# P-Channel 30 V (D-S) MOSFET

| MOSFET PRODUCT SUMMARY | | | |
|---|---|---|---|
| $V_{DS}$ (V) | $R_{DS(on)}$ (mΩ)(TYP.) | $I_D$ (A)[a] | $Q_g$ (Typ.) |
| - 30 | 53 at $V_{GS}$ = - 10 V | - 4 | 16 nC |
| | 68 at $V_{GS}$ = - 4.5 | | |

## FEATURES

- DT-Trench Power MOSFET
- 100 % $R_g$ Tested

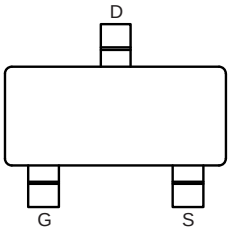
Pb-free

RoHS COMPLIANT

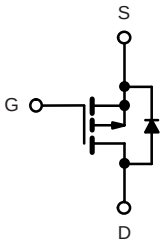
## APPLICATIONS

- Load Switch
- Notebook Adaptor Switch
- DC/DC Converter
- Power Management

SOT-23 Pin Configuration




Top View




P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C, unless otherwise noted) | | | | |
|---|---|---|---|---|
| PARAMETER | | SYMBOL | LIMIT | UNIT |
| Drain-Source Voltage | | $V_{DS}$ | - 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 20 | |
| Continuous Drain Current ($T_J$ = 150 °C)[a] | $T_C$ = 25 °C | $I_D$ | - 4 | A |
| | $T_C$ = 100 °C | | - 2.4 | |
| Pulsed Drain Current[b] | | $I_{DM}$ | - 20 | |
| Maximum Power Dissipation[c] | $T_C$ = 25 °C | $P_D$ | 1.7 | W |
| | $T_C$ = 100 °C | | 0.68 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to +150 | °C |

| THERMAL RESISTANCE RATINGS | | | | |
|---|---|---|---|---|
| PARAMETER | | SYMBOL | MAX | UNIT |
| Junction-to-Ambient | PCB mount [d] | $R_{thJA}$ | 140 | °C/W |
| Junction-to-Case | | $R_{thJC}$ | 73.5 | |

**Notes**

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.

| **SPECIFICATIONS** ($T_J$ = 25 °C, unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Min.** | **Typ.** | **Max.** | **Unit** |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = - 250 µA | - 30 | | | V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = - 250 µA | - 0. 5 | | - 1.5 | V |
| Gate-Source Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = - 30 V, $V_{GS}$ = 0 V | | | - 1 | µA |
| | | $V_{DS}$ = - 24 V, $V_{GS}$ = 0 V, $T_J$ = 55 °C | | | - 10 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ = - 5 V, $V_{GS}$ = - 10 V | - 4 | | | A |
| Drain-Source On-State Resistance[a] | $R_{DS(on)}$ | $V_{GS}$ = - 10 V, $I_D$ = - 3.8 A | | 53 | 59 | mΩ |
| | | $V_{GS}$ = - 4.5 V, $I_D$ = - 3 A | | 68 | 80 | |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = - 5 V, $I_D$ = - 3.8 A | | 22 | | S |
| **Dynamic[b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = - 15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 789 | | pF |
| Output Capacitance | $C_{oss}$ | | | 68 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 61 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = - 15 V, $V_{GS}$ = - 10 V, $I_D$ = -3.8 A | | 16 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.8 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 3 | | |
| Gate Resistance | $R_g$ | f = 1 MHz | | 8 | | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = - 15 V, $I_D$ = -3.8 A, $V_{GEN}$ = - 10 V, $R_g$ = 3 Ω | | 7.5 | | ns |
| Rise Time | $t_r$ | | | 5 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 45 | | |
| Fall Time | $t_f$ | | | 11 | | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Source-Drain Diode Current | $I_S$ | $T_C$ = 25 °C | | | - 4 | A |
| Pulse Diode Forward Current[a] | $I_{SM}$ | | | | - 20 | |
| Body Diode Voltage | $V_{SD}$ | $I_S$ = - 1 A | | | - 1.2 | V |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$ = - 3.8 A, di/dt = 100 A/µs, $T_J$ = 25 °C | | 13 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 4.5 | | nC |

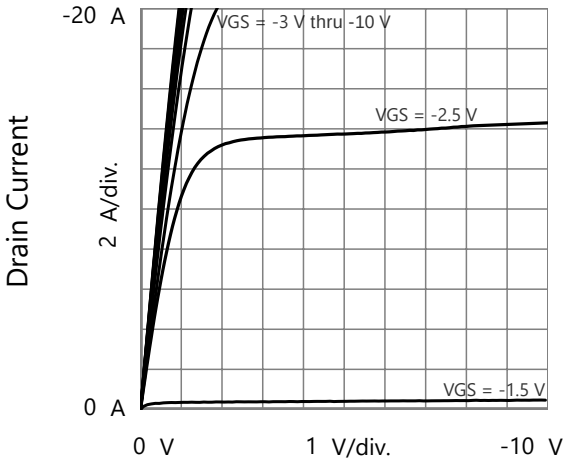
Notes:

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

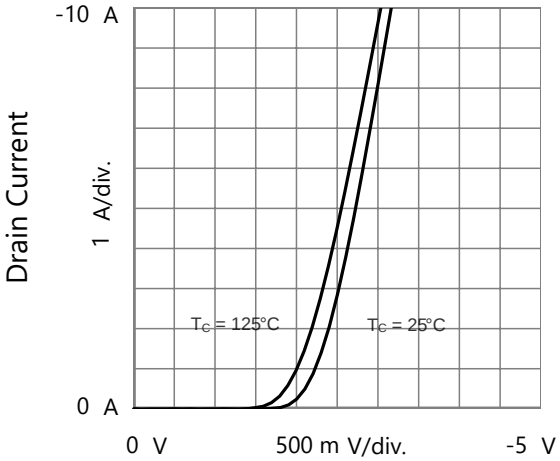
b. Guaranteed by design, not subject to production testing.

*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

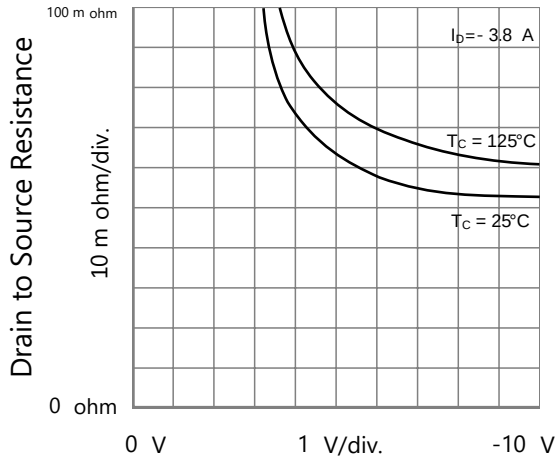
**TYPICAL CHARACTERISTICS** ($T_J$ = 25 °C, unless otherwise noted)



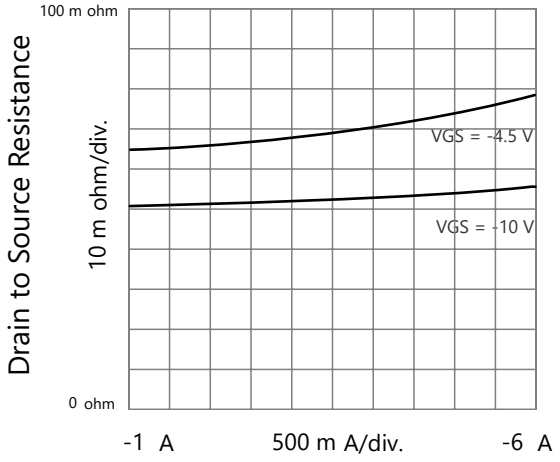

Output Characteristics



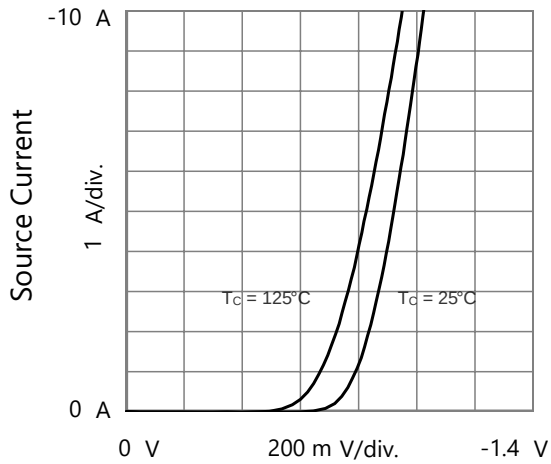

Transfer Characteristics



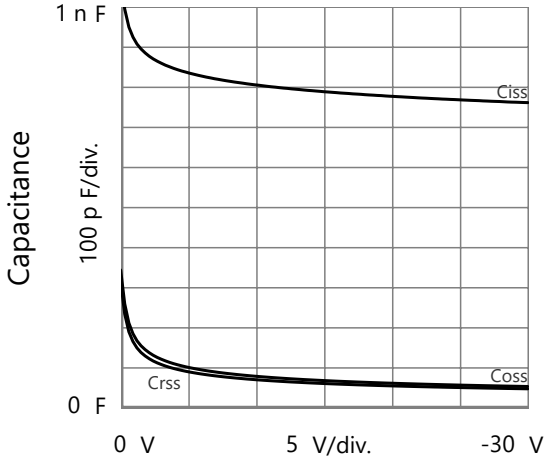

Drain to Source Resistance vs. Gate to Source Voltage




Drain to Source Resistance vs. Drain Current

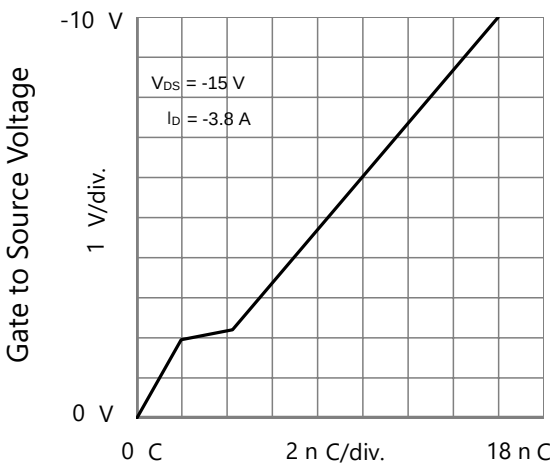



Body Diode Forward Characteristics

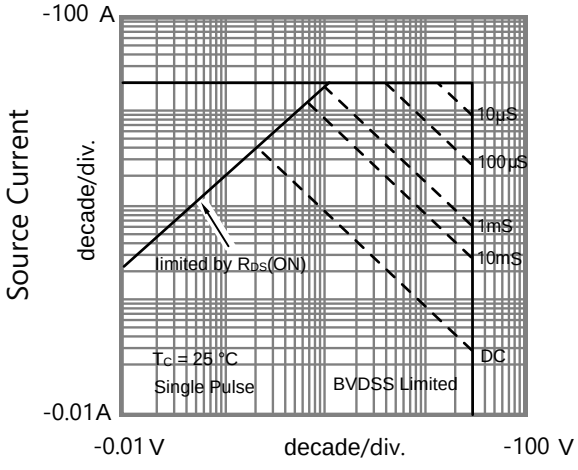



Capacitances

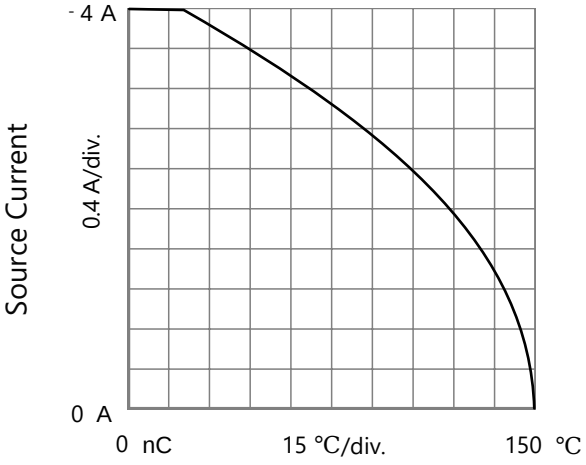
**TYPICAL CHARACTERISTICS** ($T_J$ = 25 °C, unless otherwise noted)



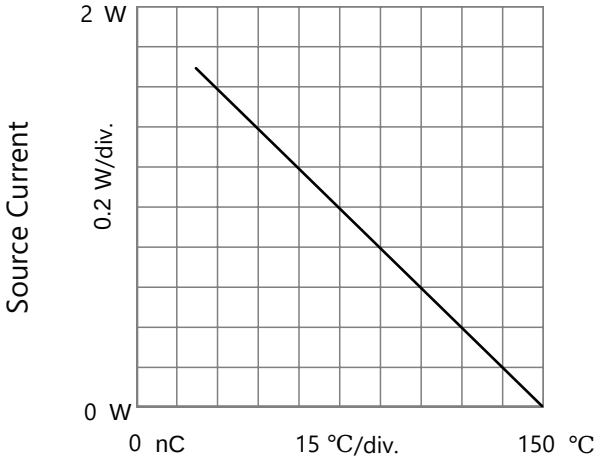

Gate to Source Voltage vs. GateCharge




Safe Operating Area, Junction-to-Ambient

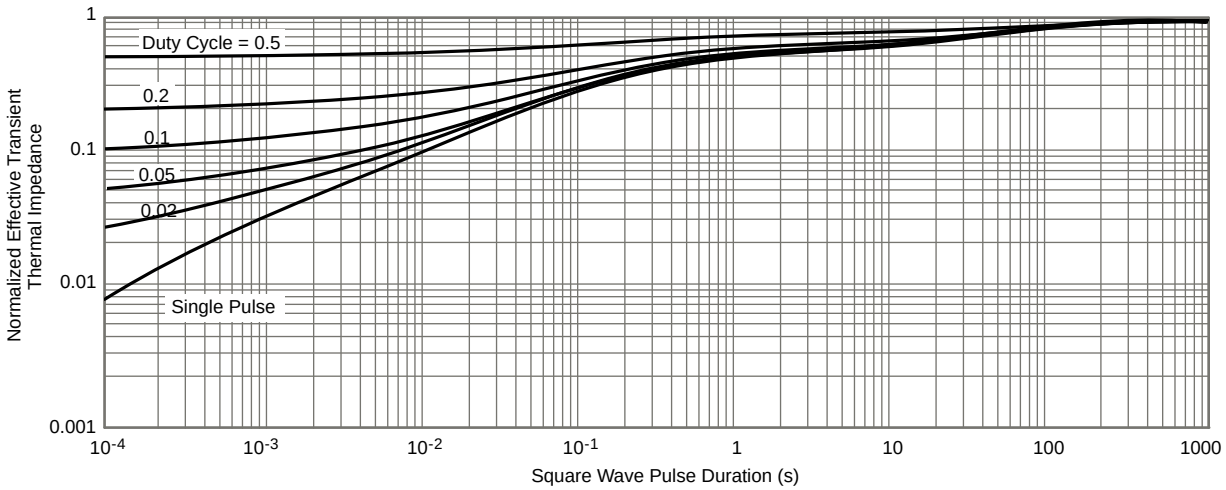



Current Derating




Current Derating

## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



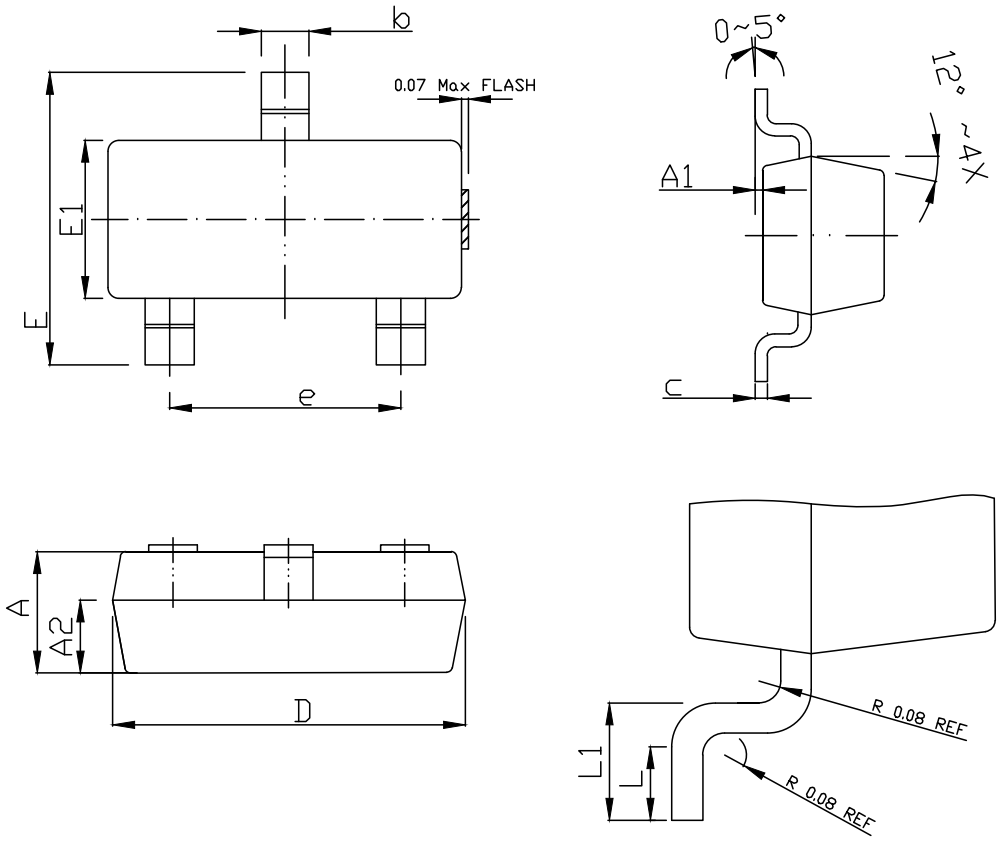

**Normalized Thermal Transient Impedance, Junction-to-Ambient**

**Note**

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

SOT-23 PACKAGE OUTLINE




COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.80 | 1.00 | 1.30 |
| A1 | 0.00 | 0.05 | 0.15 |
| b | 0.25 | 0.40 | 0.55 |
| c | 0.11 BSC | | |
| D | 2.60 | 2.90 | 3.20 |
| E | 2.10 | 2.40 | 2.70 |
| E1 | 1.10 | 1.30 | 1.48 |
| e | 1.90 BSC | | |
| L | 0.17 | - | - |
| L1 | 0.28 | 0.40 | 0.53 |
| A2 | 0.60 REF | | |

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