

P-Channel 100-V (D-S) MOSFET

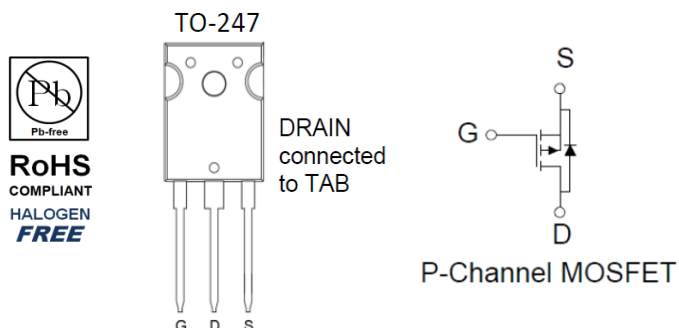
Key Features:

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

Typical Applications:

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

| PRODUCT SUMMARY | | |
|-----------------|----------------------------|------------------|
| V_{DS} (V) | $r_{DS(on)}$ (m Ω) | I_D (A) |
| -100 | 22 @ $V_{GS} = -10V$ | -90 ^a |
| | 25 @ $V_{GS} = -4.5V$ | |



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | |
|---|--------------------------|----------------|------------|------------------|
| Parameter | | Symbol | Limit | Units |
| Drain-Source Voltage | | V_{DS} | -100 | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | |
| Continuous Drain Current ^a | $T_C = 25^\circ\text{C}$ | I_D | -90 | A |
| Pulsed Drain Current ^b | | I_{DM} | -360 | |
| Continuous Source Current (Diode Conduction) ^a | $T_C = 25^\circ\text{C}$ | I_S | -90 | A |
| Power Dissipation ^a | $T_C = 25^\circ\text{C}$ | P_D | 500 | W |
| Operating Junction and Storage Temperature Range | | T_J, T_{stg} | -55 to 175 | $^\circ\text{C}$ |

| THERMAL RESISTANCE RATINGS | | | |
|--|-----------------|---------|--------------------|
| Parameter | Symbol | Maximum | Units |
| Maximum Junction-to-Ambient ^c | $R_{\theta JA}$ | 40 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 0.29 | |

Notes

- Package Limited
- Pulse width limited by maximum junction temperature
- Surface Mounted on 1" x 1" FR4 Board.

Electrical Characteristics

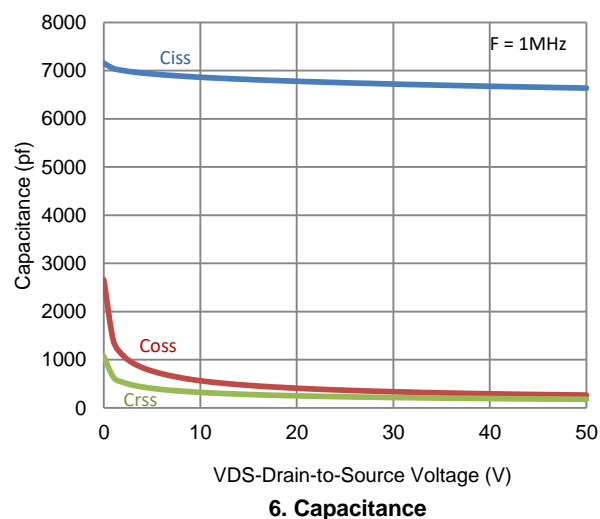
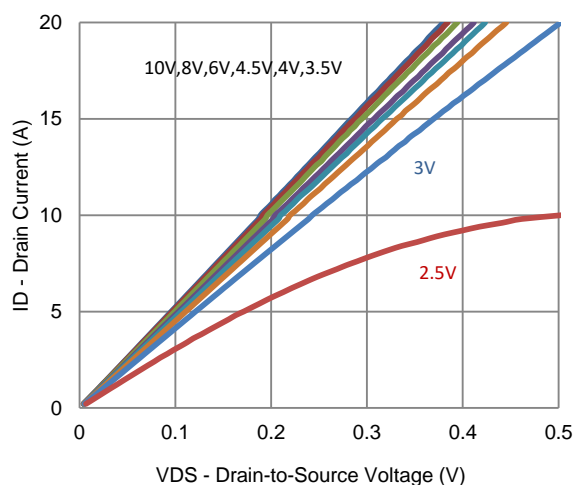
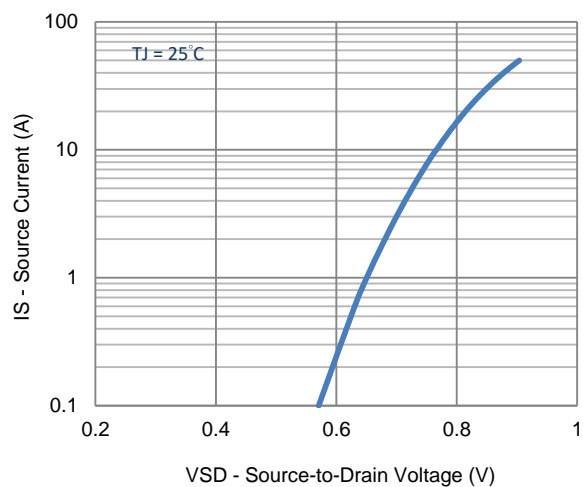
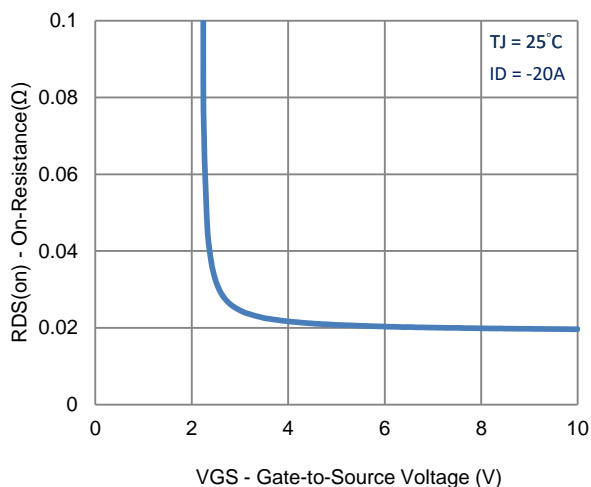
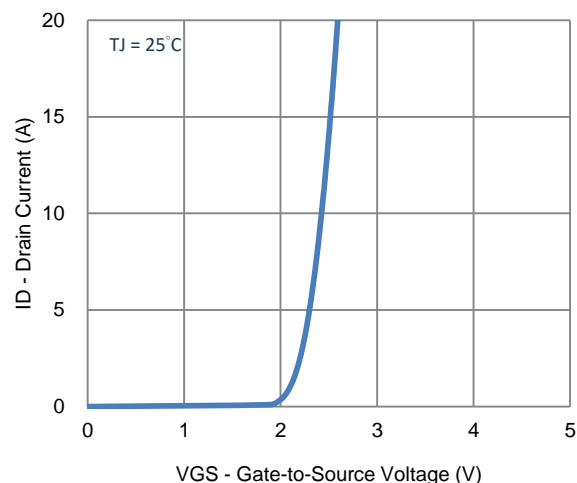
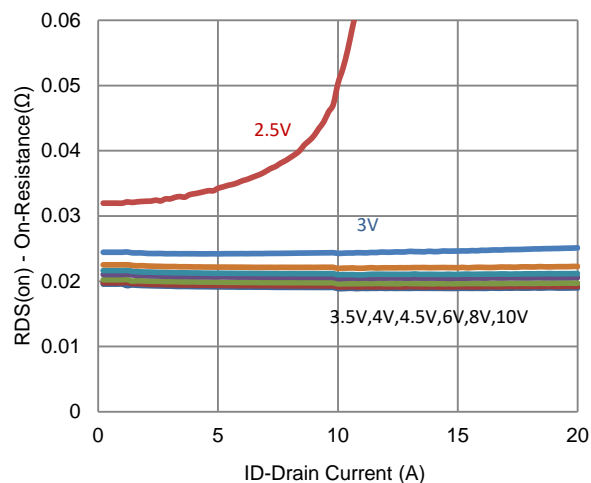
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|--------------|--|------|------|-----------|------------|
| Static | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = -250 \mu A$ | -1 | | | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 V$, $V_{GS} = \pm 20 V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -80 V$, $V_{GS} = 0 V$ | | | -1 | μA |
| | | $V_{DS} = -80 V$, $V_{GS} = 0 V$, $T_J = 55^\circ C$ | | | -10 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} = -5 V$, $V_{GS} = -10 V$ | -110 | | | A |
| Drain-Source On-Resistance ^a | $r_{DS(on)}$ | $V_{GS} = -10 V$, $I_D = -45 A$ | | | 22 | m Ω |
| | | $V_{GS} = -4.5 V$, $I_D = -40 A$ | | | 25 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = -15 V$, $I_D = -45 A$ | | 65 | | S |
| Diode Forward Voltage ^a | V_{SD} | $I_S = -45 A$, $V_{GS} = 0 V$ | | -0.9 | | V |
| Dynamic ^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = -50 V$, $V_{GS} = -4.5 V$, $I_D = -20 A$ | | 154 | | nC |
| Gate-Source Charge | Q_{gs} | | | 50 | | |
| Gate-Drain Charge | Q_{gd} | | | 42 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS} = -50 V$, $R_L = 2.5 \Omega$, $I_D = -20 A$, $V_{GEN} = -10 V$, $R_{GEN} = 6 \Omega$ | | 16 | | ns |
| Rise Time | t_r | | | 17 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 432 | | |
| Fall Time | t_f | | | 129 | | |
| Input Capacitance | C_{iss} | $V_{DS} = -50 V$, $V_{GS} = 0 V$, $f = 1 Mhz$ | | 6717 | | pF |
| Output Capacitance | C_{oss} | | | 331 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 213 | | |

Notes

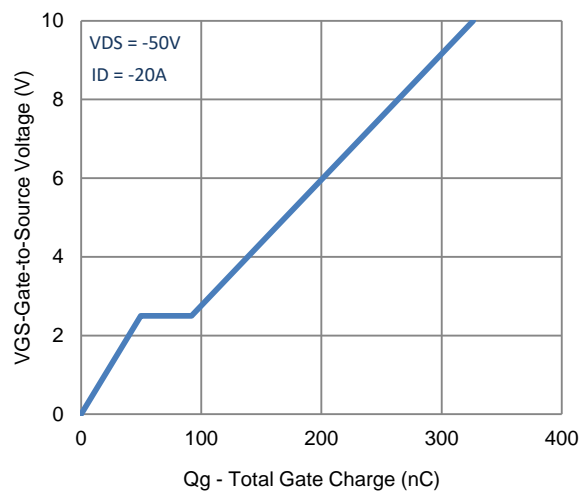
- Pulse test: PW \leq 300us duty cycle \leq 2%.
- Guaranteed by design, not subject to production testing.

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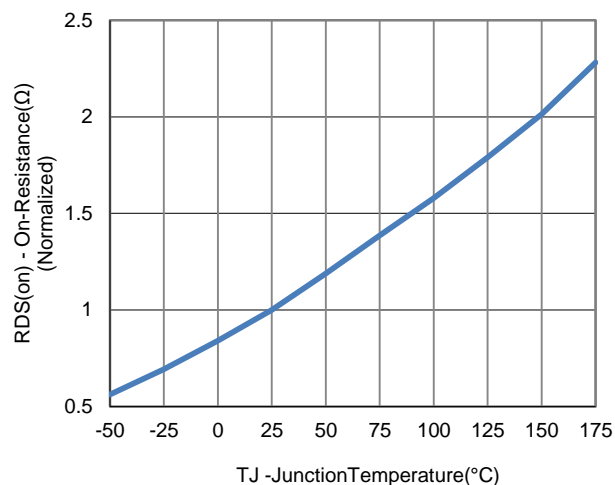
Typical Electrical Characteristics



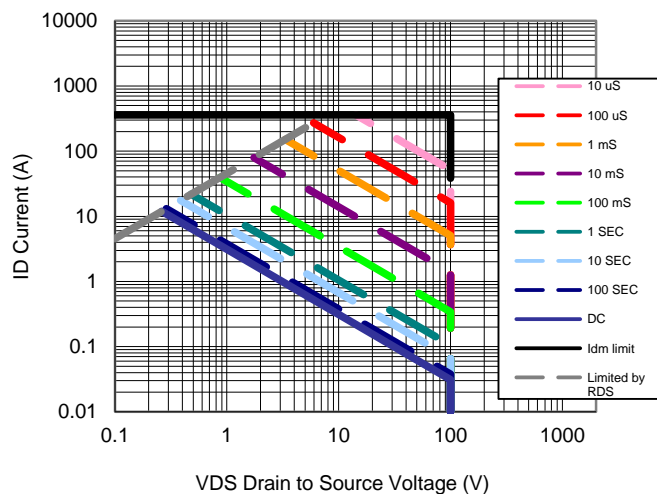
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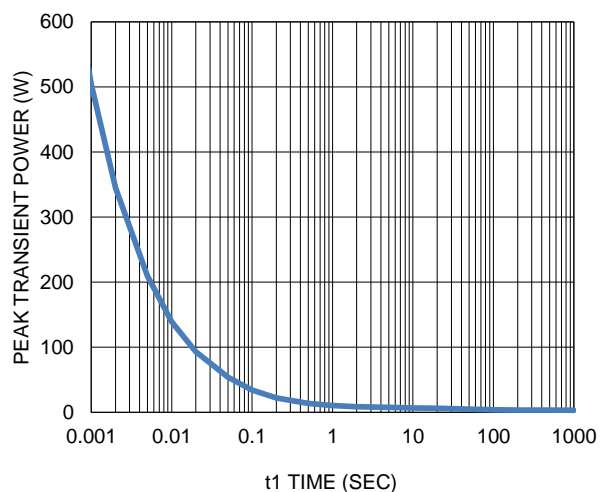
7. Gate Charge



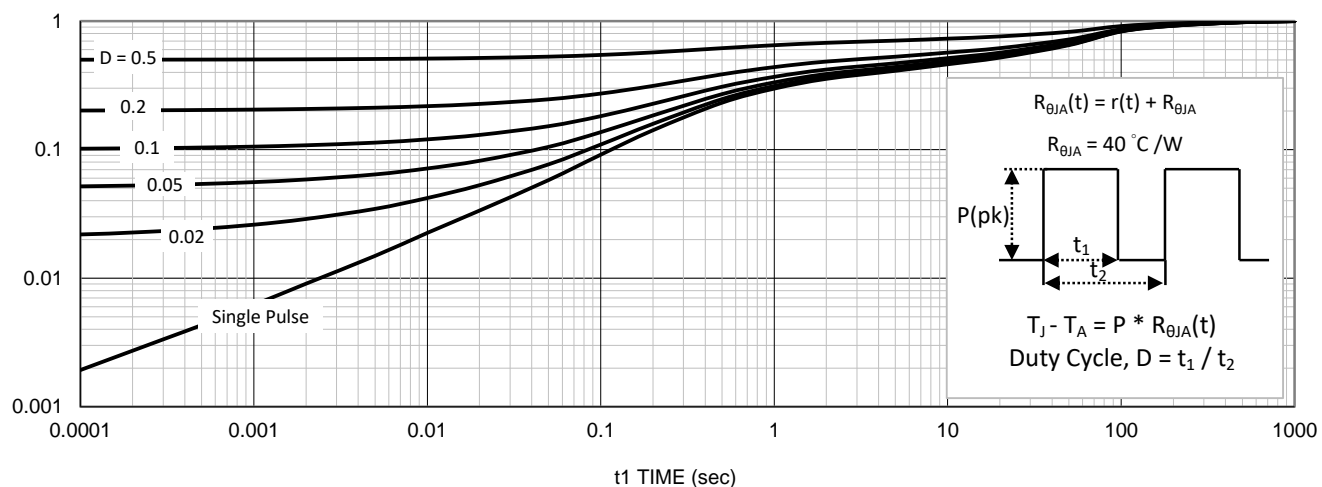
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

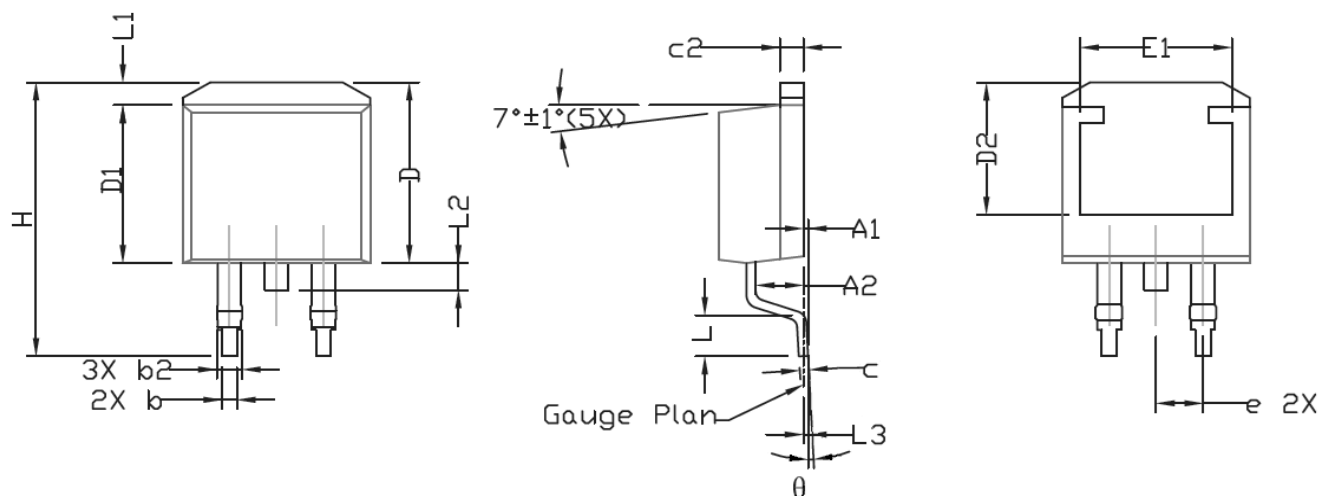


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



| SYMBOL | DIMENSIONAL REQMTS | | | INCHES REQMTS | | |
|--------|--------------------|-------|-------|---------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.30 | 4.57 | 4.72 | 0.169 | 0.180 | 0.186 |
| A1 | 0 | --- | 0.25 | 0 | --- | 0.010 |
| A2 | 2.47 | 2.57 | 2.67 | 0.097 | 0.101 | 0.105 |
| b | 0.69 | 0.813 | 0.94 | 0.027 | 0.032 | 0.037 |
| b2 | 1.17 | 1.27 | 1.45 | 0.046 | 0.050 | 0.057 |
| c | 0.48 | 0.50 | 0.60 | 0.019 | 0.020 | 0.024 |
| c2 | 1.17 | 1.27 | 1.37 | 0.046 | 0.050 | 0.054 |
| D | 9.80 | 10.05 | 10.30 | 0.386 | 0.396 | 0.406 |
| D1 | 8.64 | 8.78 | 9.65 | 0.340 | 0.346 | 0.380 |
| D2 | 7.12 | 7.37 | 7.62 | 0.280 | 0.290 | 0.300 |
| E | 9.70 | 10.15 | 10.54 | 0.382 | 0.400 | 0.415 |
| E1 | 8.00 | 8.20 | 8.40 | 0.315 | 0.323 | 0.331 |
| e | 2.54 BSC | | | 0.100 BSC | | |
| H | 14.99 | 15.24 | 15.49 | 0.590 | 0.600 | 0.610 |
| L | 1.78 | 2.29 | 2.79 | 0.070 | 0.090 | 0.110 |
| L1 | 1.02 | 1.27 | 1.52 | 0.040 | 0.050 | 0.060 |
| L2 | --- | --- | 1.75 | --- | --- | 0.069 |
| L3 | --- | 0.254 | --- | --- | 0.010 | --- |
| θ | 0° | --- | 8° | 0° | --- | 8° |