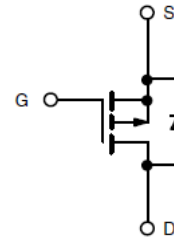




## P-Channel Enhancement Mode Power MOSFET

### ● General Description

- Power management in notebook computer
- Portable equipment and battery powered systems

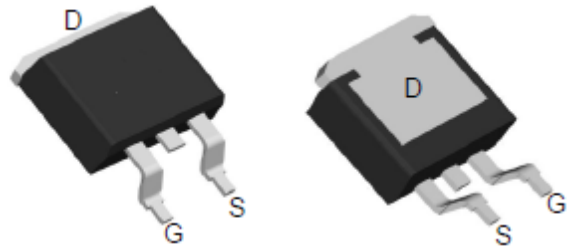


P-Channel MOSFET

### Pin Configurations

#### ● Features

- $V_{DS} = -60V$ ,
- $I_D = -132A$
- $R_{DS(ON)} @ V_{GS} = -10V$ , TYP 5.5 mΩ
- $R_{DS(ON)} @ V_{GS} = -6.0V$ , TYP 6.2 mΩ
- $R_{DS(ON)} @ V_{GS} = -4.5V$ , TYP 7.0 mΩ



TO263

### ● Absolute Maximum Ratings @ $T_A=25^\circ C$ unless otherwise noted

| Parameter                                  | Symbol        | Ratings           | Unit       |
|--|---------------|-------------------|------------|
| Drain-Source Voltage                       | $V_{DSS}$     | -60               | V          |
| Gate-Source Voltage                        | $V_{GSS}$     | $\pm 20$          | V          |
| Drain Current (Continuous) *C              | $I_D$         | $T_C=25^\circ C$  | -132       |
|  |               | $T_C=100^\circ C$ | -83        |
| Drain Current (Pulse) *B                   | $I_{DM}$      | -528              | A          |
| Power Dissipation                          | $P_D$         | 227               | W          |
| Operating Temperature/ Storage Temperature | $T_J/T_{STG}$ | -55~150           | $^\circ C$ |

### ● Thermal Resistance Ratings

| Parameter                           | Symbol     | Maximum | Unit         |
|-------------------------------------|------------|---------|--------------|
| Maximum Junction-to-Ambient *A      | $R_{thJA}$ | 62.5    | $^\circ C/W$ |
| Maximum Junction-to-Case (Drain) *A | $R_{thJC}$ | 0.55    |              |



## P-Channel Enhancement Mode Power MOSFET

● **Electrical Characteristics** @ $T_A=25^\circ\text{C}$  unless otherwise noted

| Parameter                        | Symbol        | Test Conditions  | Min | Typ  | Max       | Unit       |
|----------------------------------|---------------|--|-----|------|-----------|------------|
| <b>Static *D</b>                 |               |  |     |      |           |            |
| Drain-Source Breakdown Voltage   | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$  | -60 | --   | --        | V          |
| Zero Gate Voltage Drain Current  | $I_{DSS}$     | $V_{DS} = -48V, V_{GS} = 0V$   | --  | --   | -1        | $\mu A$    |
| Gate Threshold Voltage           | $V_{GS(TH)}$  | $V_{GS} = V_{DS}, I_{DS} = -250\mu A$                                | -1  | --   | -2.5      | V          |
| Gate Leakage Current             | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                                      | --  | --   | $\pm 100$ | nA         |
| Drain-Source On-state Resistance | $R_{DS(on)}$  | $V_{GS} = -10V, I_D = -20A$  | --  | 5.5  | 7.2       | m $\Omega$ |
|                                  | $R_{DS(on)}$  | $V_{GS} = -6.0V, I_D = -15A$   | --  | 6.2  | 8         | m $\Omega$ |
|                                  | $R_{DS(on)}$  | $V_{GS} = -4.5V, I_D = -15A$   | --  | 7    | 9         | m $\Omega$ |
| Diode Forward Voltage            | $V_{SD}$      | $I_{SD} = -1A, V_{GS} = 0V$  | --  | --   | -1.2      | V          |
| Diode Forward Current *C         | $I_S$         | $T_C = 25^\circ\text{C}$   | --  | --   | -132      | A          |
| <b>Switching</b>                 |               |  |     |      |           |            |
| Total Gate Charge                | $Q_g$         | $V_{DS} = -30V, I_D = -20A,$<br>$V_{GS} = -10V$                      | --  | 150  | --        | nC         |
| Gate-Source Charge               | $Q_{gs}$      |  | --  | 38   | --        | nC         |
| Gate-Drain Charge                | $Q_{gd}$      |  | --  | 36   | --        | nC         |
| Turn-on Delay Time               | $t_{d(on)}$   | $V_{DD} = -30V, I_D = -20A,$<br>$V_{GS} = -10V, R_{GEN} = 2.5\Omega$ | --  | 19   | --        | ns         |
| Turn-on Rise Time                | $t_r$         |  | --  | 180  | --        | ns         |
| Turn-off Delay Time              | $t_{d(off)}$  |  | --  | 132  | --        | ns         |
| Turn-Off Fall Time               | $t_f$         |  | --  | 285  | --        | ns         |
| <b>Dynamic</b>                   |               |  |     |      |           |            |
| Input Capacitance                | $C_{iss}$     | $V_{DS} = -30V, V_{GS} = 0V, f = 1.0\text{MHz}$                      | --  | 8600 | --        | pF         |
| Output Capacitance               | $C_{oss}$     |  | --  | 915  | --        | pF         |
| Reverse Transfer Capacitance     | $C_{rss}$     |  | --  | 714  | --        | pF         |

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

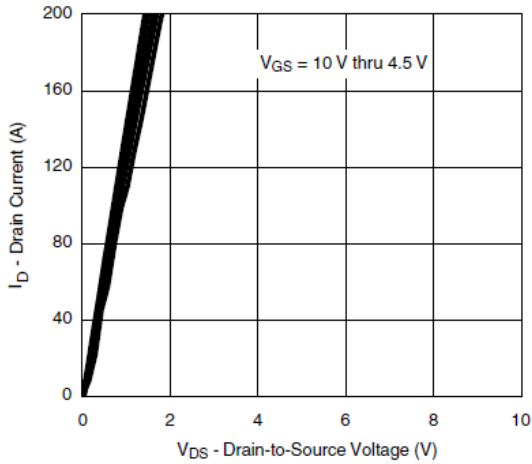
C: The current rating is based on the  $t \leq 10\text{s}$  junction to ambient thermal resistance rating.

D: Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

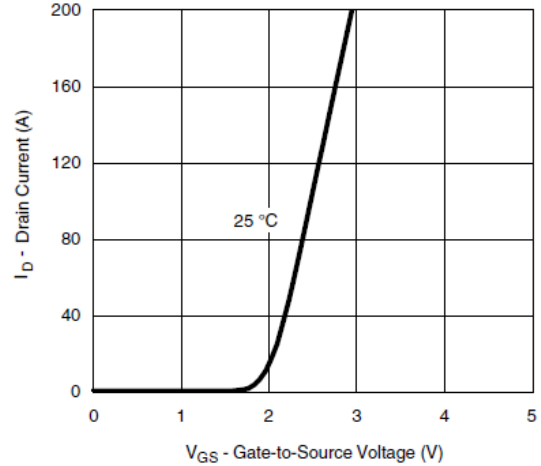


## P-Channel Enhancement Mode Power MOSFET

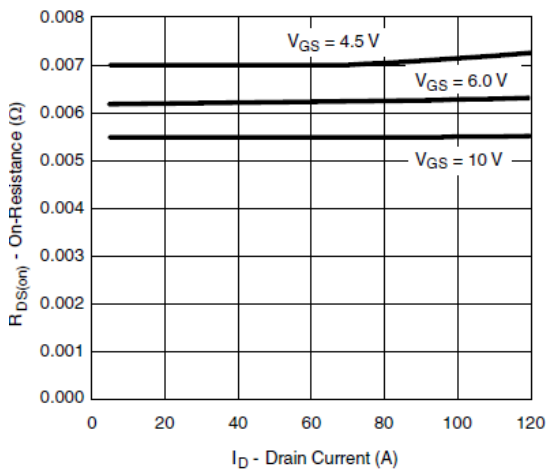
- Typical Performance Characteristics (T<sub>J</sub> = 25 °C, unless otherwise noted)



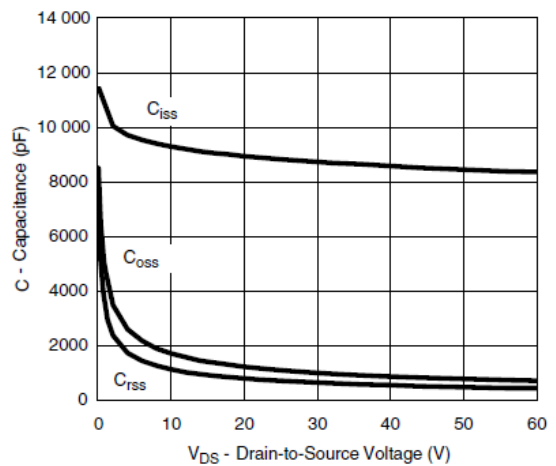
Output Characteristics



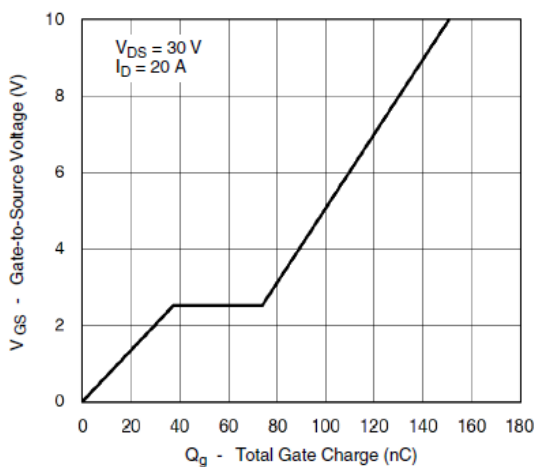
Transfer Characteristics



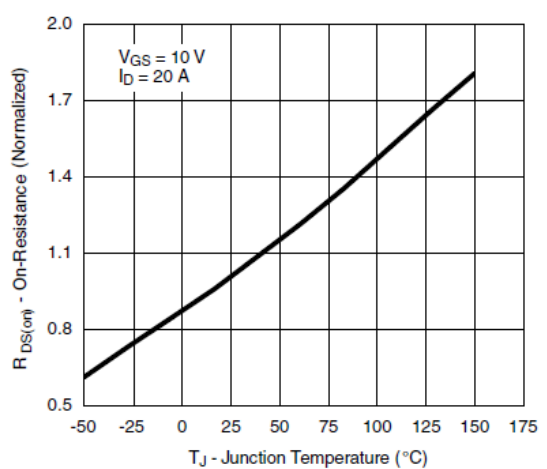
On-Resistance vs. Drain Current



Capacitance



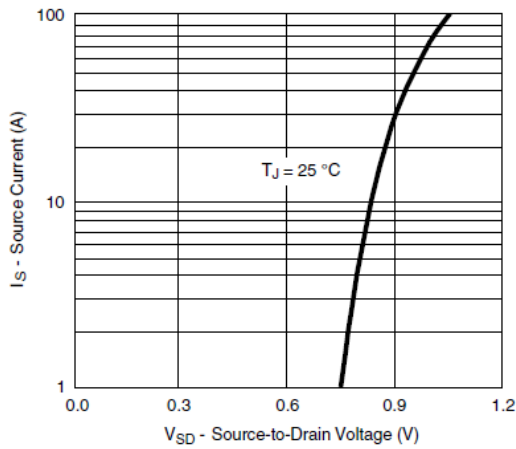
Gate Charge



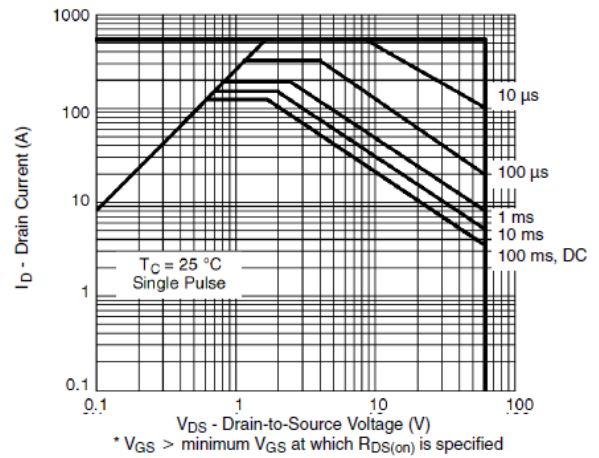
On-Resistance vs. Junction Temperature



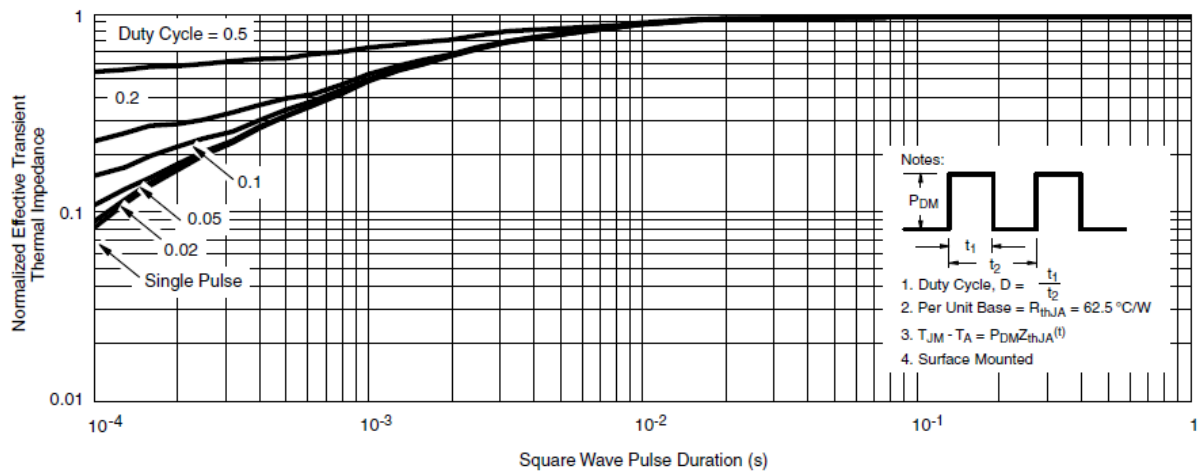
## P-Channel Enhancement Mode Power MOSFET



Source-Drain Diode Forward Voltage



Safe Operating Area

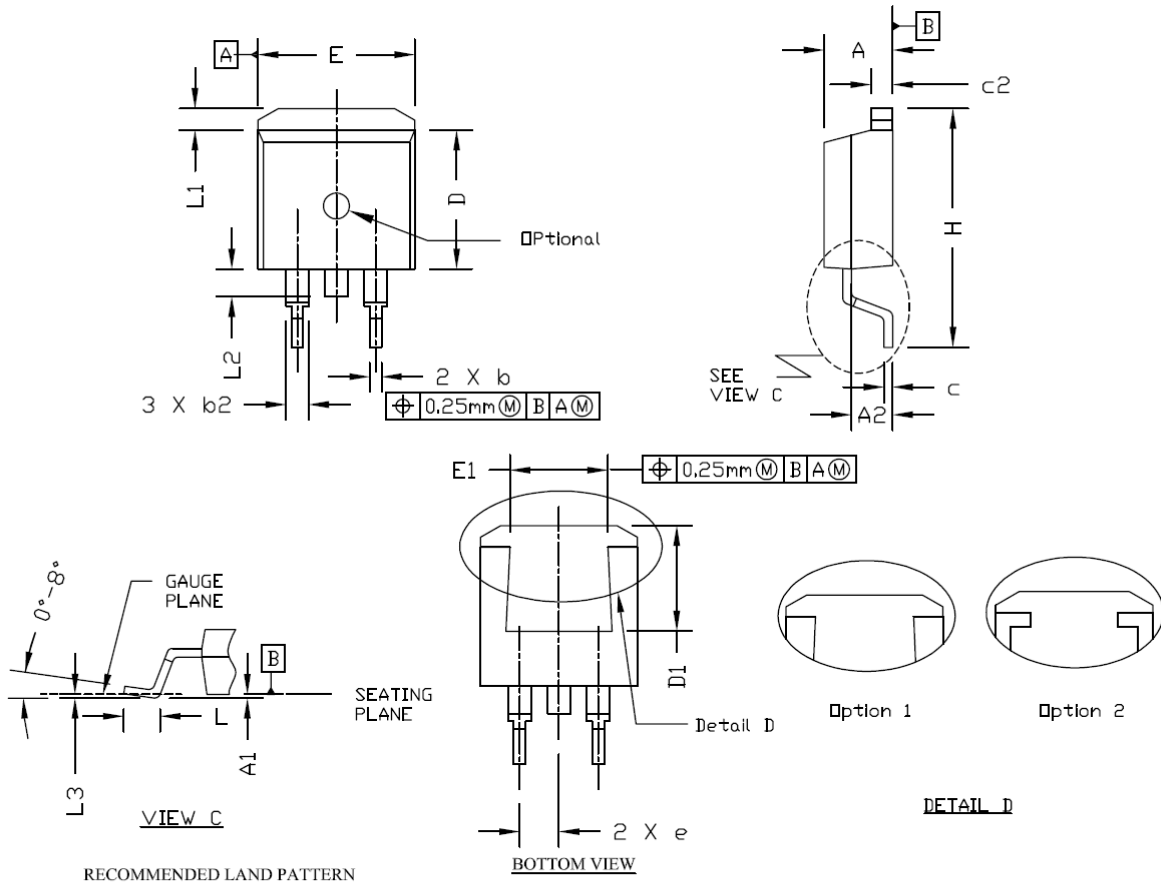


Normalized Thermal Transient Impedance, Junction-to-Case

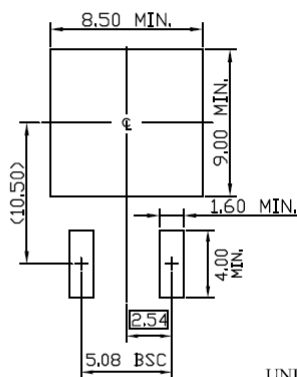


## P-Channel Enhancement Mode Power MOSFET

### ● Package Information



RECOMMENDED LAND PATTERN



UNIT: mm

| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |        | DIMENSIONS IN INCHES |       |       |
|---------|---------------------------|-------|--------|----------------------|-------|-------|
|         | MIN                       | NOM   | MAX    | MIN                  | NOM   | MAX   |
| A       | 4,064                     | 4,45  | 4,826  | 0,160                | 0,175 | 0,190 |
| A1      | 0,00                      | ---   | 0,254  | 0,000                | ---   | 0,010 |
| A2      | 2,20                      | 2,67  | 2,90   | 0,087                | 0,105 | 0,114 |
| b       | 0,508                     | 0,81  | 0,991  | 0,020                | 0,032 | 0,039 |
| b2      | 1,143                     | 1,27  | 1,778  | 0,045                | 0,050 | 0,070 |
| c       | 0,381                     | 0,50  | 0,737  | 0,015                | 0,020 | 0,029 |
| c2      | 1,143                     | 1,27  | 1,651  | 0,045                | 0,050 | 0,065 |
| D       | 8,382                     | 9,14  | 9,652  | 0,330                | 0,360 | 0,380 |
| D1      | 6,858                     | 8,00  | 8,37   | 0,270                | 0,315 | 0,330 |
| e       | 2,54 BSC                  |       |        | 0,100 BSC.           |       |       |
| E       | 9,652                     | 10,03 | 10,668 | 0,380                | 0,395 | 0,420 |
| E1      | 6,223                     | 8,00  | 8,37   | 0,245                | 0,315 | 0,330 |
| H       | 14,605                    | 15,24 | 15,875 | 0,575                | 0,600 | 0,625 |
| L       | 1,778                     | 2,54  | 2,794  | 0,070                | 0,100 | 0,110 |
| L1      | 1,02                      | 1,27  | 1,676  | 0,040                | 0,050 | 0,066 |
| L2      | 1,27                      | 1,52  | 1,778  | 0,50                 | 0,60  | 0,070 |
| L3      | 0,25 BSC                  |       |        | 0,010 BSC.           |       |       |

**NOTE:**

1. PACKAGE BODY SIDES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MILS.
2. TOLERANCE 0.10 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. DIMENSION L IS MEASURED IN GAUGE LINE.
4. CONTROLLING DIMENSION IS MILLIMETER.
5. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
6. REFER TO JEDEC TO-263 AB.