

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $R_{DS(on)}$ and to ensure minimal power loss and heat dissipation.

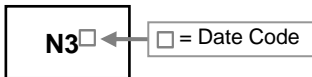
MECHANICAL DATA

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage

APPLICATION

- DC-DC converter circuit
- Load Switch

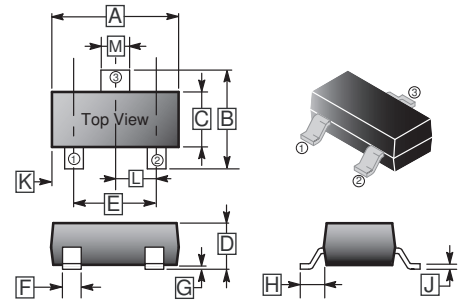
MARKING



PACKAGE INFORMATION

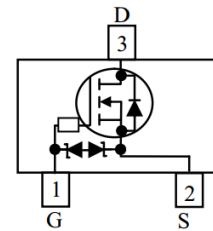
| Package | MPQ | Leader Size |
|---------|-----|-------------|
| SOT-523 | 3K | 7 inch |

SOT-523



| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|-------|
| | Min. | Max. | | Min. | Max. |
| A | 1.5 | 1.7 | G | - | 0.1 |
| B | 1.45 | 1.75 | H | 0.55 REF. | - |
| C | 0.7 | 0.9 | J | 0.1 | 0.2 |
| D | 0.7 | 0.9 | K | - | - |
| E | 0.9 | 1.1 | L | 0.5 TYP. | - |
| F | 0.15 | 0.35 | M | 0.25 | 0.325 |

Top View



MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Rating | | Unit | |
|--|----------------|--------------------------|--------------|------------------|---|
| | | 10S | Steady State | | |
| Drain – Source Voltage | V_{DS} | 20 | | V | |
| Gate – Source Voltage | V_{GS} | ± 6 | | V | |
| Continuous Drain Current ¹ | I_D | $T_A = 25^\circ\text{C}$ | 0.88 | 0.8 | A |
| | | $T_A = 70^\circ\text{C}$ | 0.71 | 0.64 | |
| Power Dissipation ¹ | P_D | $T_A = 25^\circ\text{C}$ | 0.37 | 0.3 | W |
| | | $T_A = 70^\circ\text{C}$ | 0.23 | 0.19 | |
| Continuous Drain Current ² | I_D | $T_A = 25^\circ\text{C}$ | 0.76 | 0.69 | A |
| | | $T_A = 70^\circ\text{C}$ | 0.6 | 0.55 | |
| Power Dissipation ² | P_D | $T_A = 25^\circ\text{C}$ | 0.27 | 0.22 | W |
| | | $T_A = 70^\circ\text{C}$ | 0.17 | 0.14 | |
| Pulsed Drain Current ³ | I_{DM} | 1.4 | | A | |
| Lead Temperature | T_L | 260 | | $^\circ\text{C}$ | |
| Operating Junction & Storage Temperature Range | T_J, T_{STG} | 150, -55~150 | | $^\circ\text{C}$ | |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Rating | | Unit | |
|---|-----------------|--------------|------|------|--------|
| | | Typ. | Max. | | |
| Junction-to-Ambient Thermal Resistance ¹ | $R_{\theta JA}$ | $T \leq 10S$ | 285 | 335 | °C / W |
| | | Steady State | 340 | 405 | |
| Junction-to-Ambient Thermal Resistance ² | $R_{\theta JA}$ | $T \leq 10S$ | 385 | 450 | |
| | | Steady State | 455 | 545 | |
| Junction-to-Case Thermal Resistance | $R_{\theta JC}$ | Steady State | 260 | 300 | |

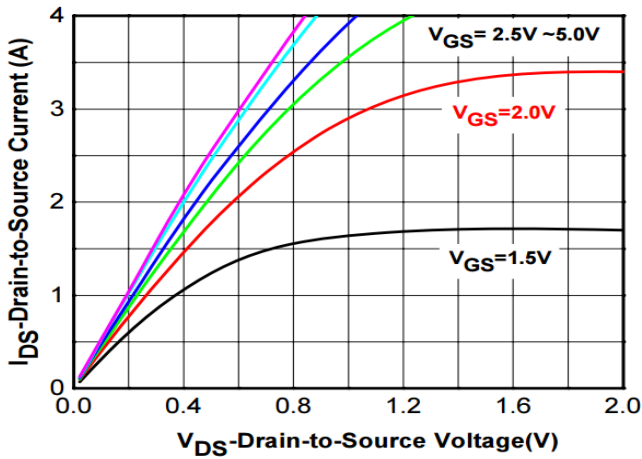
Note:

1. Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper.
2. Surface mounted on FR4 board using minimum pad size, 1oz copper
3. Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu s$, Duty Cycle=1%
4. Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ C$.

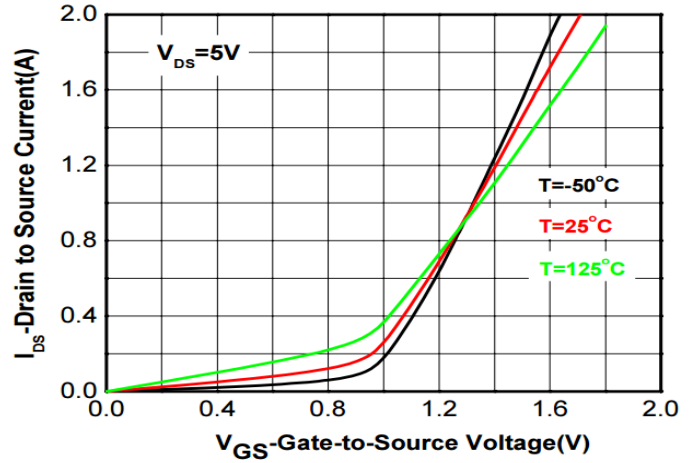
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Teat Conditions |
|---------------------------------|---------------|------|------|---------|------------|--|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 20 | - | - | V | $V_{GS}=0, I_D=250\mu A$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1 | μA | $V_{DS}=16V, V_{GS}=0$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 5 | μA | $V_{DS}=0, V_{GS}=\pm 5V$ |
| Gate-Threshold Voltage | $V_{GS(TH)}$ | 0.45 | 0.55 | 1 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| Drain-Source On Resistance | $R_{DS(ON)}$ | - | 220 | 310 | m Ω | $V_{GS}=4.5V, I_D=0.55A$ |
| | | - | 260 | 360 | | $V_{GS}=2.5V, I_D=0.45A$ |
| | | - | 320 | 460 | | $V_{GS}=1.8V, I_D=0.35A$ |
| Forward Transconductance | g_{FS} | - | 1 | - | S | $V_{DS}=10V, I_D=0.4A$ |
| Body-Drain Diode Ratings | | | | | | |
| Diode Forward On-Voltage | V_{SD} | 0.5 | 0.7 | 1.5 | V | $I_S=350mA, V_{GS}=0$ |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{ISS} | - | 68 | - | pF | $V_{DS}=10V, V_{GS}=0, f=100KHz$ |
| Output Capacitance | C_{OSS} | - | 9 | - | | |
| Reverse Transfer Capacitance | C_{RSS} | - | 7.5 | - | | |
| Total Gate Charge | $Q_{G(TOT)}$ | - | 1.15 | - | nC | $V_{DS}=10V, V_{GS}=4.5V, I_D=0.55A$ |
| Threshold Gate Charge | $Q_{G(TH)}$ | - | 0.06 | - | | |
| Gate-to-Source Charge | Q_{GS} | - | 0.15 | - | | |
| Gate-to-Drain Charge | Q_{GD} | - | 0.23 | - | | |
| Turn-on Delay Time | $T_{d(ON)}$ | - | 22 | - | nS | $V_{DD}=10V, I_D=0.55A, V_{GS}=4.5V, R_G=6\Omega.$ |
| Rise Time | T_r | - | 80 | - | | |
| Turn-off Delay Time | $T_{d(OFF)}$ | - | 700 | - | | |
| Fall Time | T_f | - | 380 | - | | |

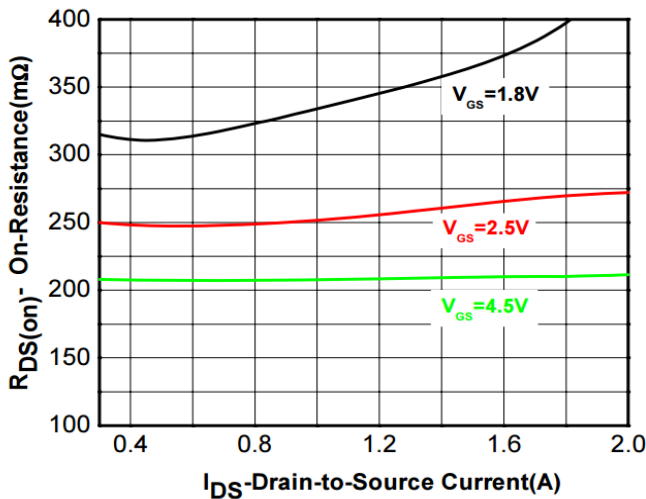
CHARACTERISTIC CURVES



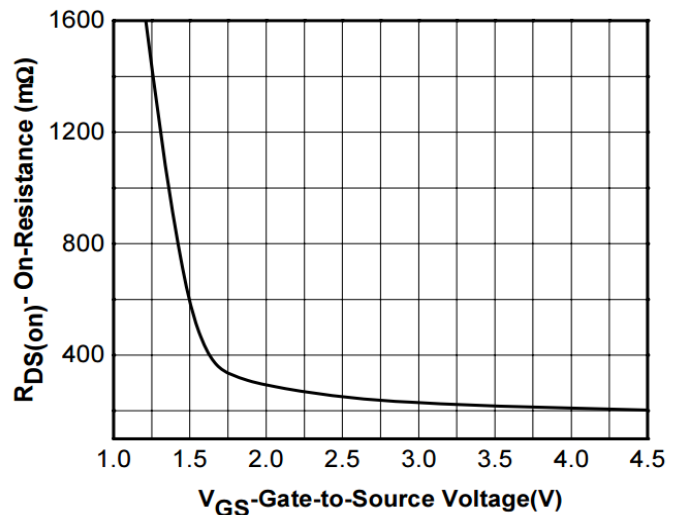
Output Characteristics



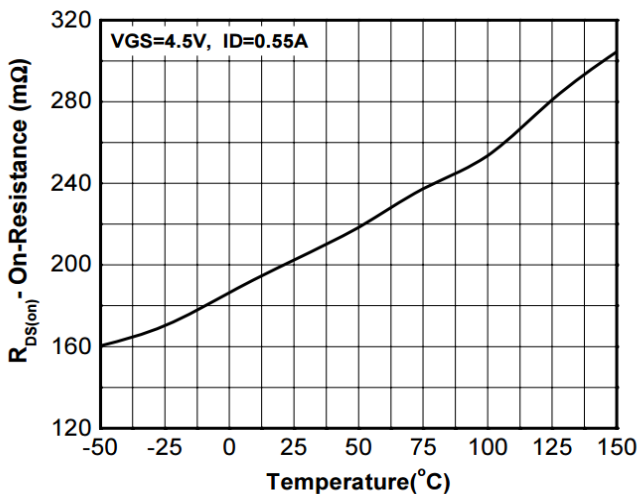
Transfer Characteristics



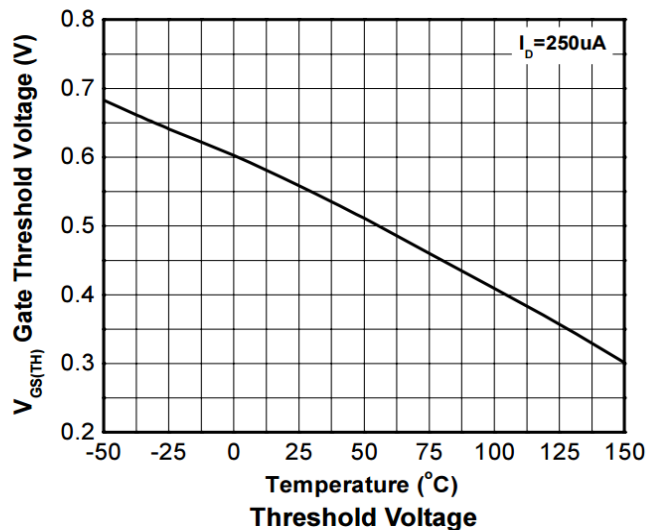
On Resistance vs. Drain Current



On Resistance vs. V_{GS} vs. Temperature

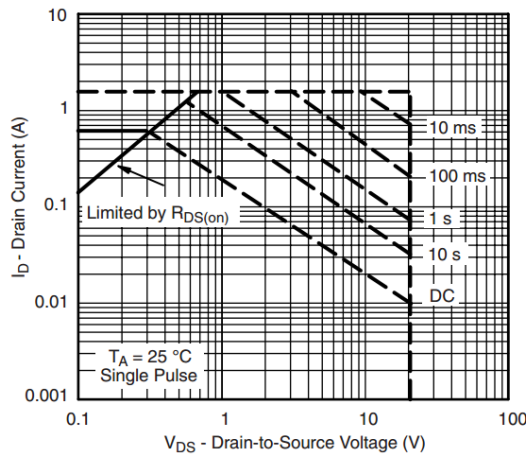
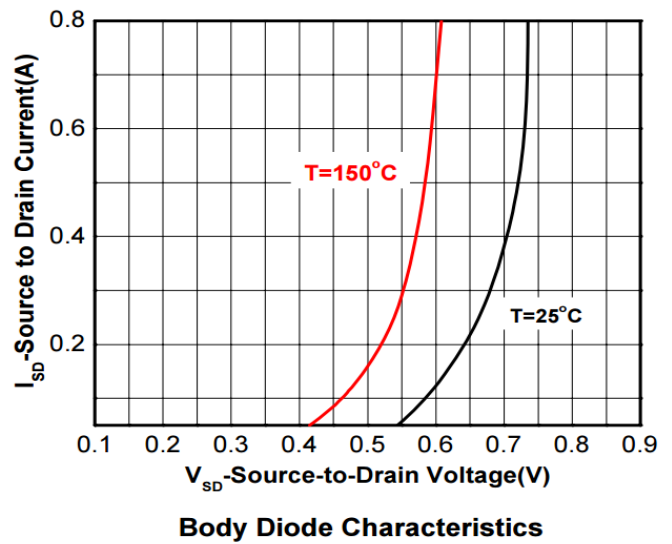
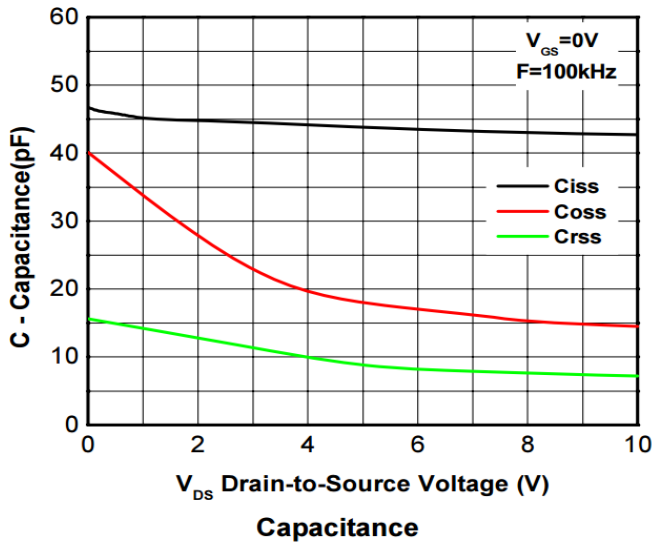


On Resistance vs. Junction Temperature

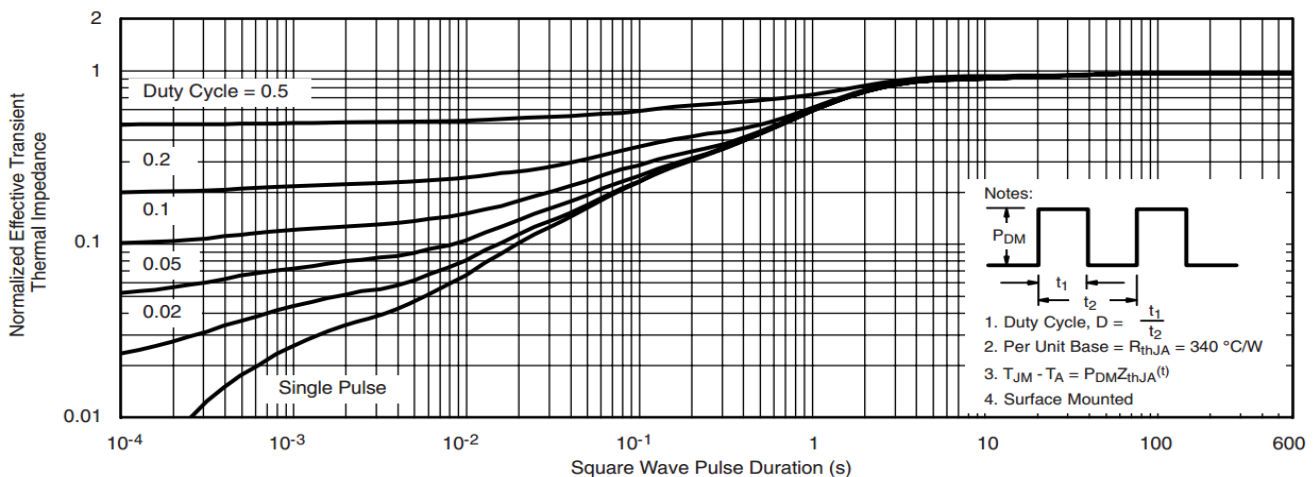


Threshold Voltage

CHARACTERISTIC CURVES



Safe Operation Area, Junction-to-Ambient



Transient thermal response (Junction-to-Ambient)