

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

### Key Features:

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

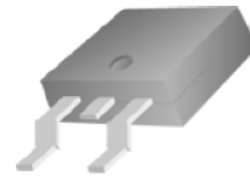
### Typical Applications:

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

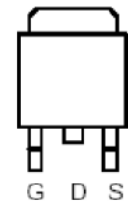
| PRODUCT SUMMARY |                            |                  |
|-----------------|----------------------------|------------------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ (m $\Omega$ ) | $I_D$ (A)        |
| -100            | 19 @ $V_{GS} = -10V$       | -90 <sup>a</sup> |
|                 | 21 @ $V_{GS} = -4.5V$      |                  |



RoHS  
COMPLIANT  
HALOGEN  
FREE



TO-263



Top View

### 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                                       | $V_{GS}$       | $\pm 20$   |                  |
| Continuous Drain Current <sup>a</sup>                     | $I_D$          | -90        | A                |
| Pulsed Drain Current <sup>b</sup>                         |                |            |                  |
| Continuous Source Current (Diode Conduction) <sup>a</sup> | $I_S$          | -90        | A                |
| Power Dissipation <sup>a</sup>                            | $P_D$          | 300        | 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 <sup>c</sup> | $R_{\theta JA}$ | 11      | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Case                 | $R_{\theta JC}$ | 0.5     |                           |

### Notes

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

## Electrical Characteristics

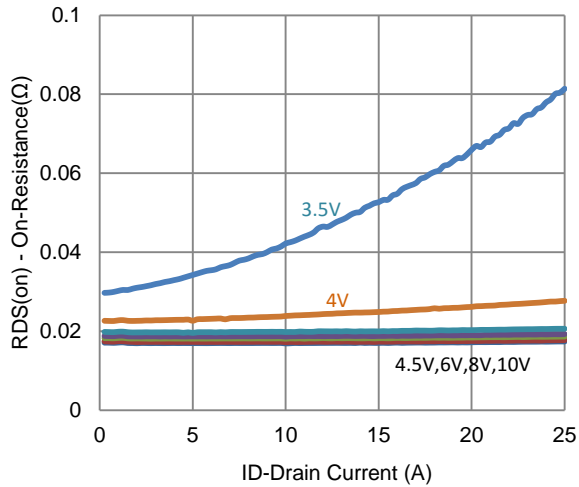
| Parameter                               | Symbol       | Test Conditions  | Min  | Typ   | Max       | Unit |
|---|--------------|--|------|-------|-----------|------|
| <b>Static</b>                           |              |  |      |       |           |      |
| Gate-Source Threshold Voltage           | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250 \mu A$  | -1   |       |           | V    |
| Gate-Body Leakage                       | $I_{GSS}$    | $V_{DS} = 0 V, V_{GS} = \pm 20 V$  |      |       | $\pm 100$ | nA   |
| Zero Gate Voltage Drain Current         | $I_{DSS}$    | $V_{DS} = -80 V, V_{GS} = 0 V$   |      |       | -1        | uA   |
|   |              | $V_{DS} = -80 V, V_{GS} = 0 V, T_J = 55^\circ C$   |      |       | -10       |      |
| On-State Drain Current <sup>a</sup>     | $I_{D(on)}$  | $V_{DS} = -5 V, V_{GS} = -10 V$  | -110 |       |           | A    |
| Drain-Source On-Resistance <sup>a</sup> | $r_{DS(on)}$ | $V_{GS} = -10 V, I_D = -25 A$  |      |       | 19        | mΩ   |
|   |              | $V_{GS} = -4.5 V, I_D = -20 A$   |      |       | 21        |      |
| Forward Transconductance <sup>a</sup>   | $g_{fs}$     | $V_{DS} = -15 V, I_D = -25 A$  |      | 75    |           | S    |
| Diode Forward Voltage <sup>a</sup>      | $V_{SD}$     | $I_S = -45 A, V_{GS} = 0 V$  |      | -0.95 |           | V    |
| <b>Dynamic <sup>b</sup></b>             |              |  |      |       |           |      |
| Total Gate Charge                       | $Q_g$        | $V_{DS} = -50 V, V_{GS} = -4.5 V,$<br>$I_D = -20 A$  |      | 164   |           | nC   |
| Gate-Source Charge                      | $Q_{gs}$     |  |      | 50    |           |      |
| Gate-Drain Charge                       | $Q_{gd}$     |  |      | 63    |           |      |
| Turn-On Delay Time                      | $t_{d(on)}$  | $V_{DS} = -50 V, R_L = 2.5 \Omega,$<br>$I_D = -20 A,$<br>$V_{GEN} = -10 V, R_{GEN} = 6 \Omega$ |      | 39    |           | ns   |
| Rise Time                               | $t_r$        |  |      | 104   |           |      |
| Turn-Off Delay Time                     | $t_{d(off)}$ |  |      | 217   |           |      |
| Fall Time                               | $t_f$        |  |      | 89    |           |      |
| Input Capacitance                       | $C_{iss}$    | $V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz$  |      | 15378 |           | pF   |
| Output Capacitance                      | $C_{oss}$    |  |      | 774   |           |      |
| Reverse Transfer Capacitance            | $C_{rss}$    |  |      | 530   |           |      |

## Notes

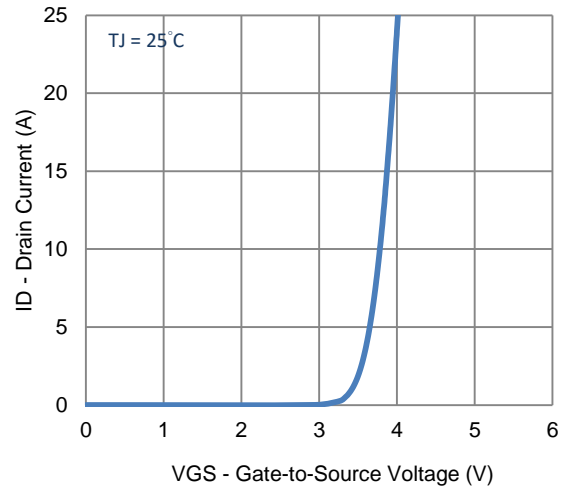
- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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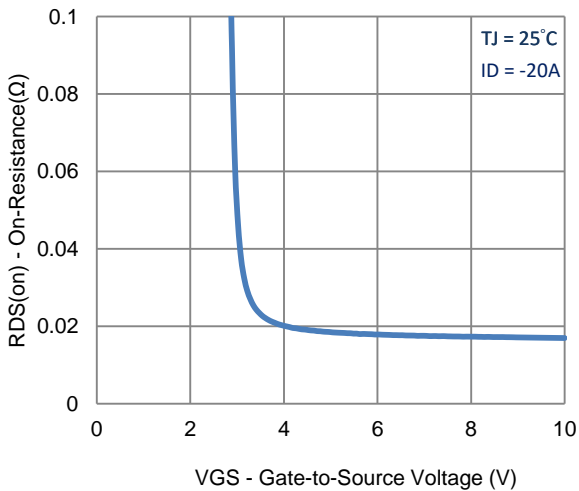
Typical Electrical Characteristics



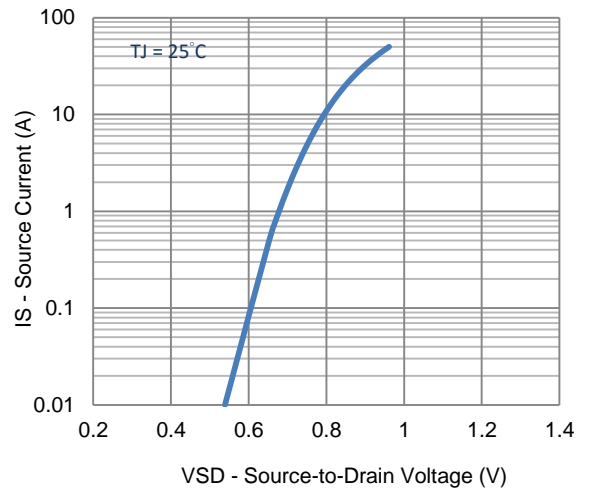
1. On-Resistance vs. Drain Current



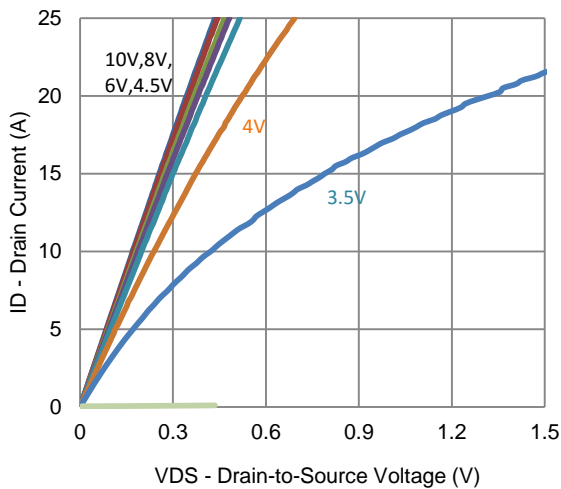
2. Transfer Characteristics



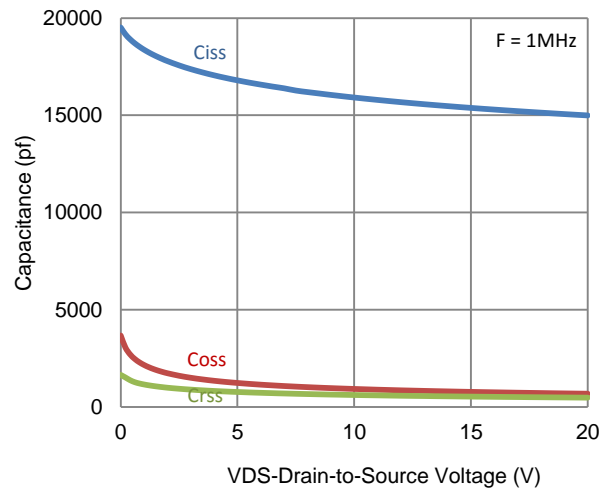
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

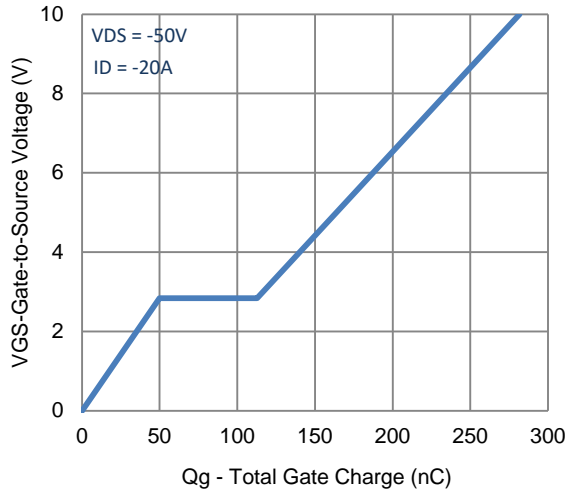


5. Output Characteristics

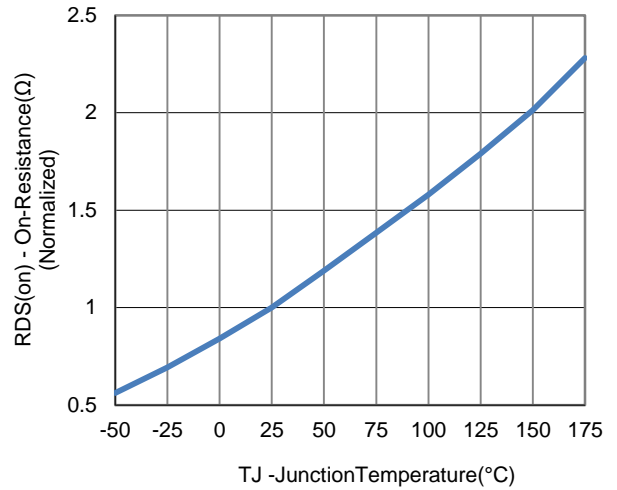


6. Capacitance

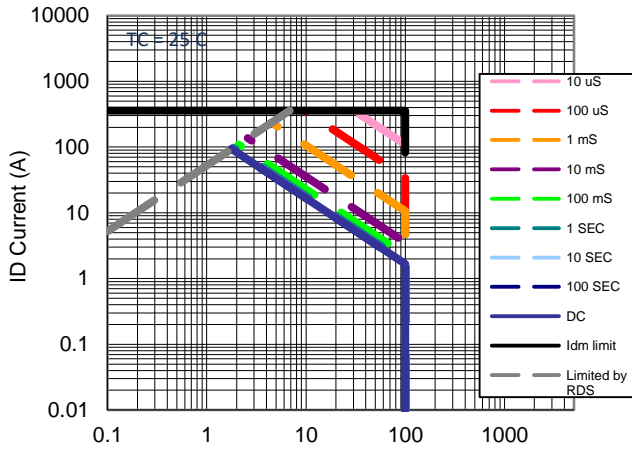
Typical Electrical Characteristics



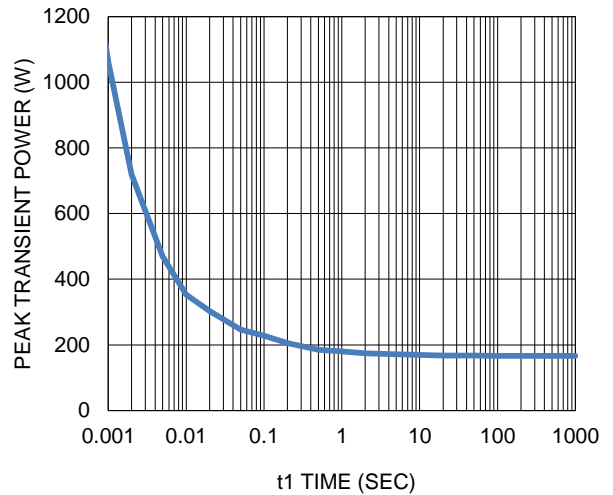
7. Gate Charge



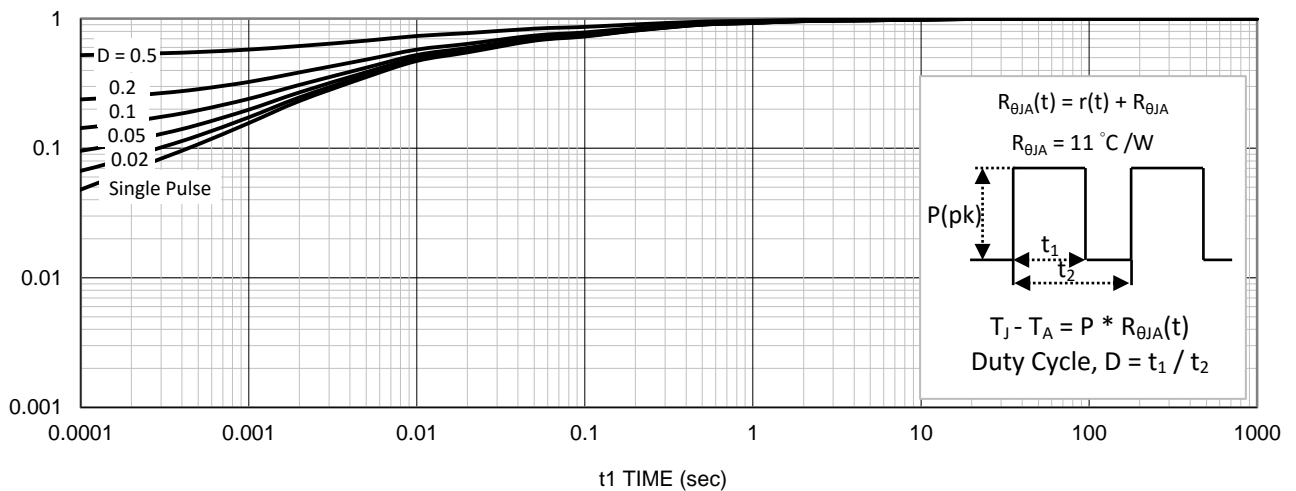
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

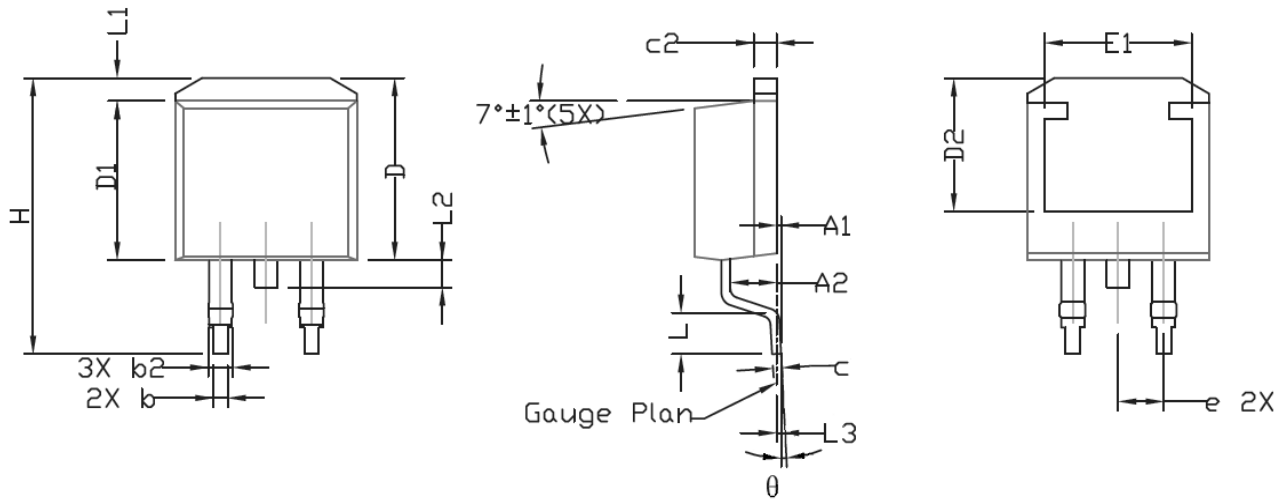


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



| SYMBOL   | 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 | ---   |
| $\theta$ | 0°                 | ---   | 8°    | 0°            | ---   | 8°    |