

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

DESCRIPTION

These miniature surface mount MOSFETs utilize high cell density process. Low $R_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are PWM DC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

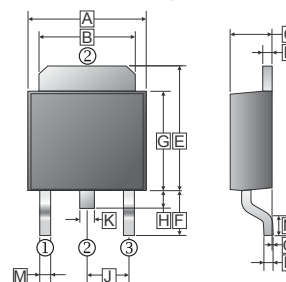
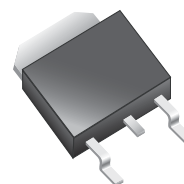
FEATURES

- Low $R_{DS(on)}$ Provides Higher Efficiency and Extends Battery Life
- Miniature TO-252 Surface Mount Package Saves Board Space
- High power and current handling capability
- Low side high current DC-DC Converter applications

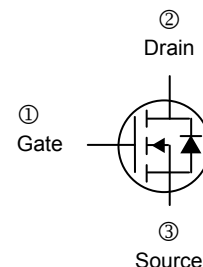
PACKAGE INFORMATION

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

TO-252(D-Pack)



| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|------|
| | Min. | Max. | | Min. | Max. |
| A | 6.4 | 6.8 | J | 2.30 | REF. |
| B | 5.20 | 5.50 | K | 0.70 | 0.90 |
| C | 2.20 | 2.40 | M | 0.50 | 1.1 |
| D | 0.45 | 0.58 | N | 0.9 | 1.6 |
| E | 6.8 | 7.3 | O | 0 | 0.15 |
| F | 2.40 | 3.0 | P | 0.43 | 0.58 |
| G | 5.40 | 6.2 | | | |
| H | 0.8 | 1.20 | | | |



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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--|-----------------|-----------|-----------------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current @ $T_C=25^\circ\text{C}$ ¹ | I_D | 51 | A |
| Pulsed Drain Current ² | I_{DM} | 200 | A |
| Continuous Source Current (Diode Conduction) ¹ | I_S | 51 | A |
| Power Dissipation @ $T_C=25^\circ\text{C}$ 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 | $R_{\theta JA}$ | 40 | $^\circ\text{C} / \text{W}$ |
| 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.

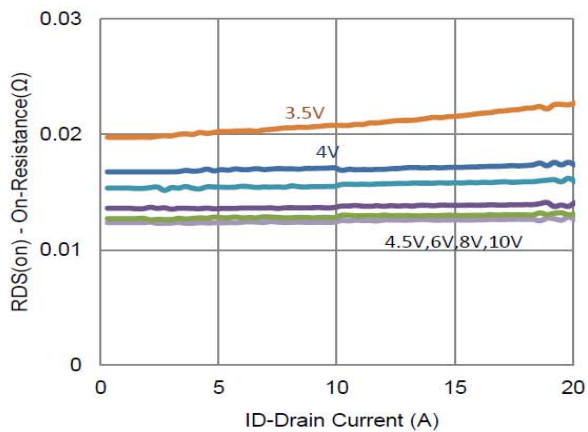
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|--------------|------|------|-----------|---------------|---|
| Static | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 1.0 | - | - | V | $V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$ |
| Gate-Body Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1 | μA | $V_{DS} = 48\text{V}$, $V_{GS} = 0\text{V}$ |
| | | - | - | 25 | | $V_{DS} = 48\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 55^\circ\text{C}$ |
| On-State Drain Current ¹ | $I_{D(ON)}$ | 35 | - | - | A | $V_{DS} = 5\text{V}$, $V_{GS} = 10\text{V}$ |
| Drain-Source On-Resistance ¹ | $R_{DS(ON)}$ | - | - | 13 | m Ω | $V_{GS} = 10\text{V}$, $I_D = 20\text{A}$ |
| | | - | - | 18 | | $V_{GS} = 4.5\text{V}$, $I_D = 16\text{A}$ |
| Forward Transconductance ¹ | g_{fs} | - | 24 | - | S | $V_{DS} = 15\text{V}$, $I_D = 20\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | 0.9 | - | V | $I_S = 25.5\text{A}$, $V_{GS} = 0$ |
| Dynamic ² | | | | | | |
| Total Gate Charge | Q_g | - | 20 | - | nC | $I_D = 20\text{A}$ $V_{DS} = 30\text{V}$ $V_{GS} = 4.5\text{V}$ |
| Gate-Source Charge | Q_{gs} | - | 5.9 | - | | |
| Gate-Drain Change | Q_{gd} | - | 11 | - | | |
| Input Capacitance | C_{iss} | - | 2022 | - | pF | $f = 1\text{MHz}$ $V_{DS} = 15\text{V}$ $V_{GS} = 0$ |
| Output Capacitance | C_{oss} | - | 101 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 158 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 10 | - | nS | $V_{DS} = 30\text{V}$ $I_D = 20\text{A}$ $R_L = 1.5\Omega$ $V_{GEN} = 10\text{V}$ $R_{GEN} = 6\Omega$ |
| Rise Time | T_r | - | 11 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 61 | - | | |
| Fall Time | T_f | - | 19 | - | | |

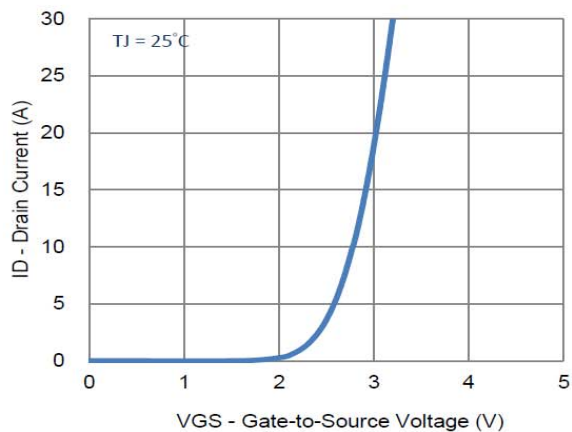
Notes

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

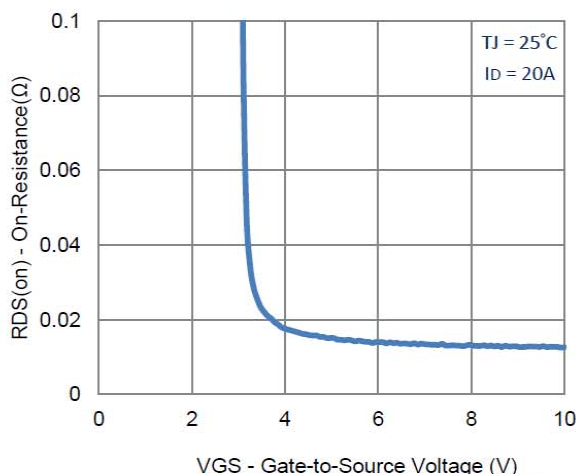
CHARACTERISTICS CURVE



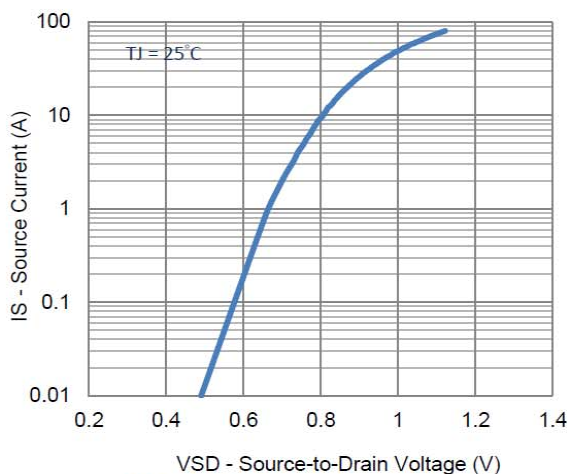
1. On-Resistance vs. Drain Current



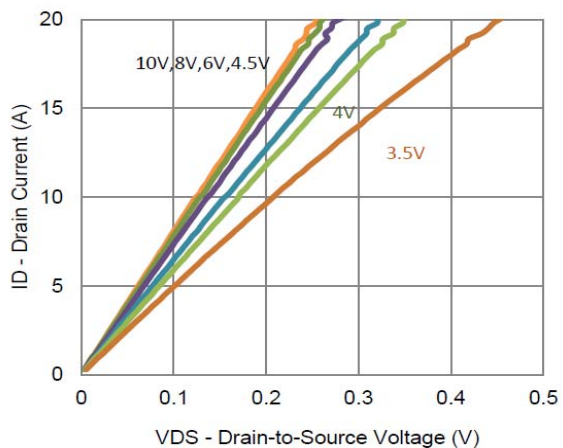
2. Transfer Characteristics



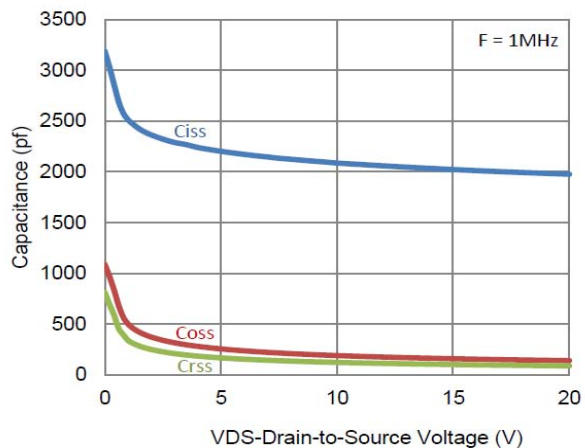
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

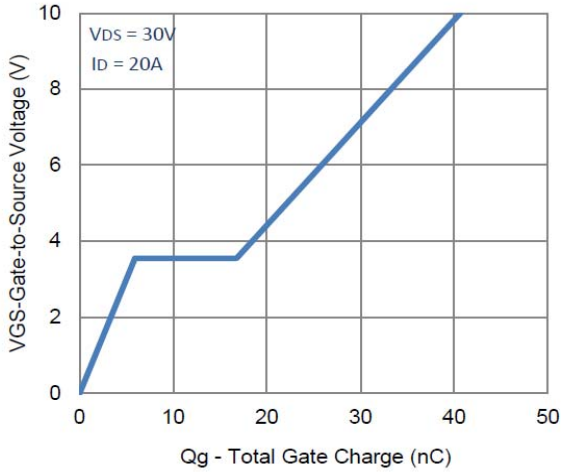


5. Output Characteristics

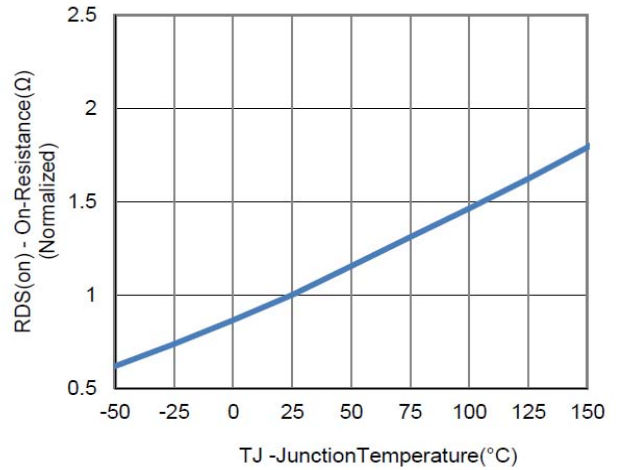


6. Capacitance

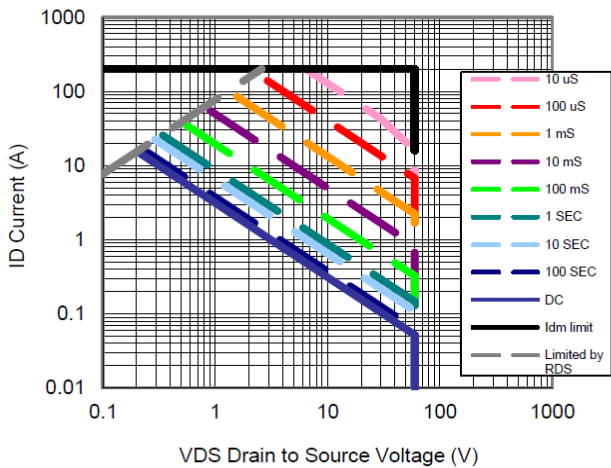
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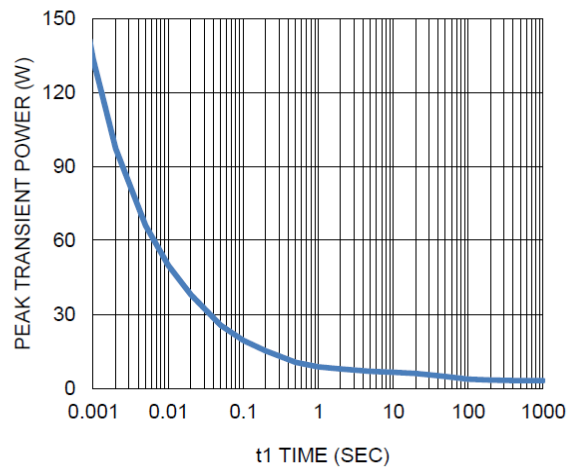
7. Gate Charge



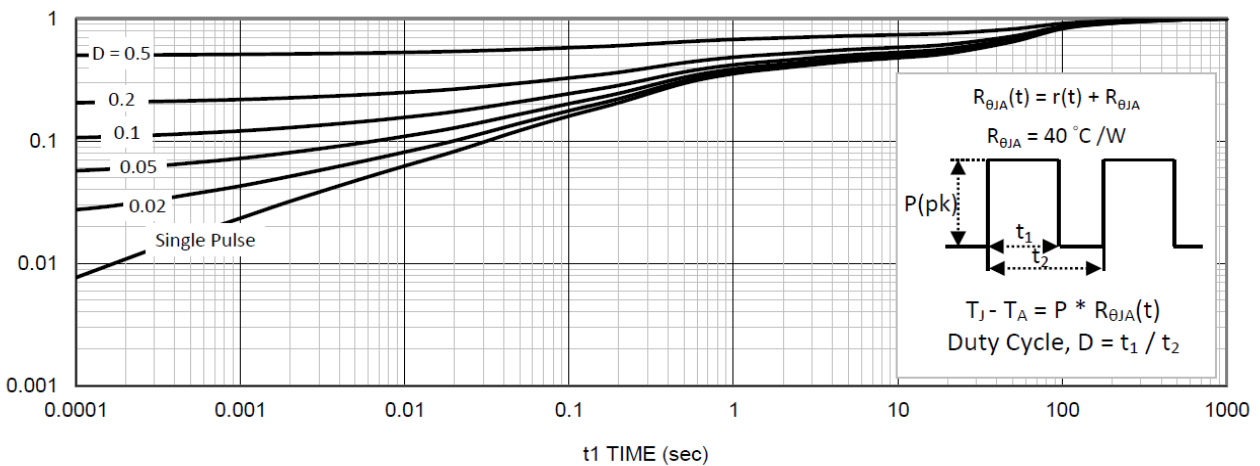
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient