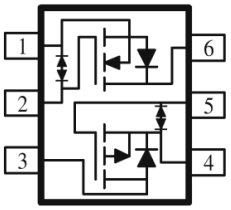
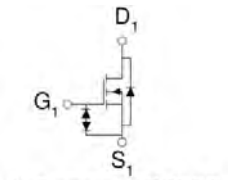
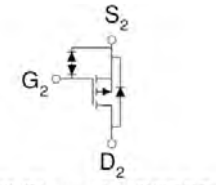
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (mΩ) | $I_D$(A) |
| 20 | 50 @ $V_{GS}$ = 4.5V | 2.0 |
| | 55 @ $V_{GS}$ = 2.5V | 1.8 |
| -20 | 130 @ $V_{GS}$ = -4.5V | -1.5 |
| | 140 @ $V_{GS}$ = -2.5V | -1.2 |

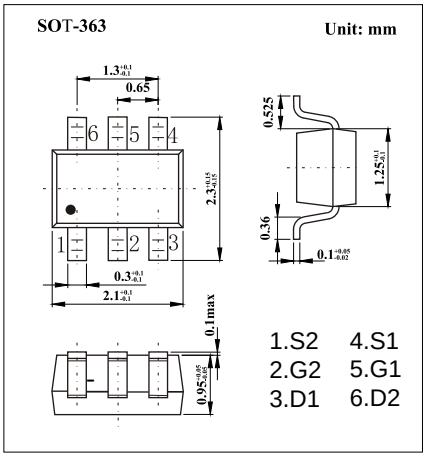


N-Channel MOSFET



P-Channel MOSFET




| ABSOLUTE MAXIMUM RATINGS (T = 25°C UNLESS OTHERWISE NOTED) | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Nch Limit** | **Pch Limit** | **Units** |
| Drain-Source Voltage | | $V_{DS}$ | 20 | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | ±12 | |
| Continuous Drain Current [a] | $T_A$=25℃ | $I_D$ | 2.0 | 1.8 | A |
| | $T_A$=70℃ | | 1.5 | 1.2 | |
| Pulsed Drain Current [b] | | $I_{DM}$ | 5 | -5 | |
| Continuous Source Current (Diode Conduction) [a] | | $I_S$ | 0.43 | -0.45 | A |
| Power Dissipation [a] | $T_A$=25℃ | $P_D$ | 0.3 | 0.3 | W |
| | $T_A$=70℃ | | 0.21 | 0.21 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | | ℃ |

| THERMAL RESISTANCE RATINGS | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Maximum** | **Units** |
| Maximum Junction-to-Ambient [a] | t <= 5 sec | $R_{\Theta JA}$ | 415 | ℃/W |
| | Steady State | | 460 | |

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

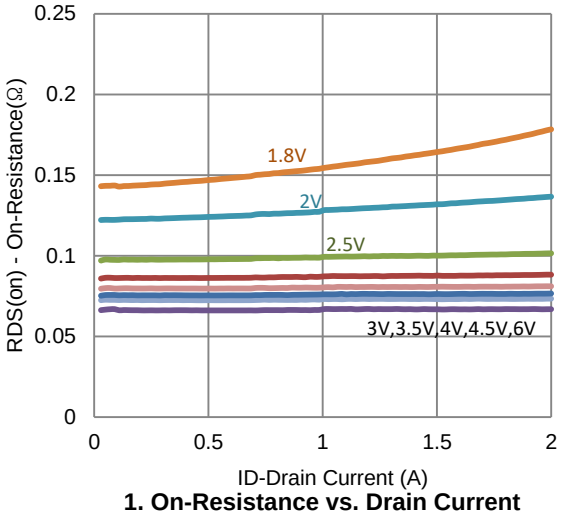
■ Marking

| Marking | ** |
|---|---|

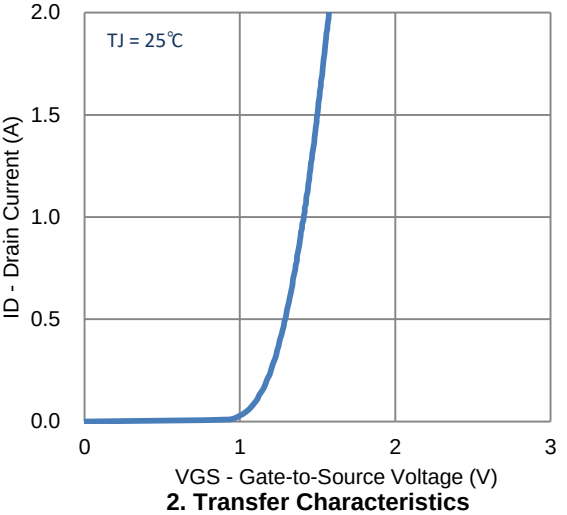
## Electrical Characteristics

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 uA **(N-ch)** | 0.3 | | | V |
| | | $V_{DS}$ = $V_{GS}$, $I_D$ = -250 uA **(P-ch)** | -0.3 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±8 V | | | ±10 | uA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V **(N-ch)** | | | 1 | uA |
| | | $V_{DS}$ = -16 V, $V_{GS}$ = 0 V **(P-ch)** | | | -1 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 4.5 V **(N-ch)** | 1.5 | | | A |
| | | $V_{DS}$ = -5 V, $V_{GS}$ = -4.5 V **(P-ch)** | -1.5 | | | A |
| Drain-Source On-Resistance | $r_{DS(on)}$ | $V_{GS}$ = 4.5 V, $I_D$ = 1.2 A **(N-ch)** | | | 50 | mΩ |
| | | $V_{GS}$ = 2.5 V, $I_D$ = 0.96 A **(N-ch)** | | | 55 | |
| | | $V_{GS}$ = -4.5 V, $I_D$ = -0.8 A **(P-ch)** | | | 130 | mΩ |
| | | $V_{GS}$ = -2.5 V, $I_D$ = -0.64 A **(P-ch)** | | | 140 | |
| Forward Transconductance | $g_{fs}$ | $V_{DS}$ = 10 V, $I_D$ = 1.2 A **(N-ch)** | | 3 | | S |
| | | $V_{DS}$ = -10 V, $I_D$ = -0.8 A **(P-ch)** | | 5 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 0.2 A, $V_{GS}$ = 0 V **(N-ch)** | | 0.65 | | V |
| | | $I_S$ = -0.2 A, $V_{GS}$ = 0 V **(P-ch)** | | -0.66 | | V |
| **Dynamic** | | | | | | |
| Total Gate Charge | $Q_g$ | N - Channel<br>$V_{DS}$ = 10 V, $V_{GS}$ = 4.5 V, $I_D$ = 1.2 A | | 5 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 0.3 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 0.7 | | |
| Turn-On Delay Time | $t_{d(on)}$ | N - Channel<br>$V_{DD}$ = 10 V, $R_L$ = 8.3 Ω,<br>$I_D$ = 1.2 A,<br>$V_{GEN}$ = 4.5 V, $R_{GEN}$ = 6 Ω | | 8 | | ns |
| Rise Time | $t_r$ | | | 13 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 25 | | |
| Fall Time | $t_f$ | | | 8 | | |
| Input Capacitance | $C_{iss}$ | N - Channel<br>$V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 73 | | pF |
| Output Capacitance | $C_{oss}$ | | | 25 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 20 | | |
| Total Gate Charge | $Q_g$ | P - Channel<br>$V_{DS}$ = -10 V, $V_{GS}$ = 4.5 V, $I_D$ = -0.8 A | | 4 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 0.5 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 0.9 | | |
| Turn-On Delay Time | $t_{d(on)}$ | P - Channel<br>$V_{DD}$ = -10 V, $R_L$ = 12.5 Ω,<br>$I_D$ = -0.8 A,<br>$V_{GEN}$ = -4.5 V, $R_{GEN}$ = 6 Ω | | 8 | | ns |
| Rise Time | $t_r$ | | | 10 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 28 | | |
| Fall Time | $t_f$ | | | 13 | | |
| Input Capacitance | $C_{iss}$ | P - Channel<br>$V_{DS}$ = -15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 120 | | pF |
| Output Capacitance | $C_{oss}$ | | | 28 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 25 | | |

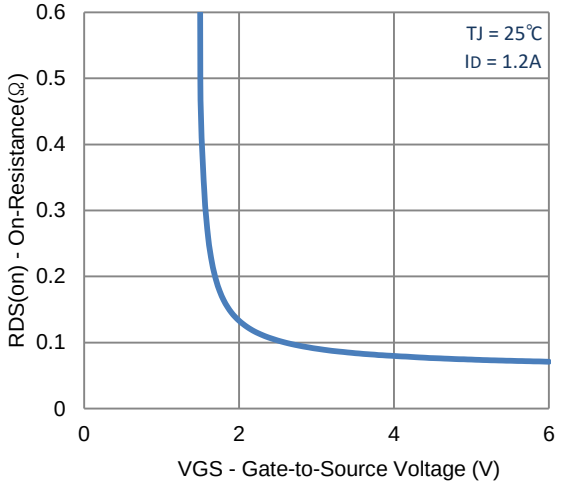
## Typical Electrical Characteristics - N-channel



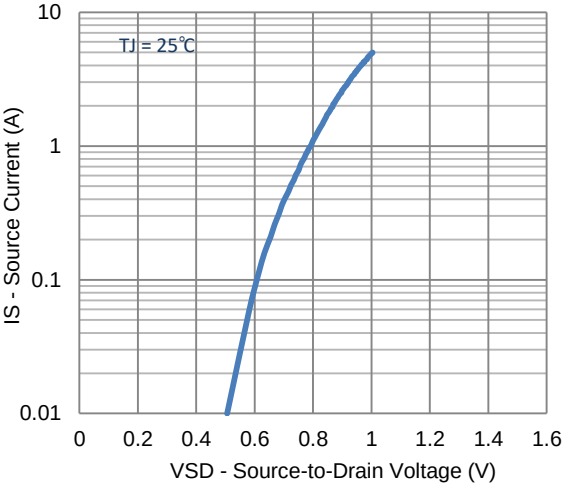

**1. On-Resistance vs. Drain Current**



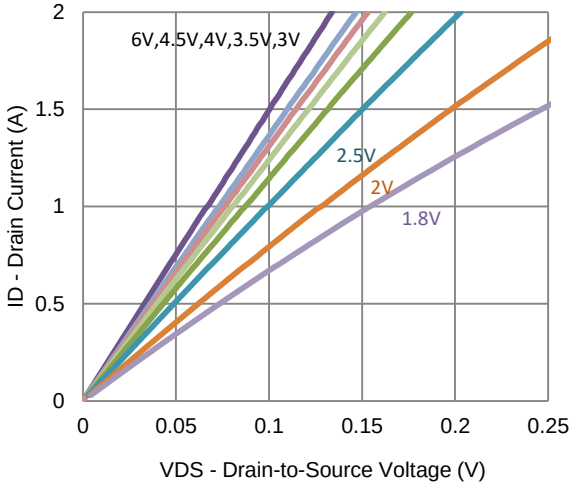

**2. Transfer Characteristics**



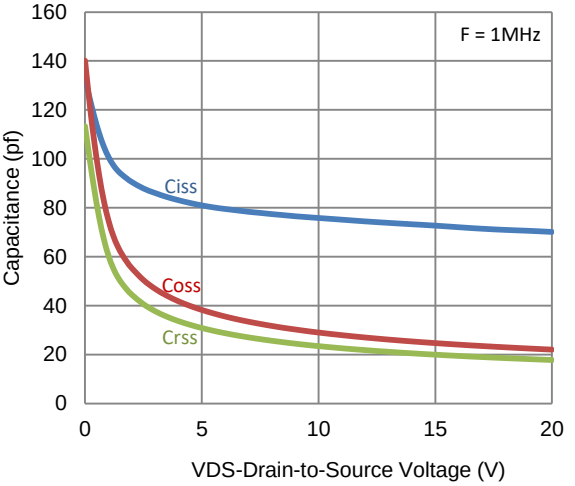

**3. On-Resistance vs. Gate-to-Source Voltage**




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

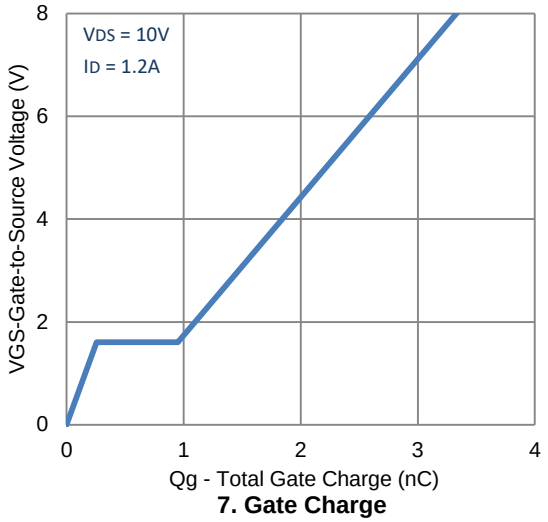



**5. Output Characteristics**

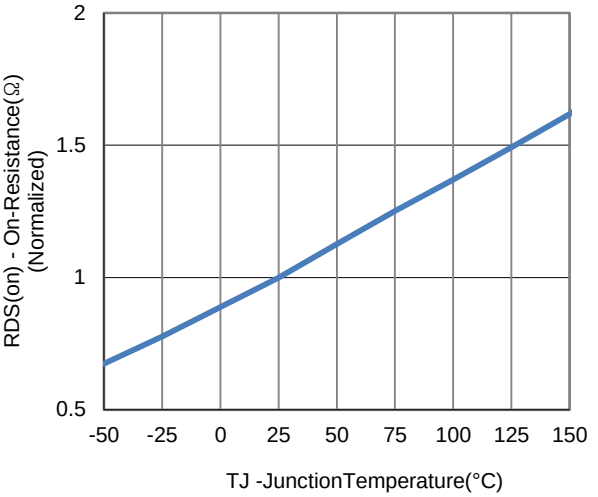



**6. Capacitance**

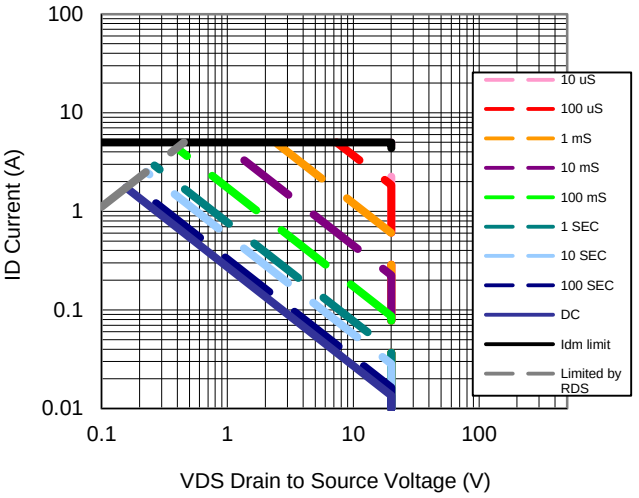
## Typical Electrical Characteristics - N-channel



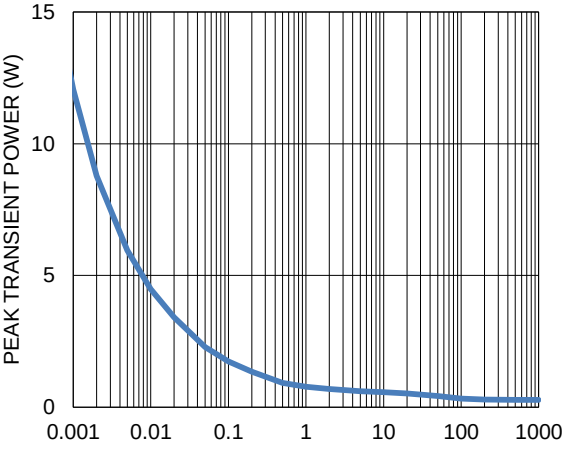

**7. Gate Charge**



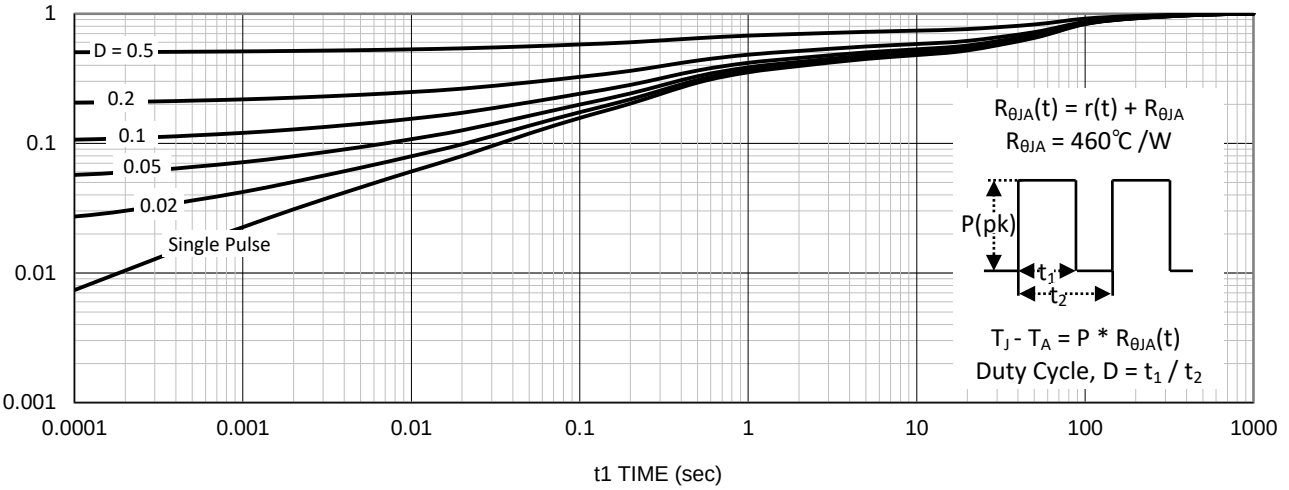

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**

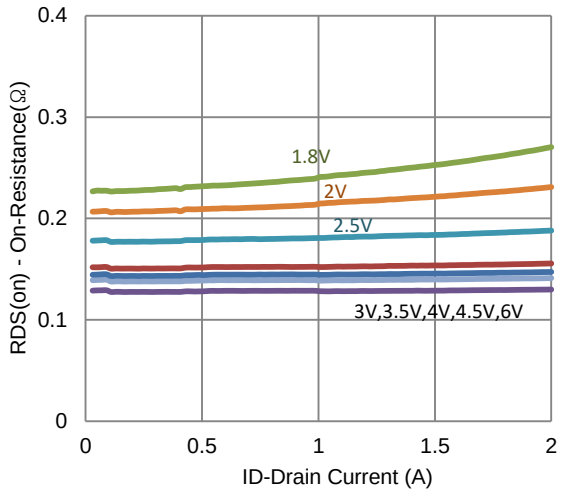



**10. Single Pulse Maximum Power Dissipation**

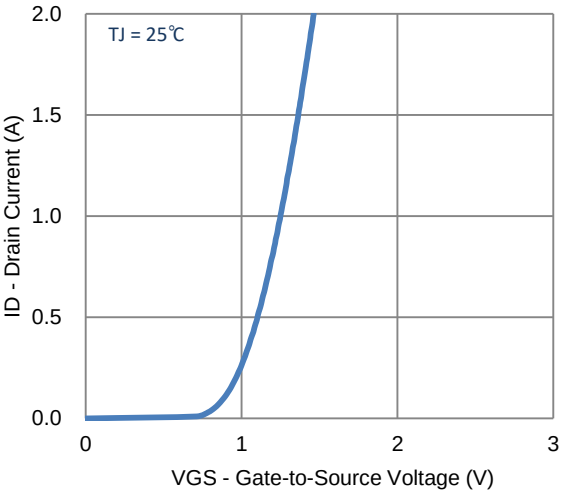



**11. Normalized Thermal Transient Junction to Ambient**

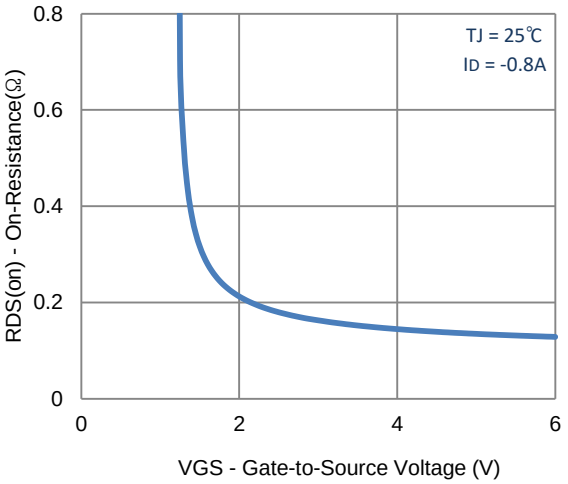
## Typical Electrical Characteristics - P-channel



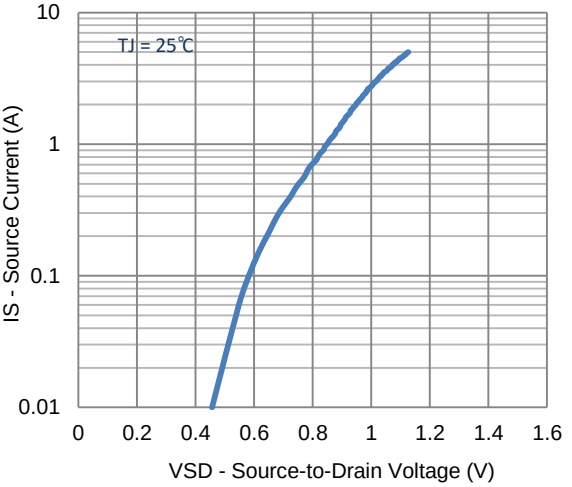

**1. On-Resistance vs. Drain Current**



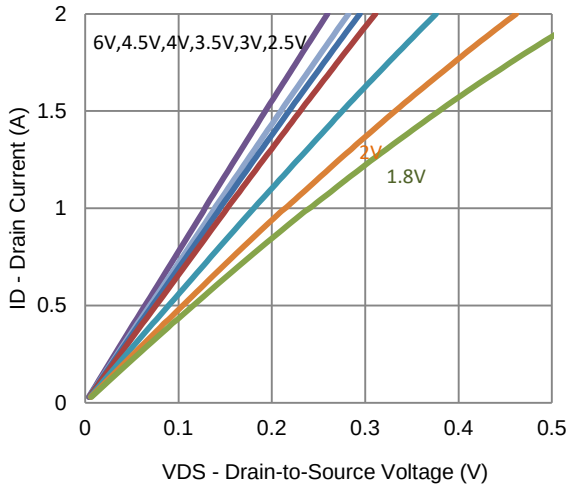

**2. Transfer Characteristics**



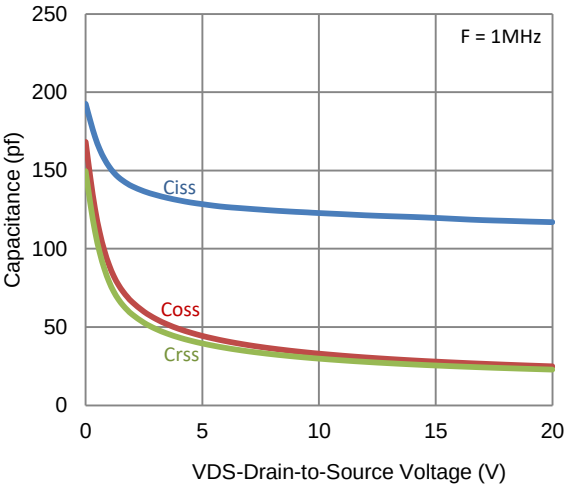

**3. On-Resistance vs. Gate-to-Source Voltage**




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

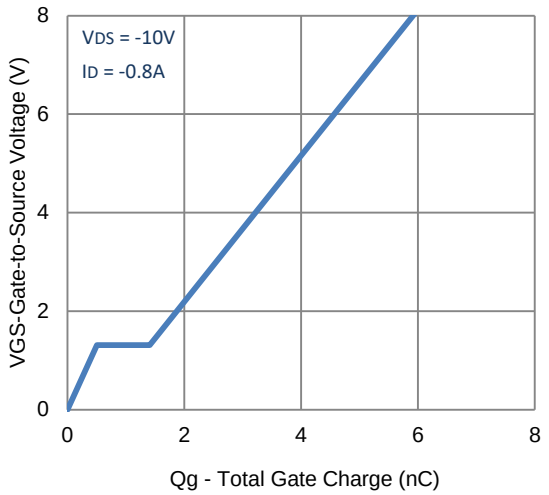



**5. Output Characteristics**

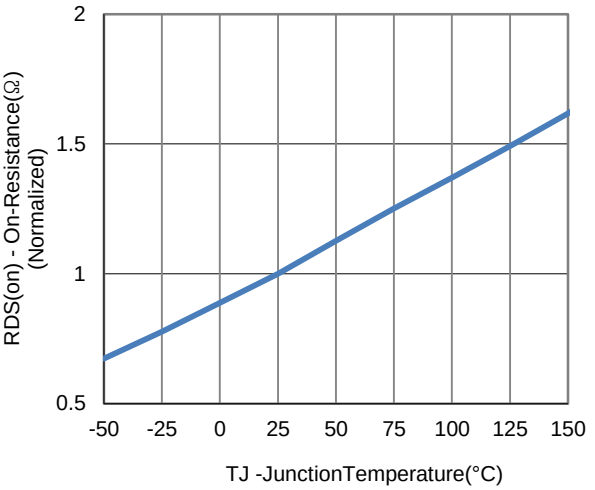



**6. Capacitance**

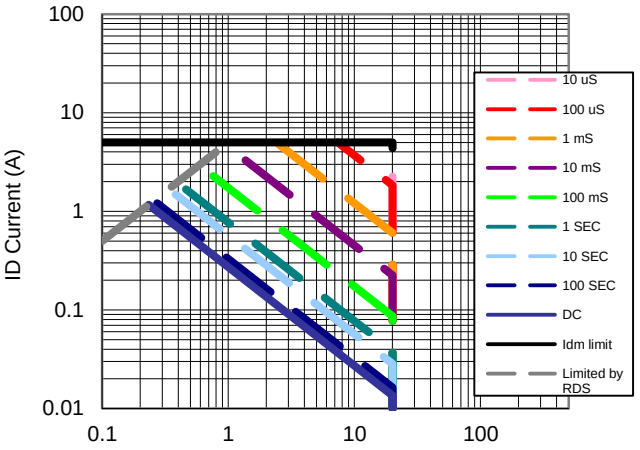
## Typical Electrical Characteristics - P-channel



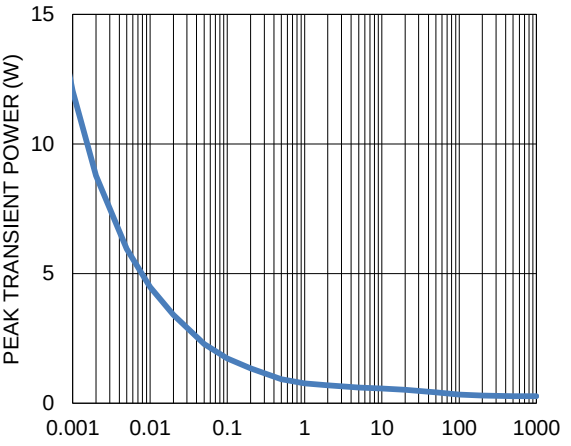

**7. Gate Charge**



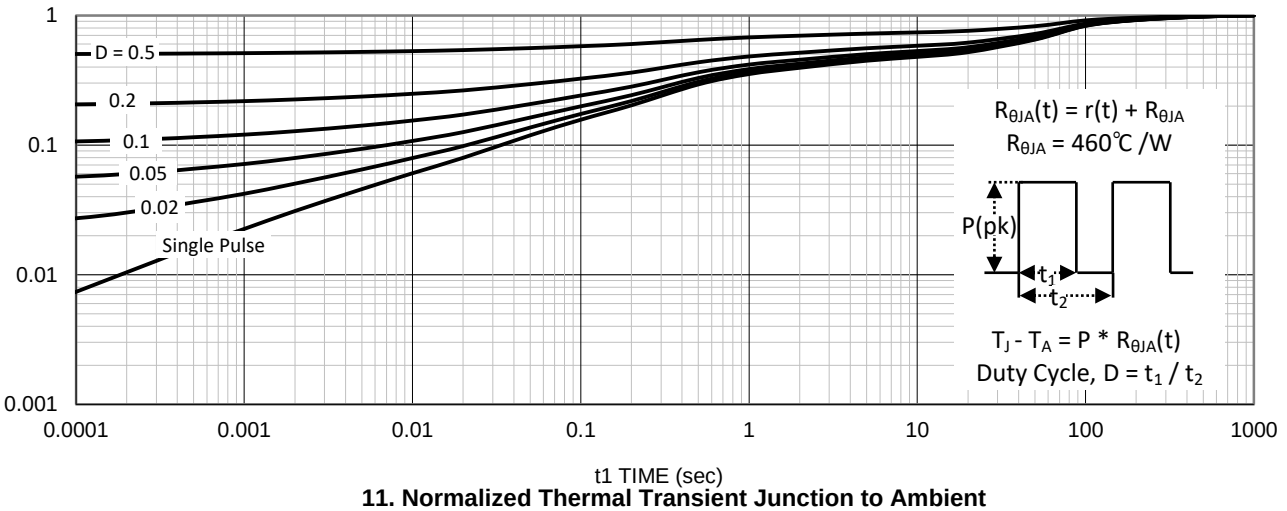

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**

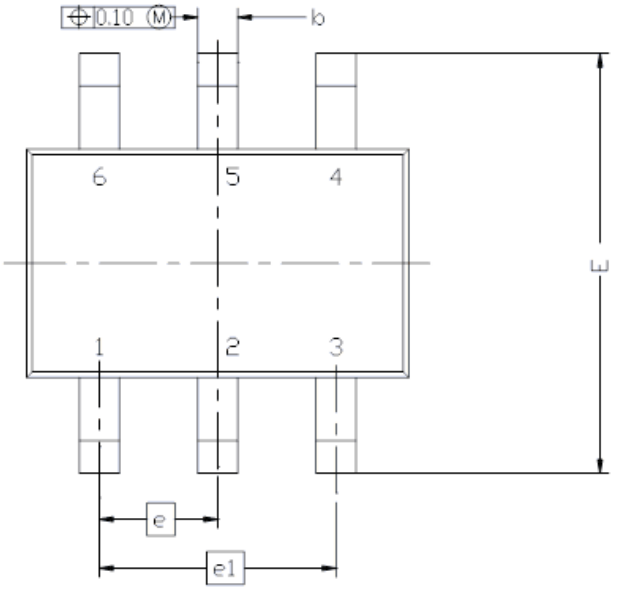



**10. Single Pulse Maximum Power Dissipation**




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

## Package Information




| DIM. | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.900 | 0.95 | 1.10 | 0.035 | 0.037 | 0.043 |
| A1 | 0.00 | --- | 0.10 | 0.000 | --- | 0.004 |
| A2 | 0.70 | 0.90 | 1.00 | 0.028 | 0.035 | 0.039 |
| b | 0.15 | 0.22 | 0.30 | 0.006 | 0.016 | 0.012 |
| c | 0.08 | 0.127 | 0.20 | 0.003 | 0.005 | 0.008 |
| D | 2.10 BSC | | | 0.083 BSC | | |
| E | 2.30 BSC | | | 0.091 BSC | | |
| E1 | 1.30 BSC | | | 0.051 BSC | | |
| e | 0.65 BSC | | | 0.026 BSC | | |
| e1 | 1.30 BSC | | | 0.051 BSC | | |
| L | 0.26 | 0.40 | 0.46 | 0.010 | 0.015 | 0.018 |
| L2 | 0.254BSC | | | 0.010BSC | | |
| R | 0.10 | --- | --- | 0.004 | --- | --- |
| θ | 0? | 4? | 8? | 0? | 4? | 8? |
| θ1 | 7?NOM | | | 7?NOM | | |