

GENERAL FEATURES

- $V_{DS} = -30V, I_D = -50A$
- $R_{DS(ON)} = 8.0m\Omega @ V_{GS} = -10V \text{ typ}$
- $R_{DS(ON)} = 18m\Omega @ V_{GS} = -4.5V \text{ typ}$

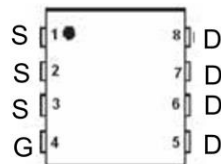
Application

- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

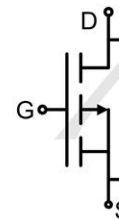
Package and Pin Configuration



PDFN3333 top view



Circuit diagram



Marking



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|--------------------------|------------|------------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | 20 | V |
| Drain Current-Continuous | I_D | -50 | A |
| Drain Current-Continuous($T_C = 100^\circ\text{C}$) | $I_D(100^\circ\text{C})$ | -32 | A |
| Pulsed Drain Current | I_{DM} | -200 | A |
| Maximum Power Dissipation | P_D | 38 | W |
| Single pulse avalanche energy ^(Note 5) | E_{AS} | 125 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ\text{C}$ |

Electrical Characteristics (T_j=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|--|------|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =-250 μA | -30 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-24V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = 20V, V _{DS} =0V | - | - | 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250 μA | -1.2 | 1.5 | -2.5 | V |
| Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} =-10V, I _D =-30A | - | 8.0 | 15 | mΩ |
| | | V _{GS} =-4.5V, I _D =-15A | - | 18 | 24 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-18A | - | 25 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-15V, V _{GS} =0V, F=1.0MHz | - | 3448 | - | PF |
| Output Capacitance | C _{oss} | | - | 508 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 421 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =-15V, I _D =-15A, R _L =1Ω | - | 9.4 | - | nS |
| Turn-on Rise Time | t _r | | - | 10.2 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | V _{GS} =-10V, R _G =3.3Ω | - | 117 | - | nS |
| Turn-Off Fall Time | t _f | | - | 24 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =-15V, I _D =-15A, V _{GS} =-4.5V | - | 30 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 10 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 10.4 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =-1A | - | - | -1 | V |
| Diode Forward Current (Note 2) | I _S | | - | - | -50 | A |

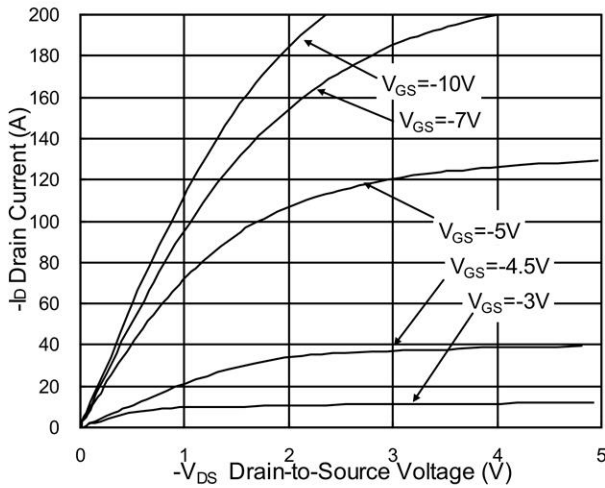


Fig.1 Typical Output Characteristics

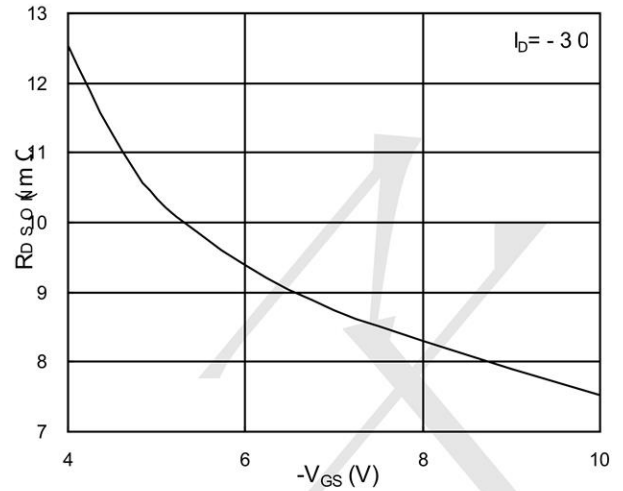


Fig.2 On-Resistance v.s Gate-Source

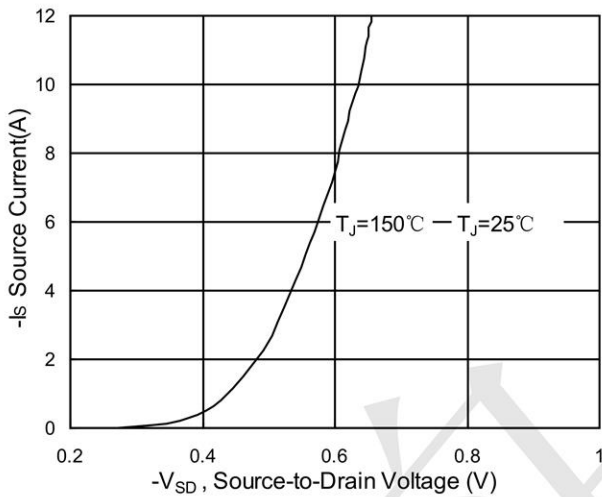


Fig.3 Forward Characteristics Of Reverse

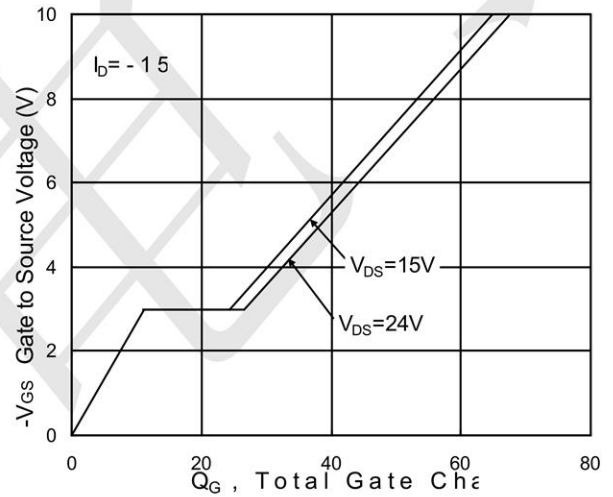


Fig.4 Gate-Charge Characteristics

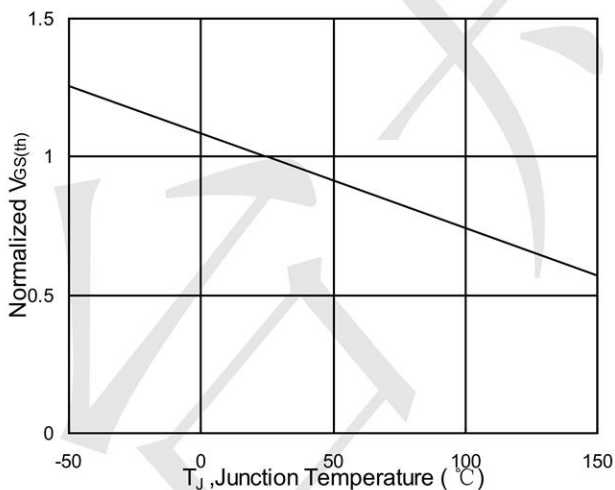


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

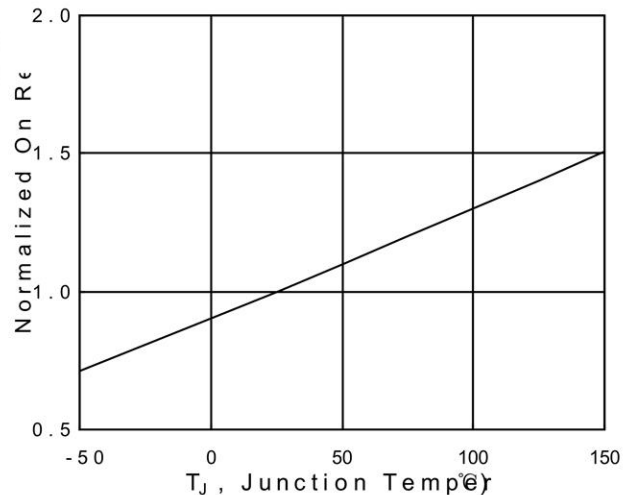


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

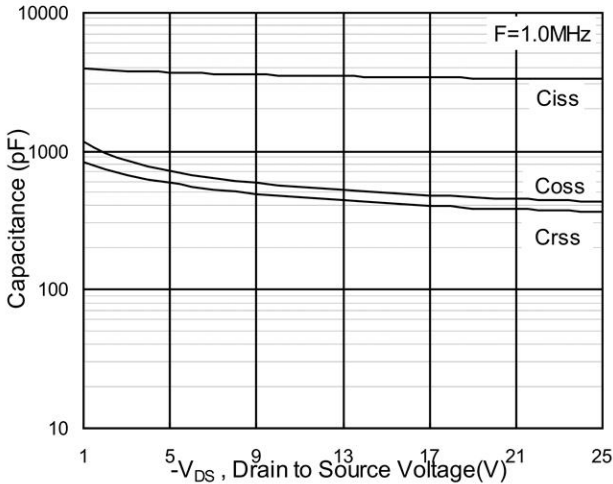


Fig.7 Capacitance

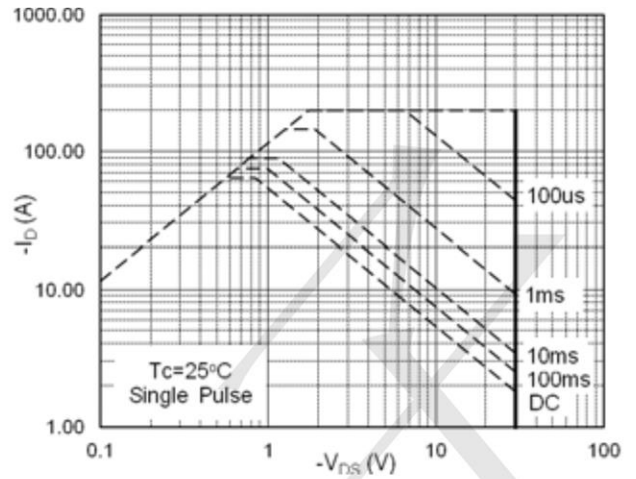


Fig.8 Safe Operating Area

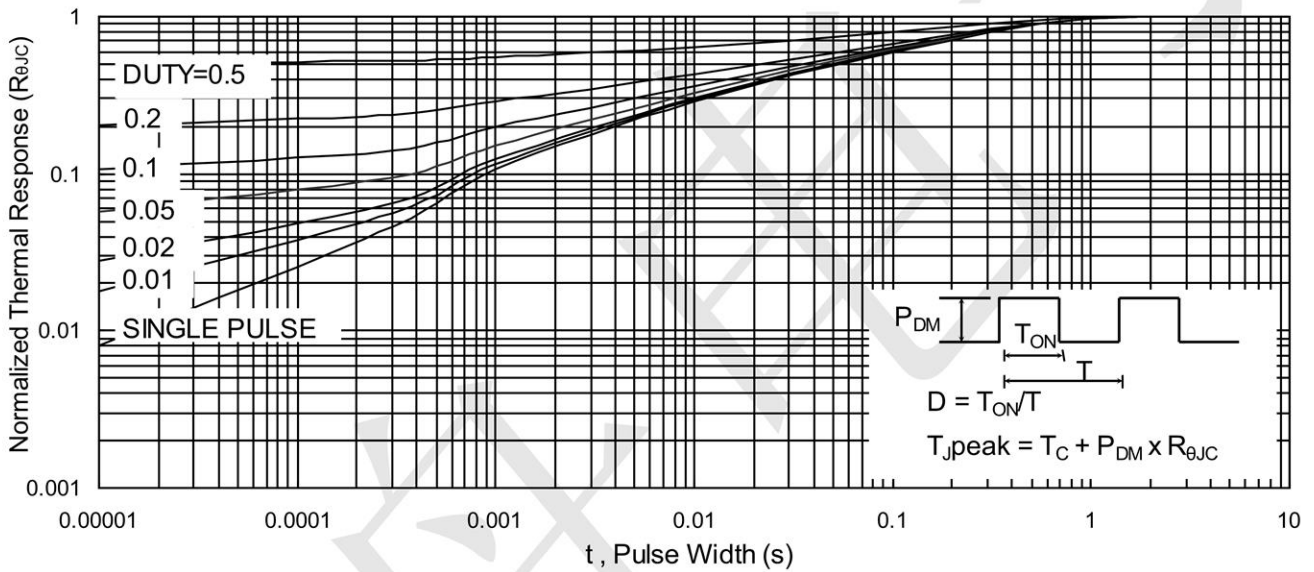


Fig.9 Normalized Maximum Transient Thermal Impedance

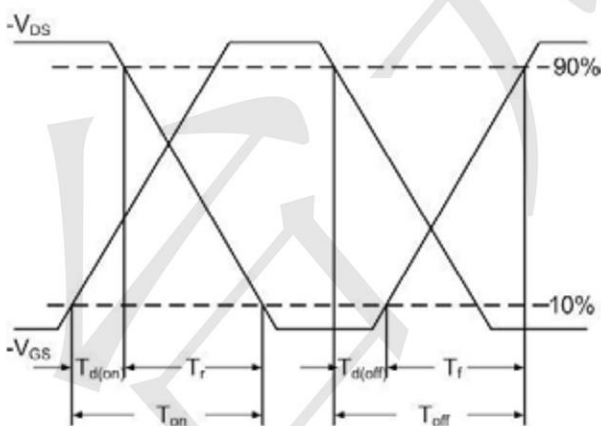


Fig.10 Switching Time Waveform

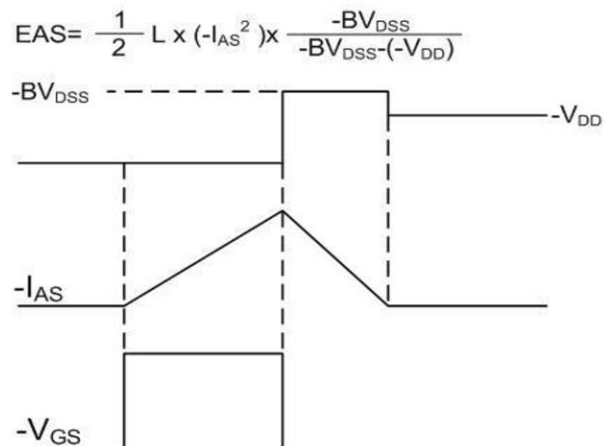
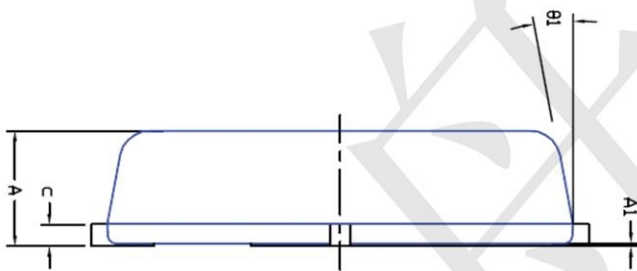
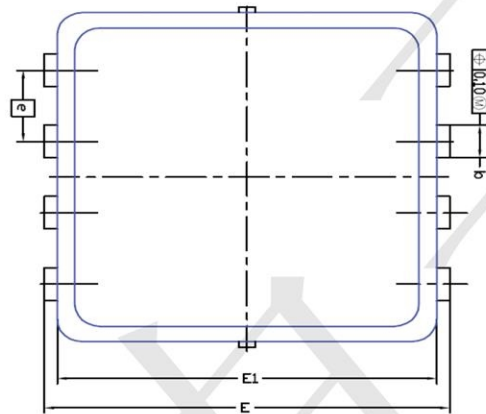
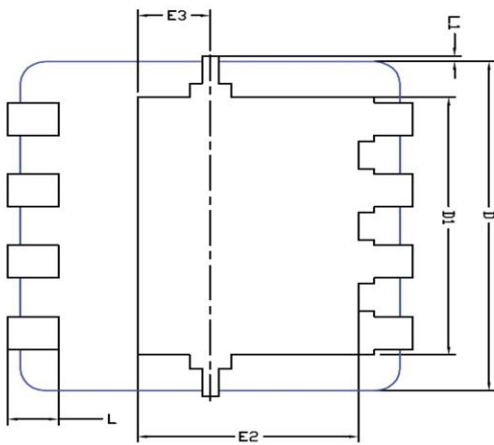


Fig.11 Unclamped Inductive Switching Waveform

PDFN3333 Package Information



| DIM. | MILLIMETERS | | | INCHES | | |
|------------|-------------|-------|-------|-----------|--------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.700 | 0.80 | 0.900 | 0.0276 | 0.0315 | 0.0354 |
| A1 | 0.00 | --- | 0.05 | 0.000 | --- | 0.002 |
| b | 0.24 | 0.30 | 0.35 | 0.009 | 0.012 | 0.014 |
| c | 0.10 | 0.152 | 0.25 | 0.004 | 0.006 | 0.010 |
| D | 3.00 BSC | | | 0.118 BSC | | |
| D1 | 2.35 BSC | | | 0.093 BSC | | |
| E | 3.20 BSC | | | 0.126 BSC | | |
| E1 | 3.00 BSC | | | 0.118 BSC | | |
| E2 | 1.75 BSC | | | 0.069 BSC | | |
| E3 | 0.575 BSC | | | 0.023 BSC | | |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.30 | 0.40 | 0.50 | 0.0118 | 0.0157 | 0.0197 |
| L1 | 0 | --- | 0.100 | 0 | --- | 0.004 |
| θ_1 | 0° | 10° | 12° | 0° | 10° | 12° |

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