

N - Channel 30 V (D-S) MOSFET

| PRODUCT SUMMARY | | | |
|---------------------|--------------------------------|---------------------------------|-----------------------|
| V _{DS} (V) | R _{DS(on)} (mΩ)(Typ.) | I _D (A) ^a | Q _g (Typ.) |
| 30 | 8 at V _{GS} = 10 V | 12 | 4.5 nC |
| | 12 at V _{GS} = 4.5 V | | |

FEATURES

- DT-Trench MOSFET
- 100 % R_g and UIS Tested
- Low RDS(ON)
- Low Gate Charge



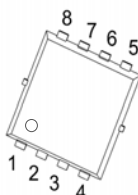
RoHS
COMPLIANT

APPLICATIONS

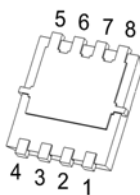
- Battery charging and discharging for battery pack
- Power switch for Adaptor/ Charger

PDFN 3.3x3.3-8L Pin Configuration

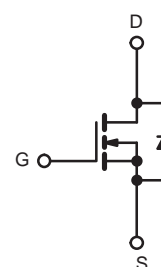
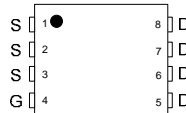
Top View



Bottom View



Top View



N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted) | | | |
|---|-----------------------------------|-------------------------|------|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Drain-Source Voltage | V _{DS} | 30 | V |
| Gate-Source Voltage | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 150 °C) ^a | I _D | T _C = 25 °C | 12 |
| | | T _C = 100 °C | 9.4 |
| Pulsed Drain Current ^b | I _{DM} | 50 | A |
| Single Avalanche Energy | E _{AS} | 33.8 | mJ |
| Maximum Power Dissipation ^c | P _D | T _C = 25 °C | 21 |
| | | T _C = 100 °C | 8.3 |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | - 55 to +150 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|--|-------------------|-----|------|
| PARAMETER | SYMBOL | MAX | UNIT |
| Junction-to-Ambient (PCB Mount) ^d | R _{thJA} | 65 | °C/W |
| Junction-to-Case (Drain) | R _{thJC} | 6 | |

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_d is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

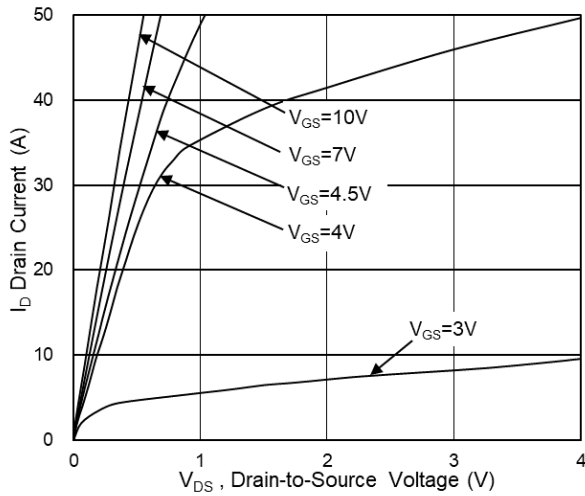
| SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | |
|--|--------------|--|------|------|-----------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 1.0 | - | 3.0 | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | - | - | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$ | - | - | 1 | μA |
| | | $V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$ | - | - | 5 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \geq 5\text{ V}, V_{GS} = 5\text{ V}$ | 12 | - | - | A |
| Drain-Source On-State Resistance ^a | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 12\text{ A}$ | - | 8 | 9.8 | m Ω |
| | | $V_{GS} = 4.5\text{ V}, I_D = 12\text{ A}$ | - | 12 | 15.8 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = 5\text{ V}, I_D = 12\text{ A}$ | - | 45 | - | S |
| Dynamic ^b | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}, f = 1\text{ MHz}$ | - | 562 | - | pF |
| Output Capacitance | C_{oss} | | - | 274 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 28 | - | |
| Total Gate Charge ^c | Q_g | $V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 12\text{ A}$ | - | 8.9 | - | nC |
| Gate-Source Charge ^c | Q_{gs} | | - | 2.4 | - | |
| Gate-Drain Charge ^c | Q_{gd} | | - | 1.6 | - | |
| Gate Resistance | R_g | $f = 1\text{ MHz}$ | - | 3 | - | Ω |
| Turn-On Delay Time ^c | $t_{d(on)}$ | $V_{DS} = 15\text{ V}, I_D = 12\text{ A}, R_g = 3\text{ }\Omega$ $V_{GS} = 10\text{ V}$ | - | 5 | - | ns |
| Rise Time ^c | t_r | | - | 3.7 | - | |
| Turn-Off Delay Time ^c | $t_{d(off)}$ | | - | 18.5 | - | |
| Fall Time ^c | t_f | | - | 3.2 | - | |
| Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25\text{ }^\circ\text{C}$) | | | | | | |
| Continuous Source-Drain Diode Current | I_S | $T_C = 25\text{ }^\circ\text{C}$ | - | - | 12 | A |
| Pulsed Current ($t = 100\text{ }\mu\text{s}$) | I_{SM} | | - | - | 50 | A |
| Forward Voltage ^a | V_{SD} | $I_F = 1\text{ A}, V_{GS} = 0\text{ V}$ | - | - | 1 | V |

Notes

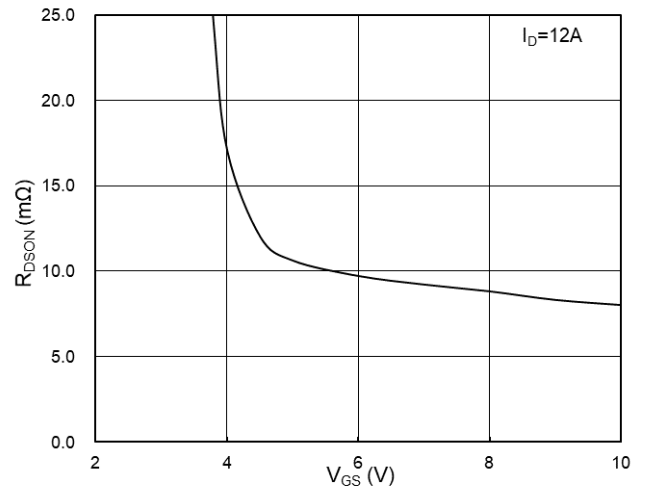
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

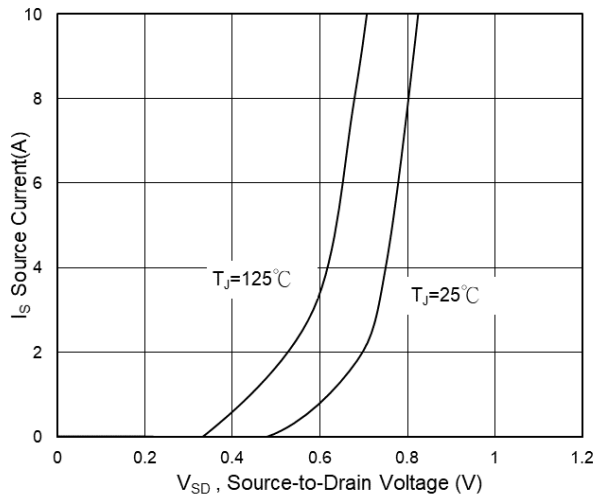
TYPICAL CHARACTERISTICS (25°C , unless otherwise noted)



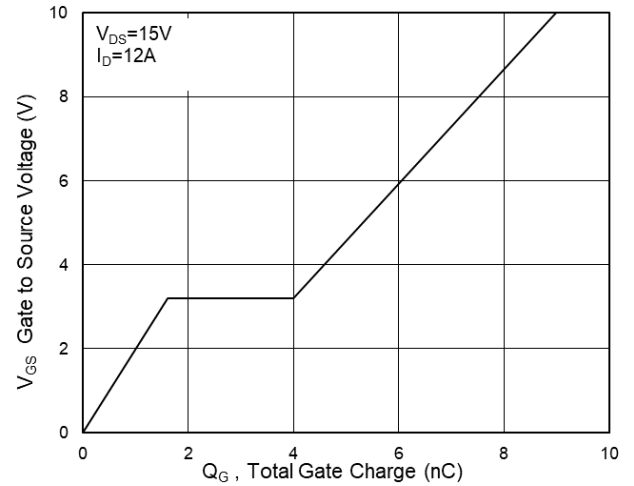
Typical Output Characteristics



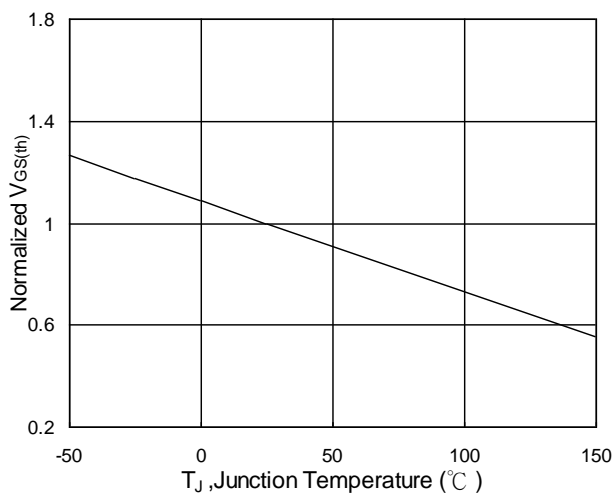
On-Resistance vs G-S Voltage



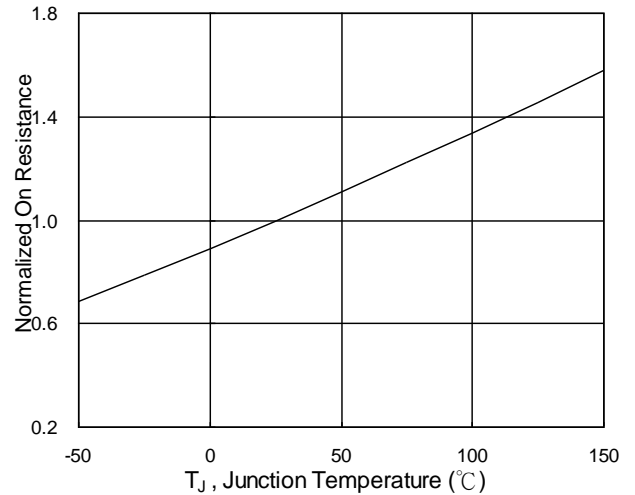
Source Drain Forward Characteristics



Gate-Charge Characteristics

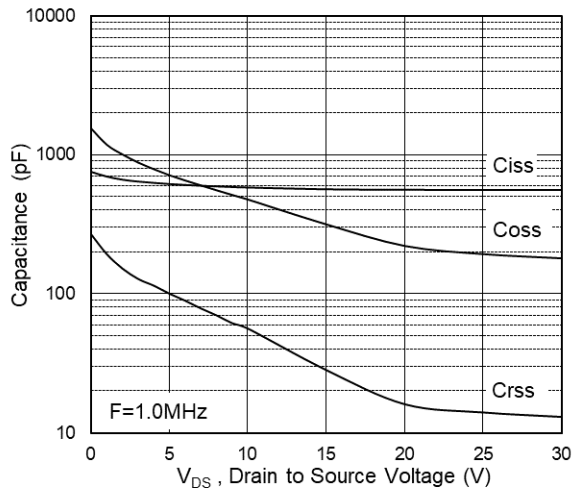


Normalized $V_{GS(th)}$ vs T_J

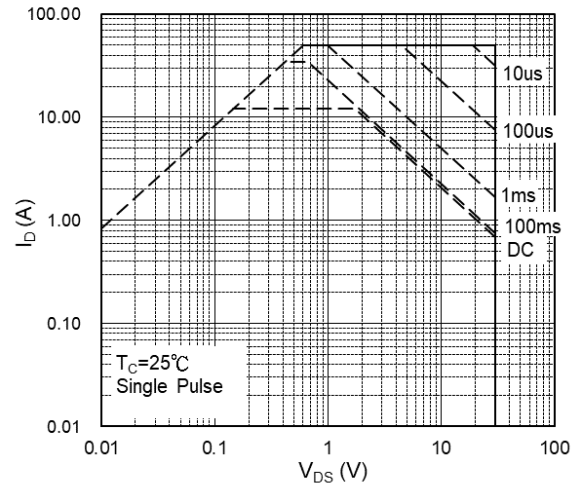


Normalized $R_{DS(on)}$ vs T_J

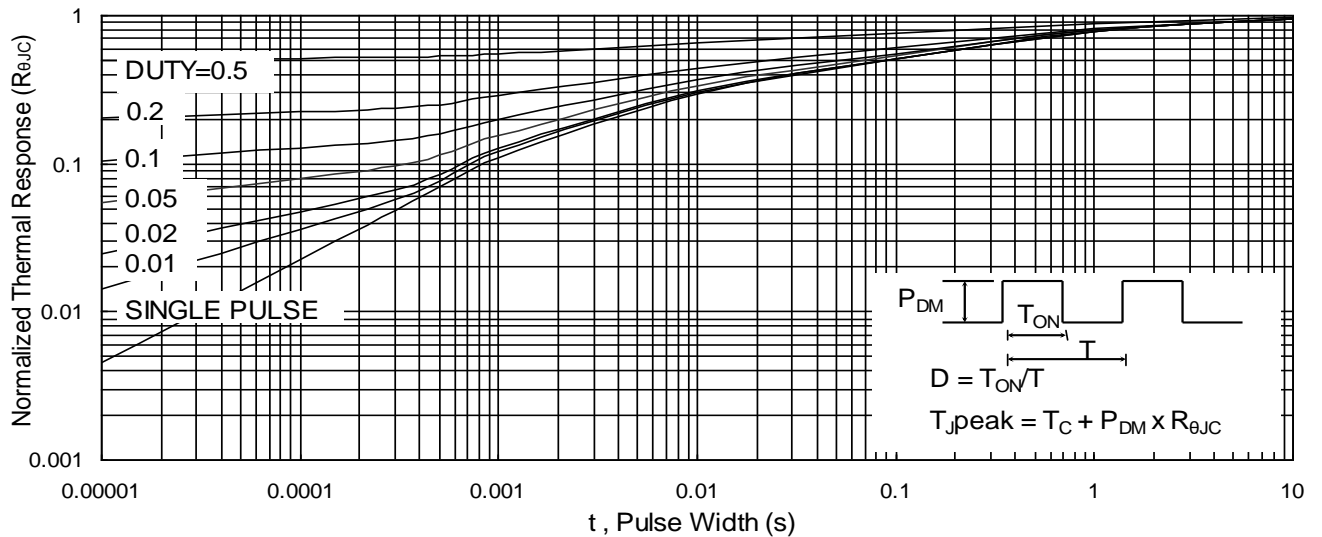
TYPICAL CHARACTERISTICS (25°C , unless otherwise noted)



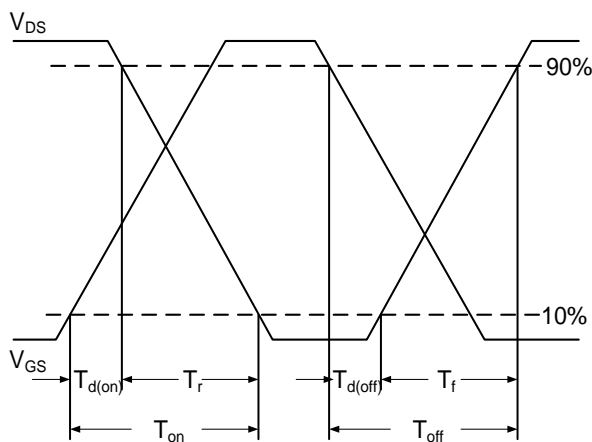
Capacitance



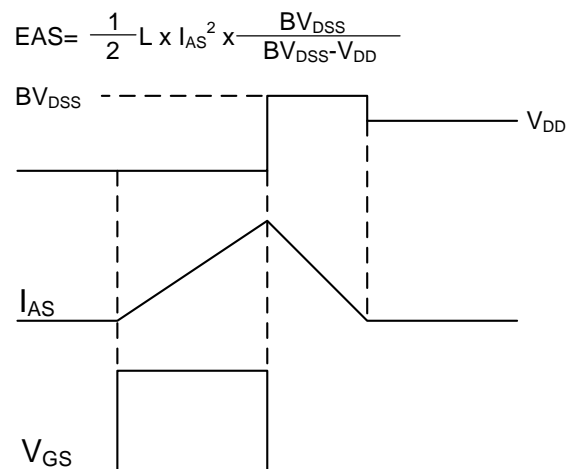
Safe Operating Area



Normalized Maximum Transient Thermal Impedance



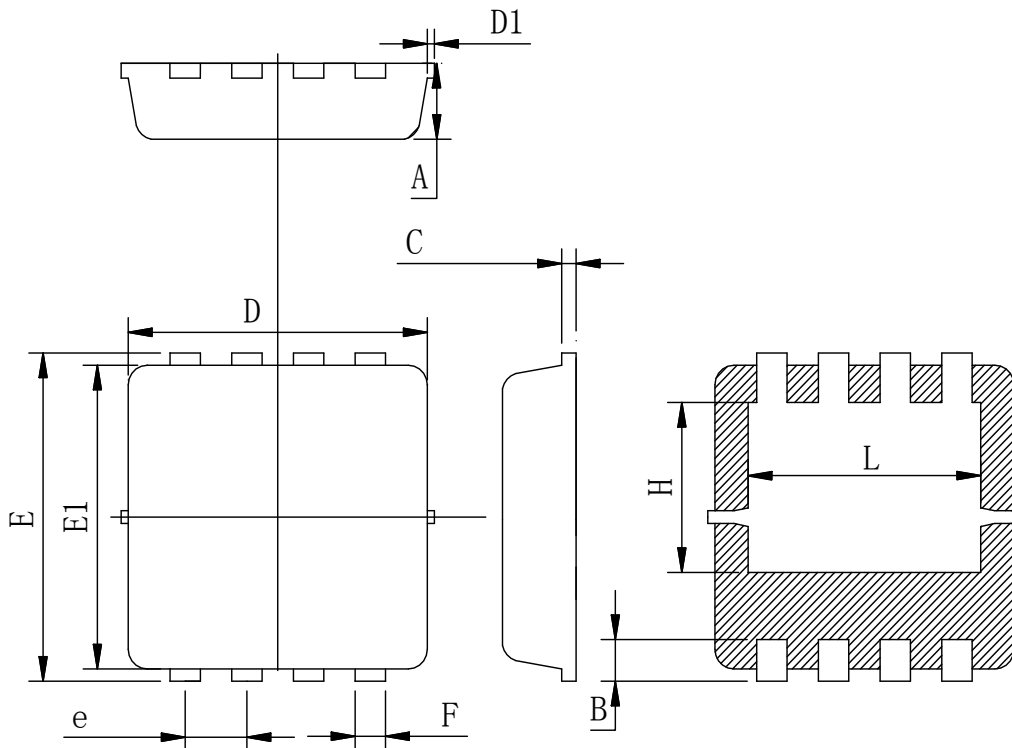
Switching Time Waveform



Unclamped Inductive Switching Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

PDFN 3.3X3.3 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| Symbol | Min | Typ | Max |
|--------|-------|-------|-------|
| A | 0.600 | 0.775 | 1.000 |
| B | 0.20 | 0.38 | 0.55 |
| C | 0.05 | 0.15 | 0.40 |
| D | 3.10 | 3.25 | 3.50 |
| D1 | - | - | 0.15 |
| E | 3.15 | 3.35 | 3.50 |
| E1 | 2.60 | 3.10 | 3.45 |
| e | 0.50 | 0.65 | 0.80 |
| F | 0.15 | 0.32 | 0.45 |
| H | 1.25 | 1.73 | 2.10 |
| L | 2.20 | 2.45 | 2.85 |

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