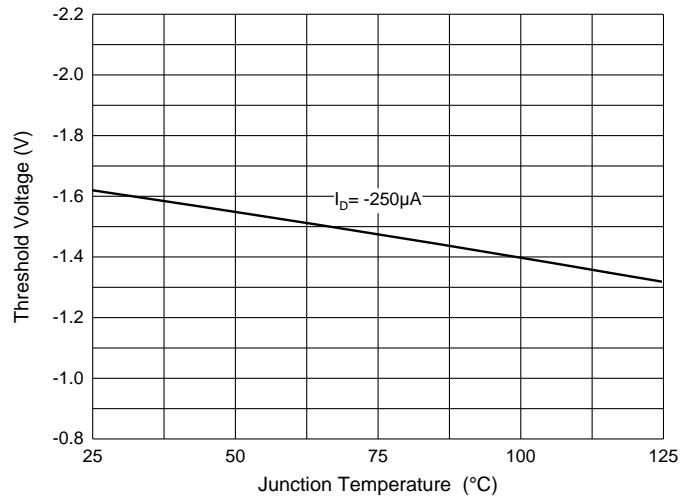


Fig. 6 - Threshold Voltage



Ordering Information

| Device | Packing |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

Note : Adding "-HF" Suffix for Halogen Free, eg. Part Number-TP-HF

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