

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

FEATURES

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

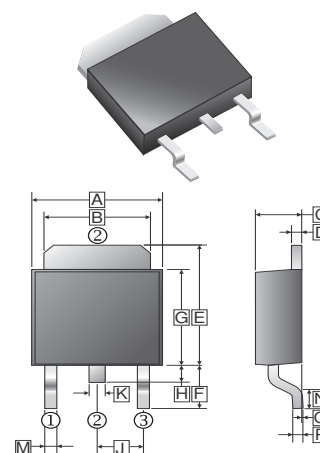
APPLICATION

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

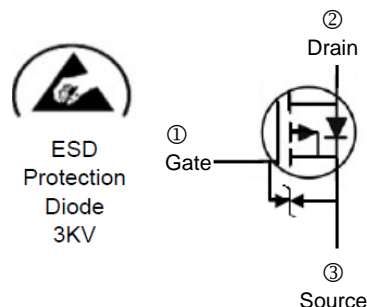
PACKAGE INFORMATION

| 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 | Ratings | Unit |
|---|-----------------|-----------|-----------------------------|
| Drain-Source Voltage | V_{DS} | -40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ¹ | I_D | -36 | A |
| Pulsed Drain Current @ $T_A=25^\circ\text{C}$ ² | I_{DM} | -40 | A |
| Continuous Source Current (Diode Conduction) ¹ | I_S | -30 | A |
| Total Power Dissipation @ $T_A=25^\circ\text{C}$ ¹ | P_D | 50 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 ~ 175 | $^\circ\text{C}$ |
| Thermal Resistance Ratings | | | |
| Maximum Thermal Resistance Junction-Ambient ¹ | $R_{\theta JA}$ | 50 | $^\circ\text{C} / \text{W}$ |
| Maximum Thermal Resistance Junction-Case | $R_{\theta JC}$ | 3 | $^\circ\text{C} / \text{W}$ |

Notes :

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

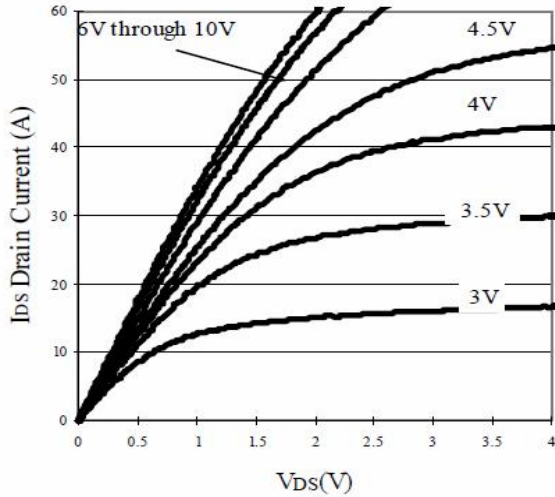
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|--------------|------|------|-----------|---------------|---|
| Static | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | -1 | - | - | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Gate-Body Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{DS} = 0, V_{GS} = \pm 25\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | -1 | μA | $V_{DS} = -24\text{V}, V_{GS} = 0$ |
| | | - | - | -5 | | $V_{DS} = -24\text{V}, V_{GS} = 0, T_J = 55^\circ\text{C}$ |
| On-State Drain Current ¹ | $I_{D(on)}$ | -41 | - | - | A | $V_{DS} = -5\text{V}, V_{GS} = -10\text{V}$ |
| Drain-Source On-Resistance ¹ | $R_{DS(ON)}$ | - | - | 30 | m Ω | $V_{GS} = -10\text{V}, I_D = -36\text{A}$ |
| | | - | - | 40 | | $V_{GS} = -4.5\text{V}, I_D = -29\text{A}$ |
| Forward Transconductance ¹ | g_{fs} | - | 31 | - | S | $V_{DS} = -15\text{V}, I_D = -36\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | -0.7 | - | V | $I_S = -41\text{A}, V_{GS} = 0$ |
| Dynamic ² | | | | | | |
| Total Gate Charge | Q_g | - | 13.9 | 30 | nC | $V_{DS} = -15\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -36\text{A}$ |
| Gate-Source Charge | Q_{gs} | - | 5.2 | 20 | | |
| Gate-Drain Charge | Q_{gd} | - | 5.8 | 20 | | |
| Input Capacitance | C_{iss} | - | 1583 | 4000 | pF | $V_{DS} = -15\text{V},$ $V_{GS} = 0,$ $f = 1\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 278 | 600 | | |
| Reverse Transfer Capacitance | C_{rss} | - | 183 | 400 | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 15 | - | nS | $V_{DD} = -15\text{V}$ $I_D = -41\text{A}$ $V_{GEN} = -10\text{V}$ $R_L = 15\Omega$ $R_G = 6\Omega$ |
| Rise Time | T_r | - | 12 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 62 | - | | |
| Fall Time | T_f | - | 46 | - | | |

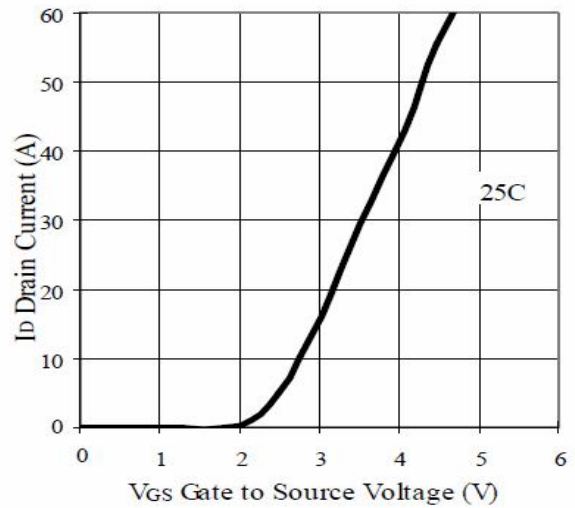
Notes:

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

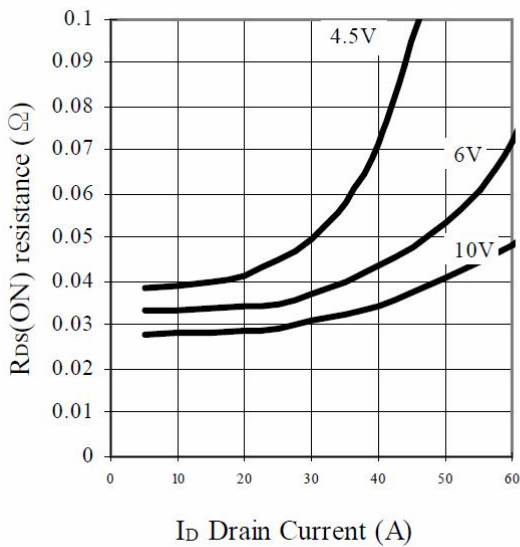
CHARACTERISTIC CURVES



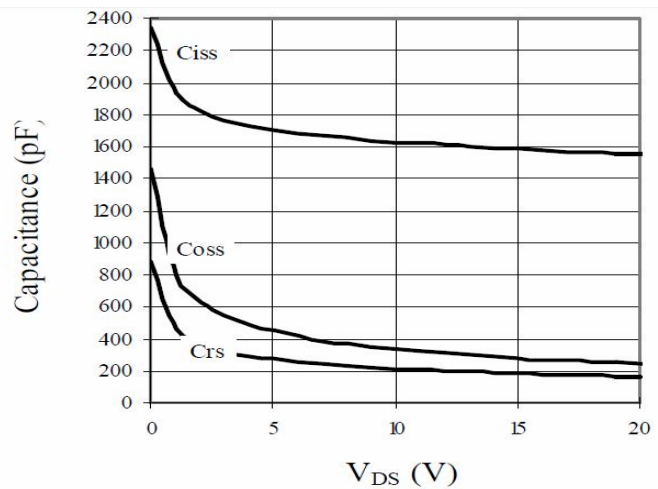
Output Characteristics



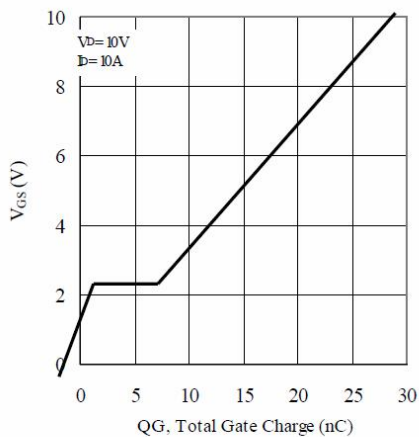
Transfer Characteristics



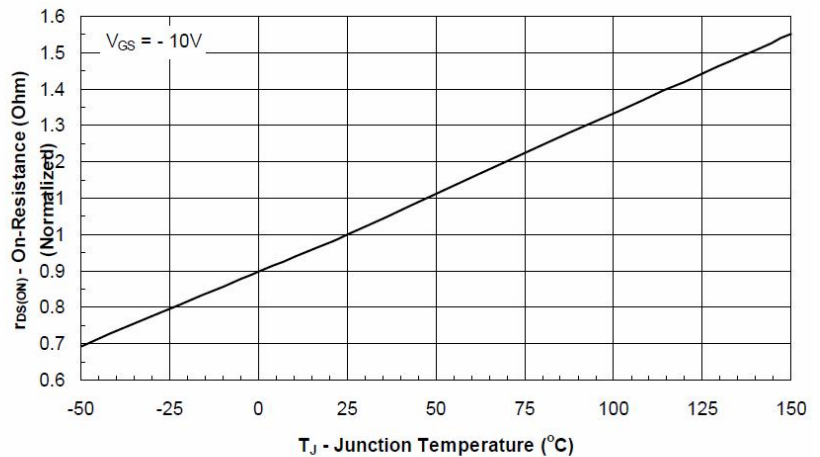
On Resistance Vs Vgs Voltage



Capacitance

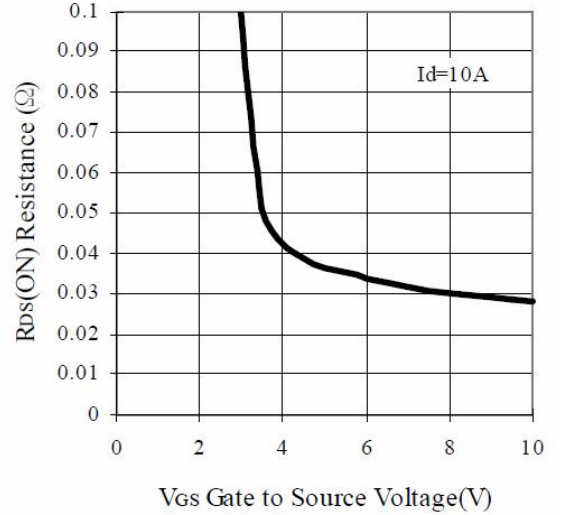
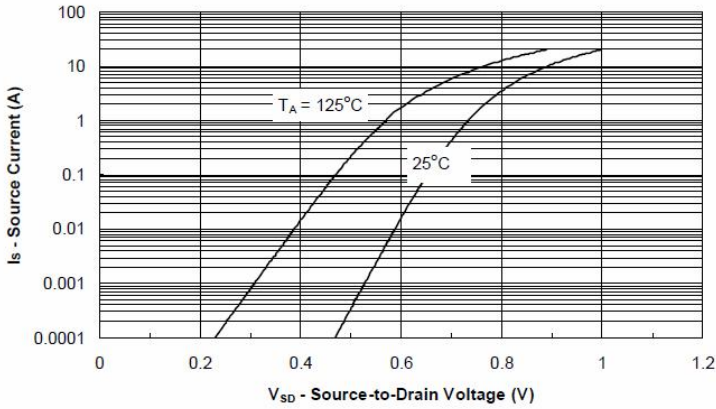


Gate Charge

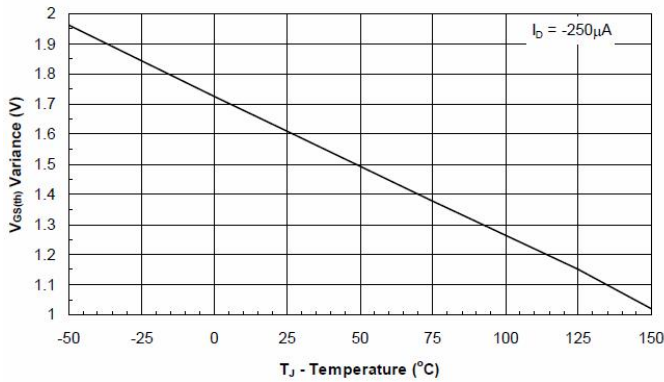


On-Resistance vs. Junction Temperature

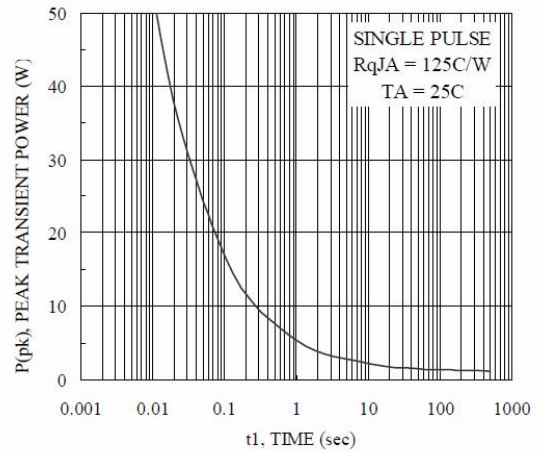
CHARACTERISTIC CURVES



Source-Drain Diode Forward Voltage



On-Resistance with Gate to Source Voltage



Threshold Voltage

Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

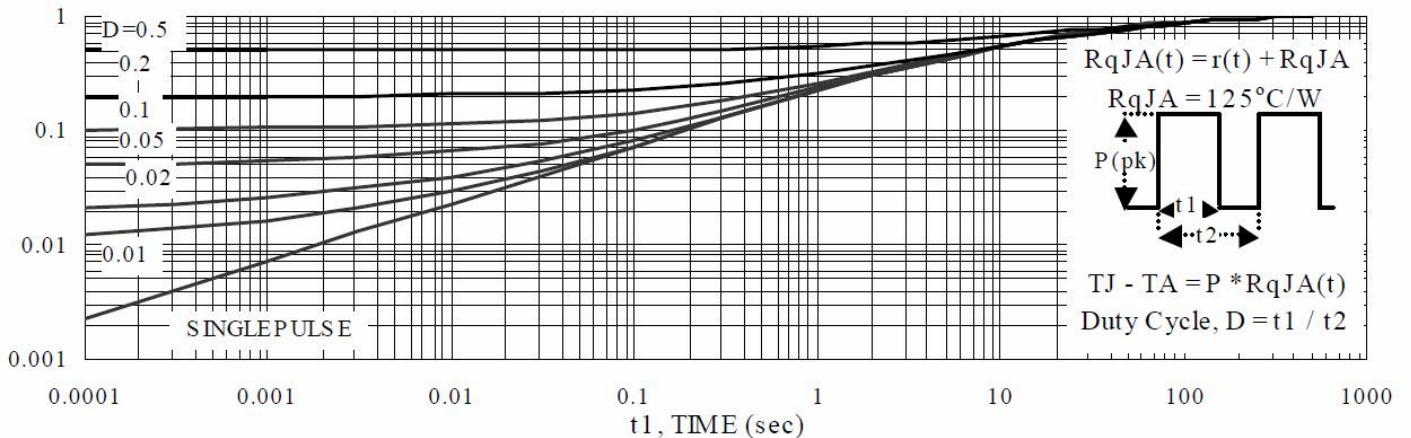


Figure 11. Transient Thermal Response Curve