

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

DESCRIPTION

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

FEATURES

- Low $R_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe TO-252 saves board space
- Fast switching speed
- High performance trench technology

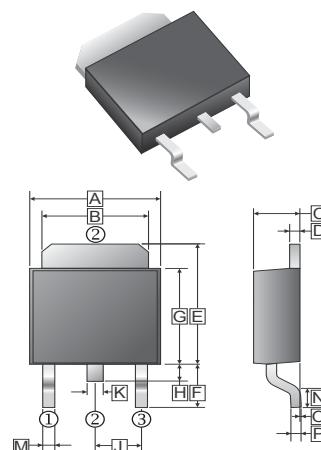
APPLICATION

DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

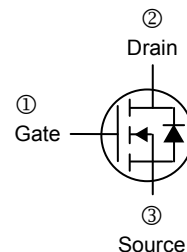
PACKAGE INFORMATION

| Package | MPQ | Leader Size |
|---------|------|-------------|
| TO-252 | 2.5K | 13 inch |

TO-252(D-Pack)



| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|------|
| | Min. | Max. | | Min. | Max. |
| A | 6.35 | 6.80 | J | 2.30 | REF. |
| B | 5.20 | 5.50 | K | 0.64 | 0.90 |
| C | 2.15 | 2.40 | M | 0.50 | 1.1 |
| D | 0.45 | 0.58 | N | 0.9 | 1.65 |
| E | 6.8 | 7.5 | O | 0 | 0.15 |
| F | 2.40 | 3.0 | P | 0.43 | 0.58 |
| G | 5.40 | 6.25 | | | |
| H | 0.64 | 1.20 | | | |



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

| Parameter | Symbol | Rating | Unit |
|---|-----------------|----------|-----------------------------|
| Drain-Source Voltage | V_{DS} | 90 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ¹ | I_D | 17 | A |
| Pulsed Drain Current ² | I_{DM} | 70 | A |
| Continuous Source Current (Diode Conduction) ¹ | I_S | 42 | A |
| Total Power Dissipation ¹ | P_D | 50 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~175 | $^\circ\text{C}$ |
| Thermal Resistance Rating | | | |
| Maximum Thermal Resistance Junction-Ambient ¹ | $R_{\theta JA}$ | 40 | $^\circ\text{C} / \text{W}$ |
| Maximum Thermal Resistance Junction-Case | $R_{\theta JC}$ | 3 | $^\circ\text{C} / \text{W}$ |

Note:

1. Surface Mounted on 1" x 1" FR4 Board.
2. Pulse width limited by maximum junction temperature

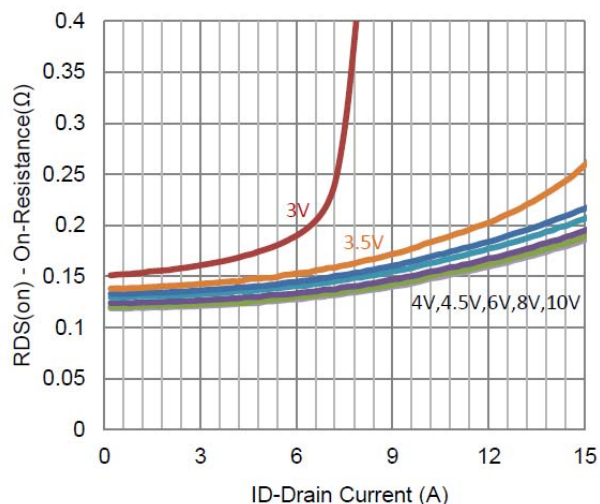
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|--------------|------|------|-----------|------------|---|
| Static | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | 1.0 | - | - | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| Gate-Body Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{DS}=0, V_{GS}=\pm 20V$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1 | μA | $V_{DS}=80V, V_{GS}=0$ |
| | | - | - | 25 | | $V_{DS}=80V, V_{GS}=0, T_J=55^\circ C$ |
| On-State Drain Current ¹ | $I_{D(on)}$ | 30 | - | - | A | $V_{DS}=5V, V_{GS}=10V$ |
| Drain-Source On-Resistance ¹ | $R_{DS(ON)}$ | - | - | 130 | m Ω | $V_{GS}=10V, I_D=8.5A$ |
| | | - | - | 160 | | $V_{GS}=4.5V, I_D=7.5A$ |
| Forward Transconductance ¹ | g_{fs} | - | 15 | - | S | $V_{DS}=15V, I_D=8.5A$ |
| Diode Forward Voltage | V_{SD} | - | 1.03 | - | V | $I_S=21A, V_{GS}=0$ |
| Dynamic ² | | | | | | |
| Input Capacitance | C_{iss} | - | 398 | - | pF | $V_{GS}=0$ $V_{DS}=15V$ $f=1.0MHz$ |
| Output Capacitance | C_{oss} | - | 43 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 34 | - | | |
| Total Gate Charge | Q_g | - | 4.9 | - | nC | $V_{DS}=50V$ $V_{GS}=4.5V$ $I_D=8.5A$ |
| Gate-Source Charge | Q_{gs} | - | 1.9 | - | | |
| Gate-Drain Charge | Q_{gd} | - | 2.3 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 4 | - | nS | $V_{DS}=50V$ $I_D=8.5A$ $V_{GEN}=10V$ $R_L=3.7\Omega$ $R_{GEN}=6\Omega$ |
| Rise Time | T_r | - | 6 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 19 | - | | |
| Fall Time | T_f | - | 7 | - | | |

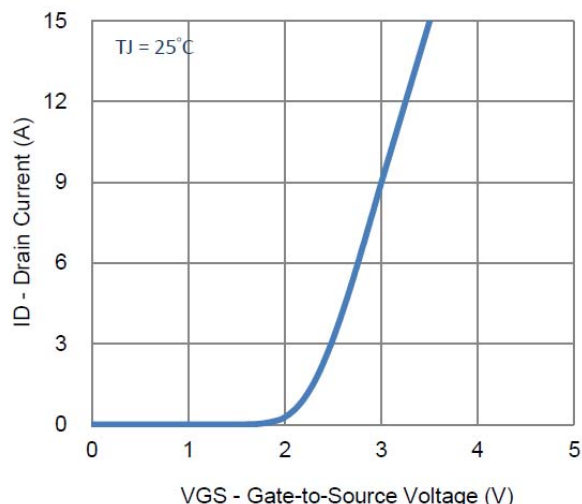
Notes:

1. Pulse test : Pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production testing.

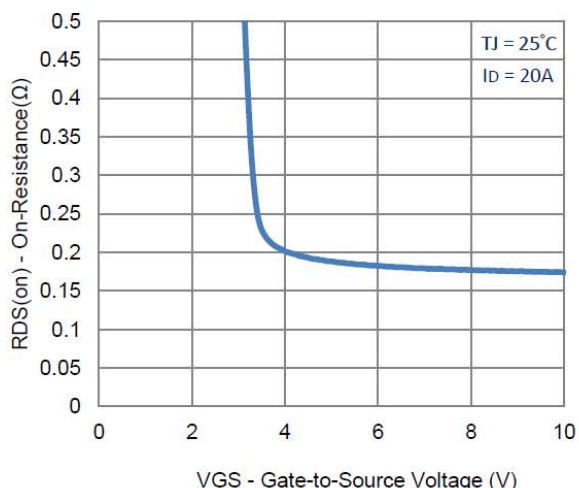
CHARACTERISTIC CURVES



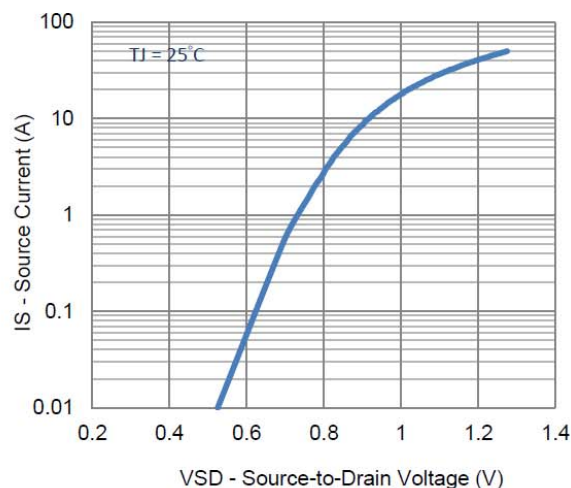
1. On-Resistance vs. Drain Current



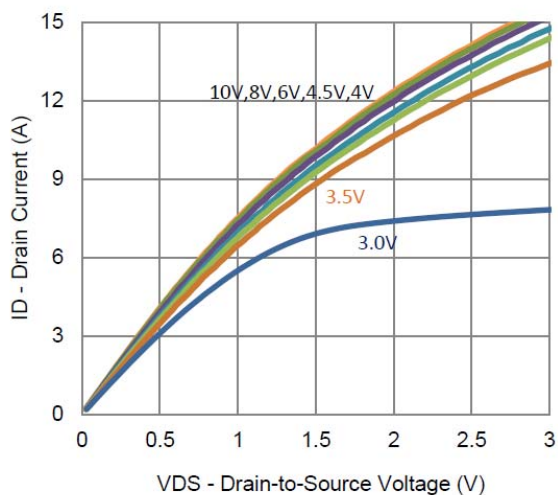
2. Transfer Characteristics



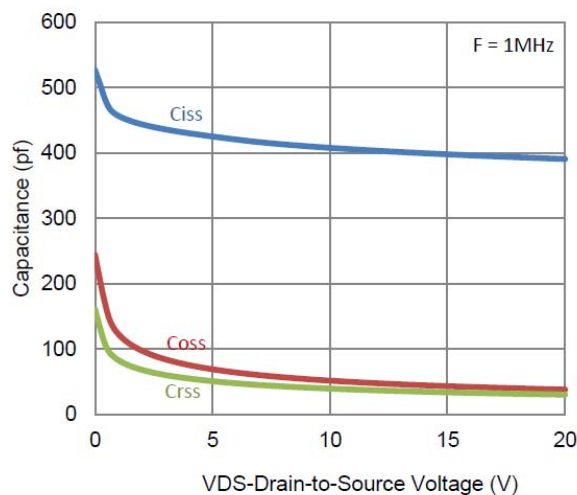
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

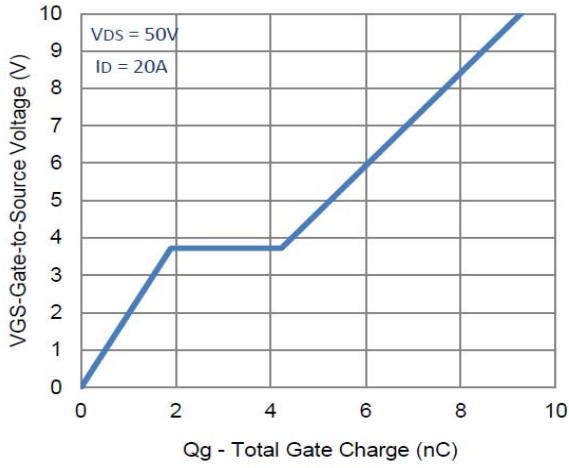


5. Output Characteristics

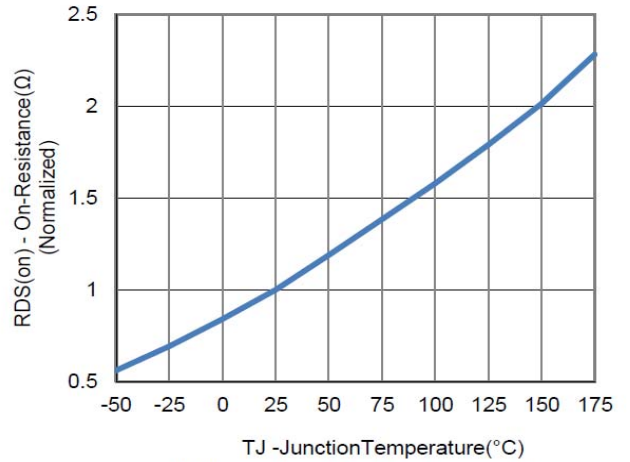


6. Capacitance

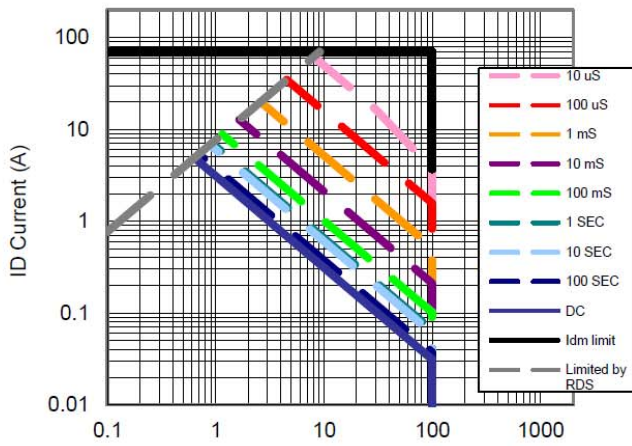
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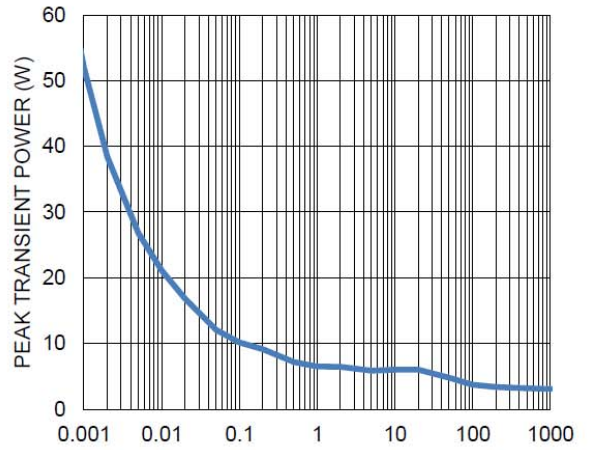
7. Gate Charge



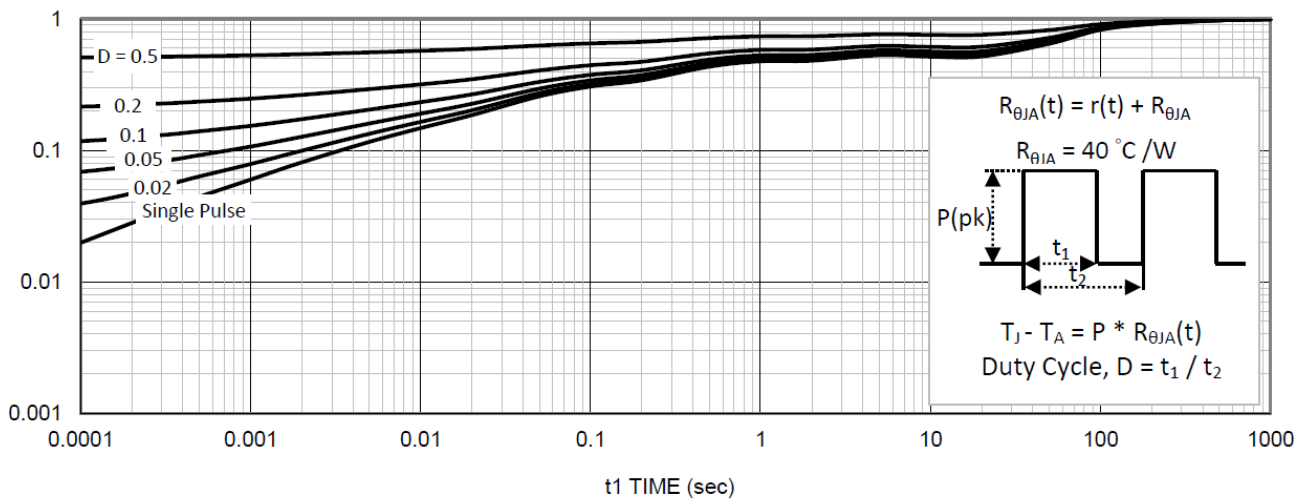
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient