

N-Channel 30-V (D-S) MOSFET

Key Features:

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

Typical Applications:

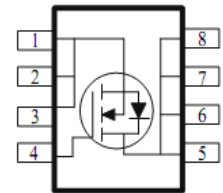
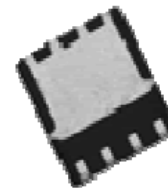
- DC/DC Conversion
- Power Routing
- Motor Drives

| PRODUCT SUMMARY | | |
|-----------------|----------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (m Ω) | I_D (A) |
| 30 | 4.9 @ $V_{GS} = 10V$ | 27 |
| | 7.6 @ $V_{GS} = 4.5V$ | 21 |



RoHS
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DFN5X6-8L



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Limit | Units |
|---|----------------|--------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current ^a | I_D | $T_A = 25^\circ\text{C}$ | 27 |
| | | $T_A = 70^\circ\text{C}$ | 21 |
| Pulsed Drain Current ^b | I_{DM} | 100 | A |
| Continuous Source Current (Diode Conduction) ^a | I_S | 6.8 | A |
| Power Dissipation ^a | P_D | $T_A = 25^\circ\text{C}$ | 5 |
| | | $T_A = 70^\circ\text{C}$ | 3.2 |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | $^\circ\text{C}$ |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Maximum | Units |
|--|-----------------|-----------------|-------|
| Maximum Junction-to-Ambient ^a | $R_{\theta JA}$ | t \leq 10 sec | 25 |
| | | Steady State | 65 |

Notes

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

Electrical Characteristics

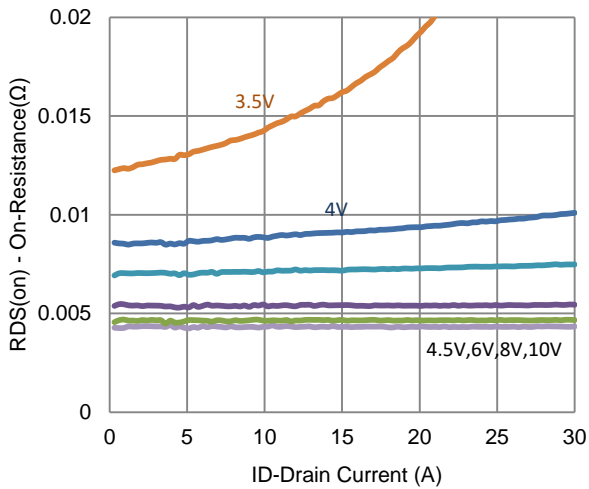
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------|--------------|---|-----|------|-----------|------------|
| Static | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$ | 1 | | | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 24 V, V_{GS} = 0 V$ | | | 1 | uA |
| | | $V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55^\circ C$ | | | 25 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS} = 5 V, V_{GS} = 10 V$ | 40 | | | A |
| Drain-Source On-Resistance | $r_{DS(on)}$ | $V_{GS} = 10 V, I_D = 20 A$ | | | 4.9 | m Ω |
| | | $V_{GS} = 4.5 V, I_D = 16 A$ | | | 7.6 | |
| Forward Transconductance | g_{fs} | $V_{DS} = 15 V, I_D = 20 A$ | | 15 | | S |
| Diode Forward Voltage | V_{SD} | $I_S = 3.4 A, V_{GS} = 0 V$ | | 0.73 | | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 15 V, V_{GS} = 4.5 V,$ $I_D = 20 A$ | | 16 | | nC |
| Gate-Source Charge | Q_{gs} | | | 7.1 | | |
| Gate-Drain Charge | Q_{gd} | | | 6.2 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS} = 15 V, R_L = 0.8 \Omega,$ $I_D = 20 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$ | | 9 | | ns |
| Rise Time | t_r | | | 12 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 50 | | |
| Fall Time | t_f | | | 22 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$ | | 2031 | | pF |
| Output Capacitance | C_{oss} | | | 326 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 292 | | |

Notes

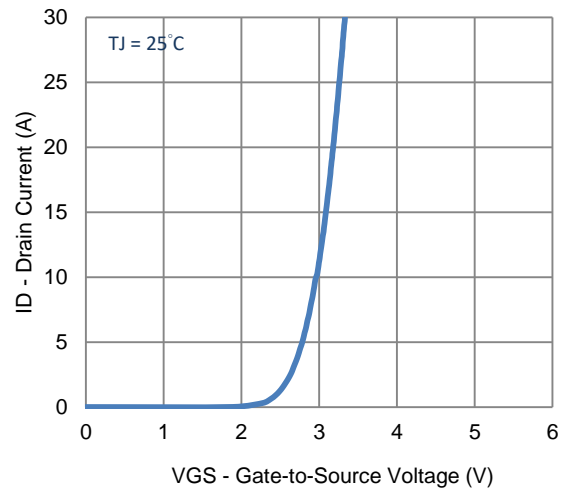
- Pulse test: $PW \leq 300 \mu s$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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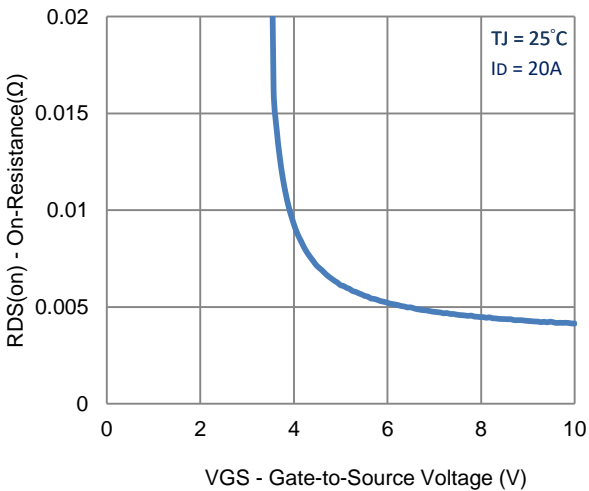
Typical Electrical Characteristics



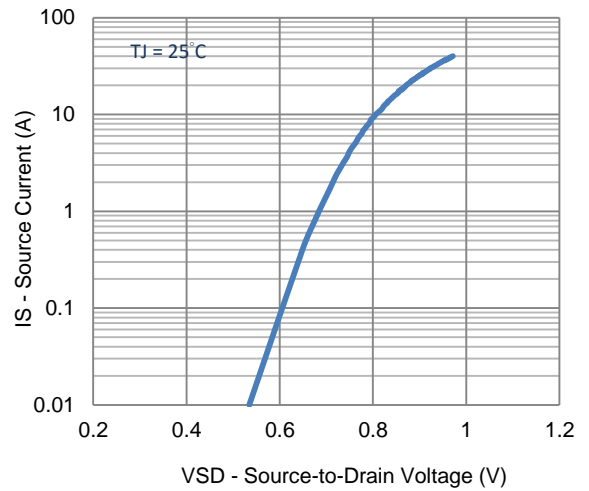
1. On-Resistance vs. Drain Current



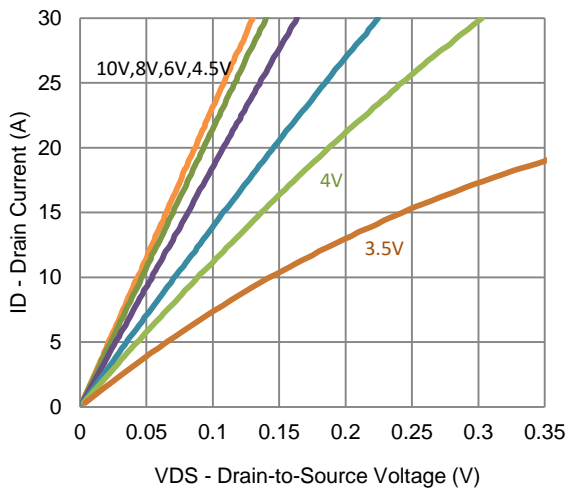
2. Transfer Characteristics



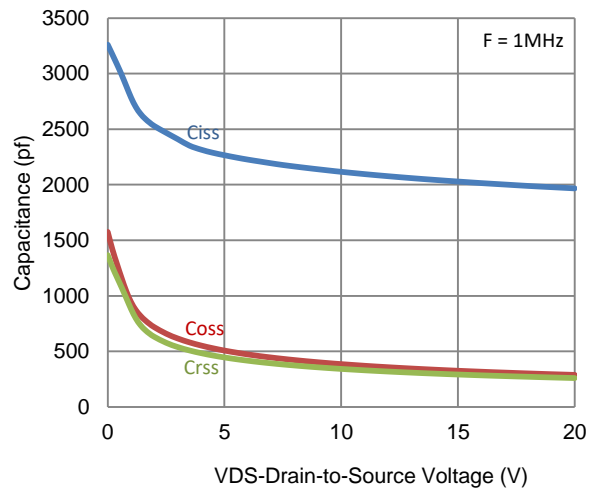
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

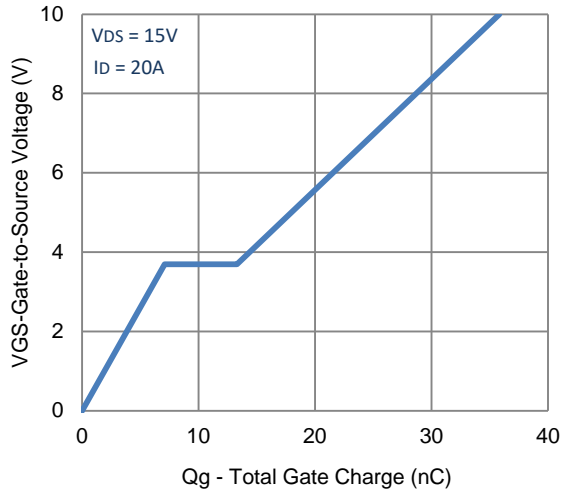


5. Output Characteristics

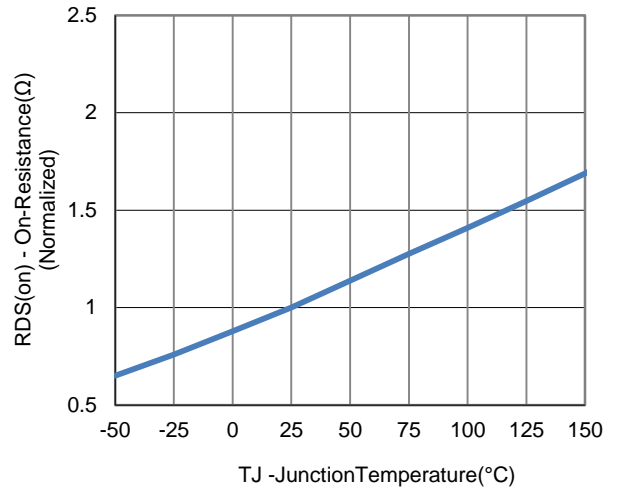


6. Capacitance

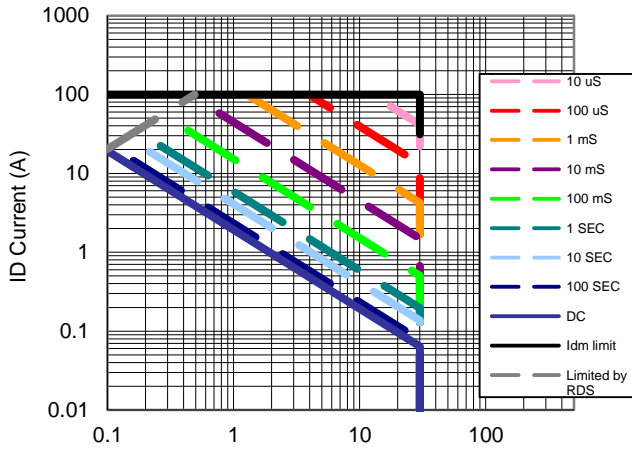
Typical Electrical Characteristics



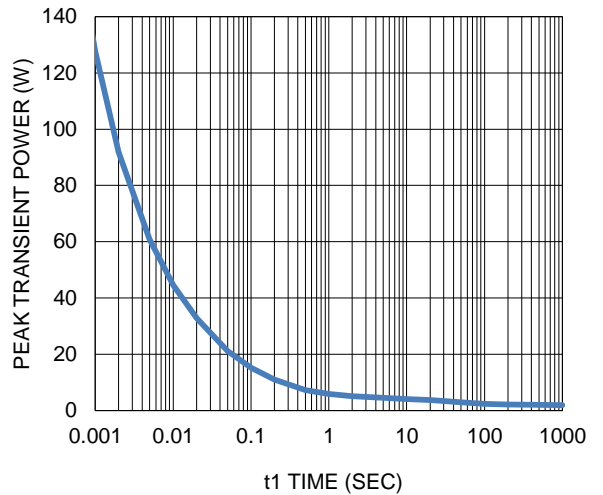
7. Gate Charge



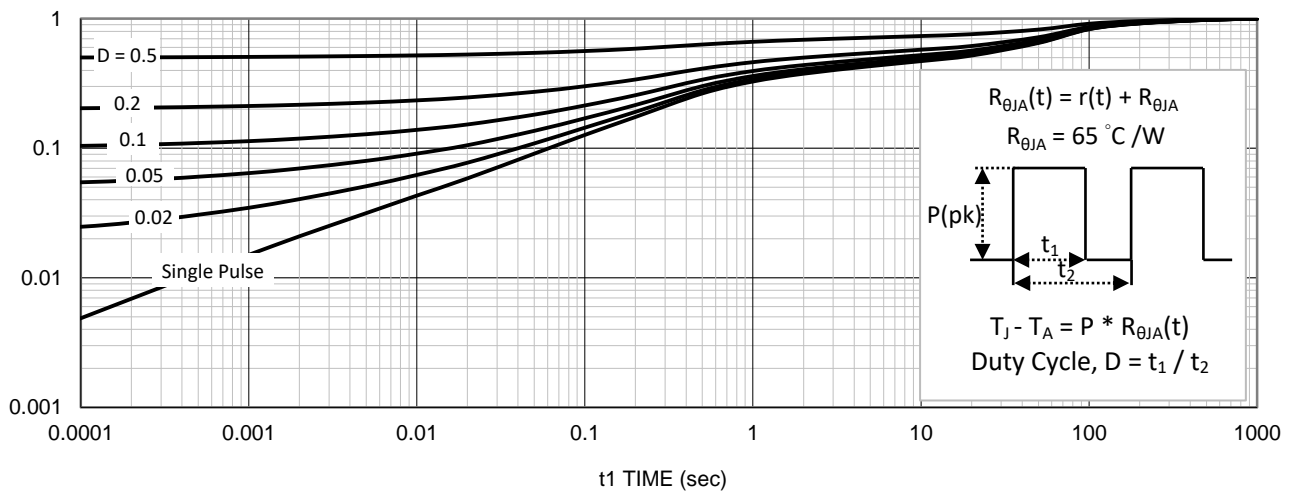
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

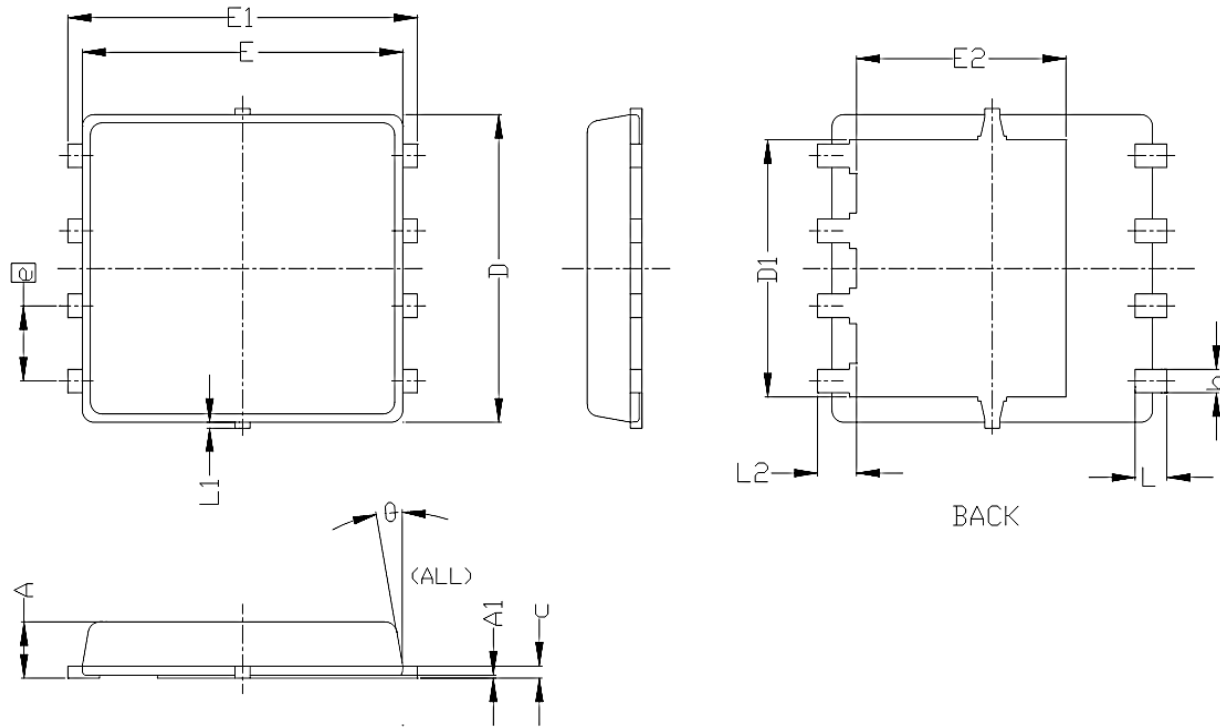


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|------|------|----------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.85 | 0.95 | 1.00 | 0.033 | 0.037 | 0.039 |
| A1 | 0.00 | --- | 0.05 | 0.000 | --- | 0.002 |
| b | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| c | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 5.20 BSC | | | 0.205 BSC | | |
| D1 | 4.35 BSC | | | 0.171 BSC | | |
| E | 5.55 BSC | | | 0.219 BSC | | |
| E1 | 6.05 BSC | | | 0.238 BSC | | |
| E2 | 3.62 BSC | | | 0.143 BSC | | |
| e | 1.27 BSC | | | 0.050 BSC | | |
| L | 0.45 | 0.55 | 0.65 | 0.018 | 0.022 | 0.026 |
| L1 | 0 | --- | 0.15 | 0 | --- | 0.006 |
| L2 | 0.68 REF | | | 0.027 REF | | |
| theta | 0° | --- | 10° | 0° | --- | 10° |