# P-Channel 60-V (D-S) MOSFET

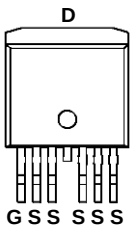
**Key Features:**
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

**Typical Applications:**
- Load Switches
- DC/DC Conversion
- Motor Drives

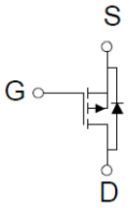
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (mΩ) | $I_D$ (A) |
| -60 | 10 @ $V_{GS}$ = -10V | -90[a] |
| | 14 @ $V_{GS}$ = -4.5V | |

Pb-free
RoHS COMPLIANT
HALOGEN FREE

**TO-263-6L**




DRAIN connected to TAB




P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Limit** | **Units** |
| Drain-Source Voltage | | $V_{DS}$ | -60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current [a] | $T_C$=25°C | $I_D$ | -90 | A |
| Pulsed Drain Current [b] | | $I_{DM}$ | -360 | |
| Continuous Source Current (Diode Conduction) [a] | $T_C$=25°C | $I_S$ | -90 | |
| Power Dissipation [a] | $T_C$=25°C | $P_D$ | 300 | W |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 175 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|---|---|---|---|
| **Parameter** | **Symbol** | **Maximum** | **Units** |
| Maximum Junction-to-Ambient [c] | $R_{\theta JA}$ | 62.5 | °C/W |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 0.5 | |

Notes
a. Package Limited
b. Pulse width limited by maximum junction temperature
c. Surface Mounted on 1” x 1” FR4 Board.

## Electrical Characteristics

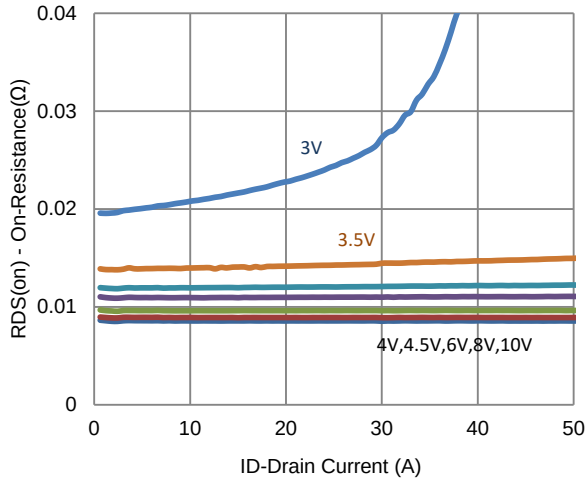
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250 uA | -1 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -48 V, $V_{GS}$ = 0 V | | | -1 | uA |
| | | $V_{DS}$ = -48 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 | -110 | | | A |
| Drain-Source On-Resistance [a] | $r_{DS(on)}$ | $V_{GS}$ = -10 V, $I_D$ = -45 A | | | 10 | mΩ |
| | | $V_{GS}$ = -4.5 V, $I_D$ = -40 A | | | 14 | |
| Forward Transconductance [a] | $g_{fs}$ | $V_{DS}$ = -15 V, $I_D$ = -45 A | | 60 | | S |
| Diode Forward Voltage [a] | $V_{SD}$ | $I_S$ = -45 A, $V_{GS}$ = 0 V | | -0.92 | | V |
| **Dynamic [b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = -30 V, $V_{GS}$ = -4.5 V, $I_D$ = -20 A | | 66 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 23 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 23 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}$ = -30 V, $R_L$ = 1.5 Ω, $I_D$ = -20 A, $V_{GEN}$ = -10 V, $R_{GEN}$ = 6 Ω | | 15 | | ns |
| Rise Time | $t_r$ | | | 21 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 255 | | |
| Fall Time | $t_f$ | | | 90 | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = -15 V, $V_{GS}$ = 0 V, f = 1 Mhz | | 5960 | | pF |
| Output Capacitance | $C_{oss}$ | | | 540 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 370 | | |

Notes

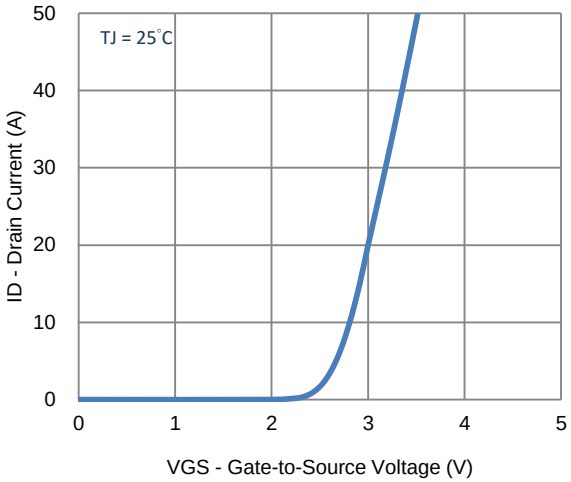
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

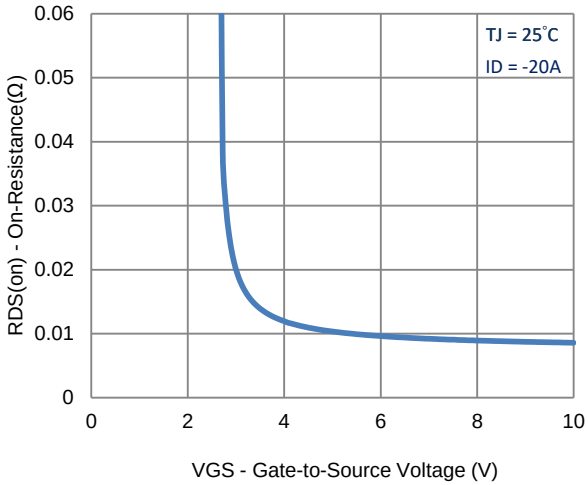
## Typical Electrical Characteristics



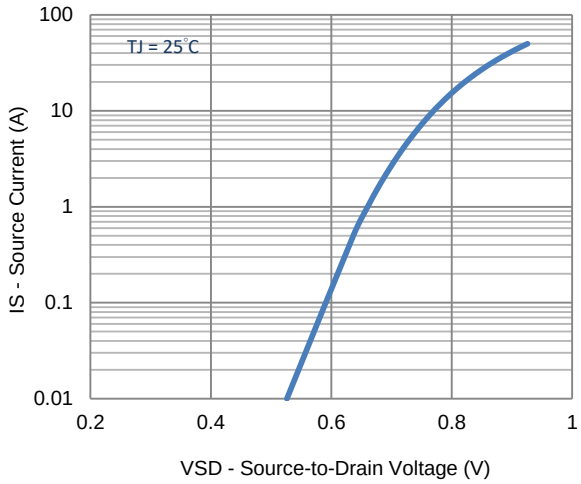

**1. On-Resistance vs. Drain Current**



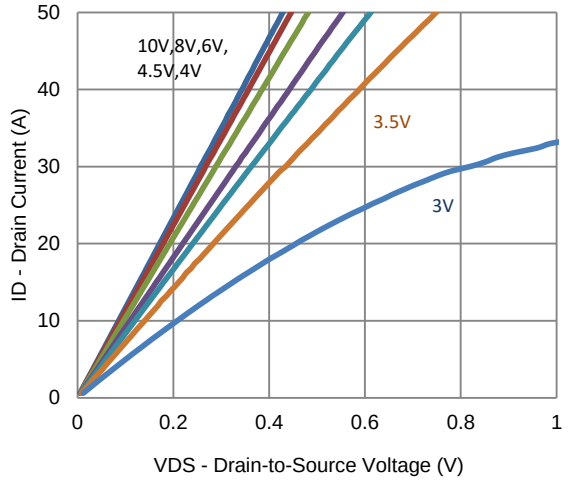

**2. Transfer Characteristics**



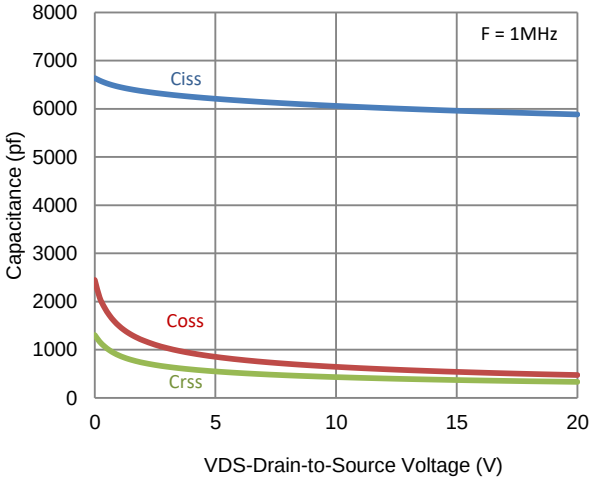

**3. On-Resistance vs. Gate-to-Source Voltage**




**4. Drain-to-Source Forward Voltage**

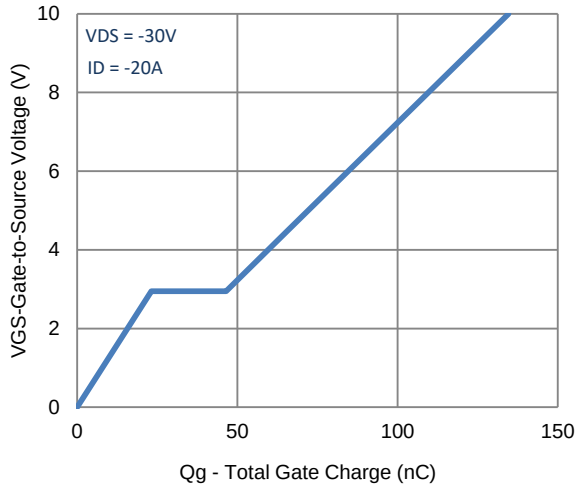



**5. Output Characteristics**

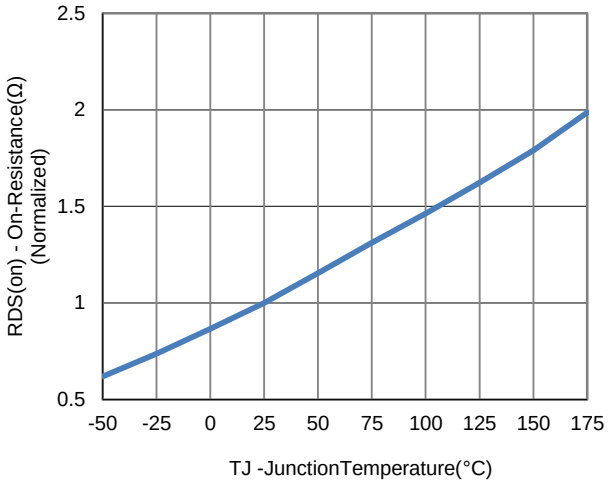



**6. Capacitance**

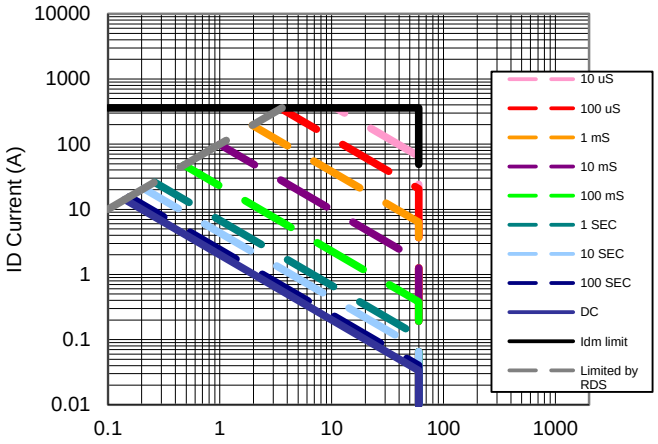
## Typical Electrical Characteristics



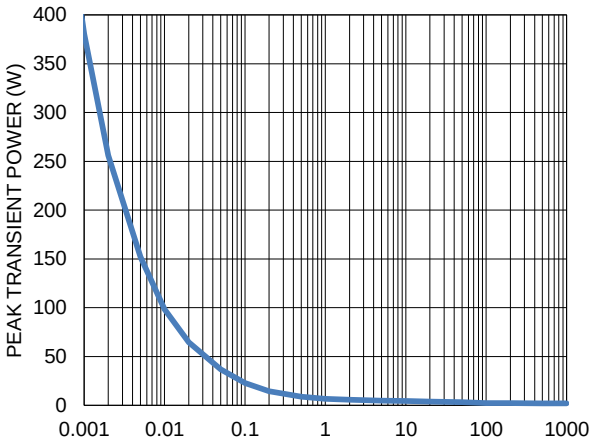

**7. Gate Charge**



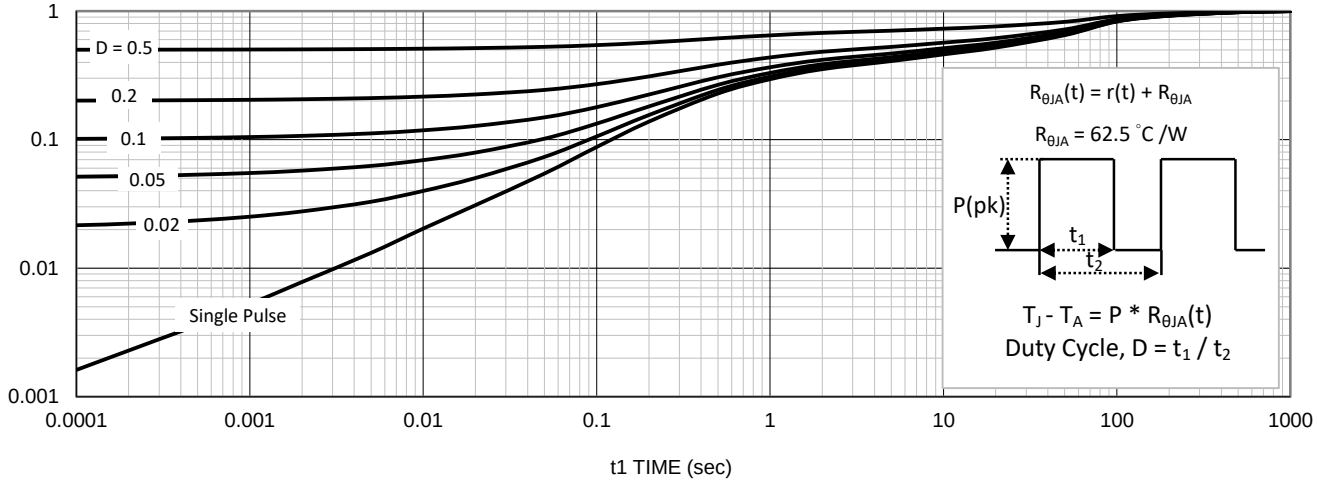

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**

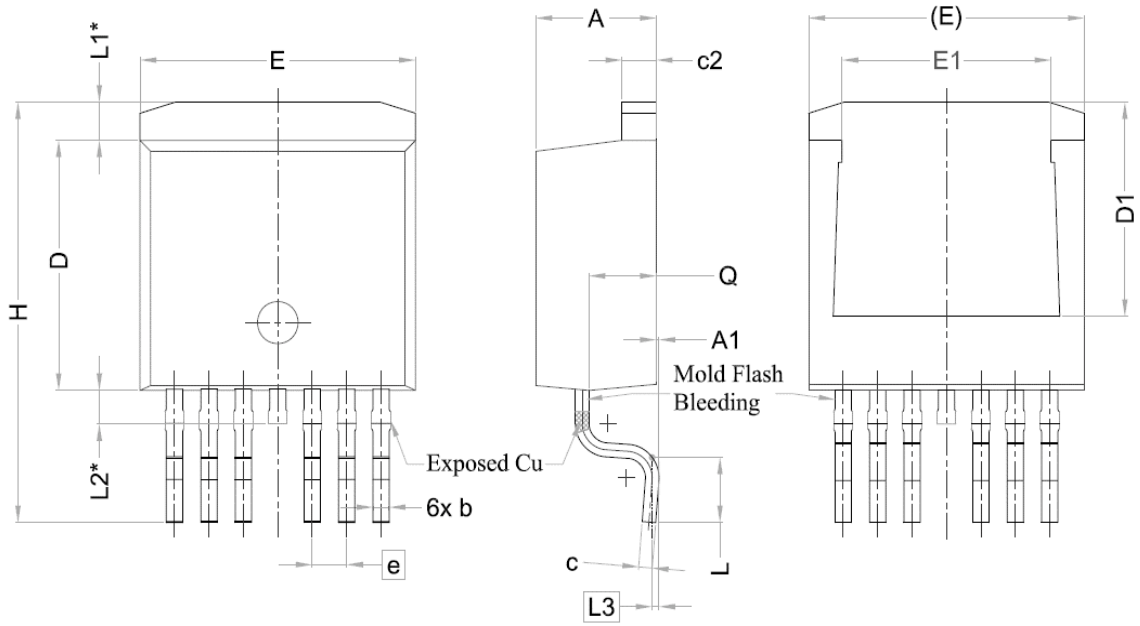


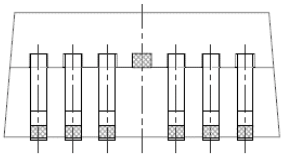

**10. Single Pulse Maximum Power Dissipation**




**11. Normalized Thermal Transient Junction to Ambient**

## Package Information



| SYMBOL | DIMENSIONS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 4.24 | 4.44 | 4.64 |
| A1 | 0.00 | 0.10 | 0.25 |
| b | 0.50 | 0.60 | 0.70 |
| c | 0.40 | 0.50 | 0.60 |
| c2 | 1.15 | 1.27 | 1.40 |
| D | 8.82 | 8.92 | 9.02 |
| D1 | 6.86 | 7.65 | — |
| E | 9.96 | 10.16 | 10.36 |
| E1 | 6.89 | 7.77 | 7.89 |
| e | 1.27 BSC | | |
| H | 14.61 | 15.00 | 15.88 |
| L | 1.78 | 2.32 | 2.79 |
| L1 | 1.36 REF. | | |
| L2 | 1.20 REF. | | |
| L3 | 0.25 BSC | | |
| Q | 2.30 | 2.48 | 2.70 |