

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

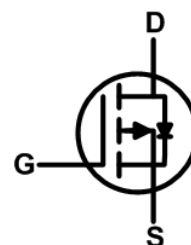
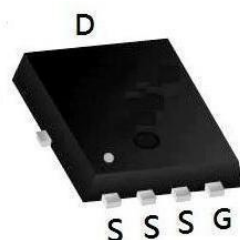


| BVDSS | RDSON | ID |
|-------|-------|------|
| -100V | 115mΩ | -15A |

Applications

- Battery switching application
- Hard switched and high frequency circuits
- Power management

PDFN3333-8L Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------------|--|------------|------------------|
| V_{DS} | Drain-Source Voltage | -100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | -15 | A |
| $I_D @ T_C = 100^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | -9.2 | A |
| I_{DM} | Pulsed Drain Current ² | -58 | A |
| EAS | Single Pulse Avalanche Energy ³ | --- | mJ |
| I_{AS} | Avalanche Current | --- | A |
| $P_D @ T_C = 25^\circ\text{C}$ | Total Power Dissipation ⁴ | 69 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 75 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 1.8 | $^\circ\text{C/W}$ |

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--|--|------|------|-----------|----------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V$, $I_D=-250\mu A$ | -100 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=1mA$ | --- | --- | --- | V/ $^\circ\text{C}$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=-10V$, $I_D=-5A$ | --- | 115 | 150 | m Ω |
| | | $V_{GS}=-4.5V$, $I_D=-5A$ | --- | 130 | 165 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}$, $I_D=-250\mu A$ | -1.2 | -1.7 | -2.2 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | --- | --- | mV/ $^\circ\text{C}$ |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=-100V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=-100V$, $V_{GS}=0V$, $T_J=100^\circ\text{C}$ | --- | --- | --- | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V$, $V_{DS}=0V$ | --- | --- | ± 100 | nA |
| gfs | Forward Transconductance | $V_{DS}=-10V$, $I_D=-5A$ | --- | --- | --- | S |
| R_g | Gate Resistance | $V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$ | --- | --- | --- | Ω |
| Q_g | Total Gate Charge | $V_{DS}=-50V$, $V_{GS}=-10V$, $I_D=-5A$ | --- | 12.7 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 2.1 | --- | |
| Q_{gd} | Gate-Drain Charge | | --- | 2.3 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{GS}=-10V$, $V_{DS}=-50V$, $I_D=-5A$, $R_G=5\Omega$ | --- | 5.9 | --- | ns |
| T_r | Rise Time | | --- | 3.7 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 39.5 | --- | |
| T_f | Fall Time | | --- | 24.6 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=-50V$, $V_{GS}=0V$, $f=1MHz$ | --- | 700 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 56 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 8.6 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|--|--|------|------|------|------|
| I_S | Continuous Source Current ^{1,4} | $V_G=V_D=0V$, Force Current | --- | --- | -15 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V$, $I_S=-5A$, $T_J=25^\circ\text{C}$ | --- | --- | -1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_F=-5A$, $di/dt=100A/\mu s$ | --- | 66 | --- | nS |
| Q_{rr} | Reverse Recovery Charge | μs , $T_J=25^\circ\text{C}$ | --- | 214 | --- | nC |

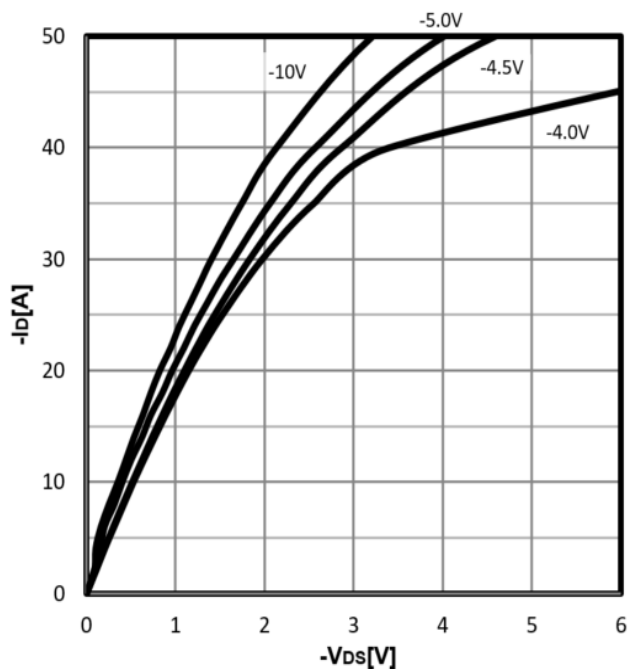
Notes:

1. Repetitive rating; pulse width limited by maximum junction temperature

Characteristics Curve:

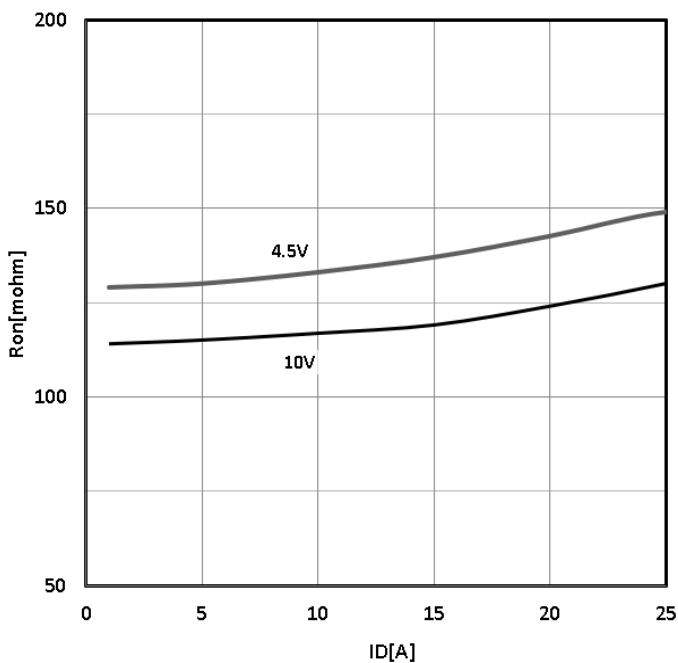
Typ. output characteristics

$$-I_D = f(-V_{DS})$$



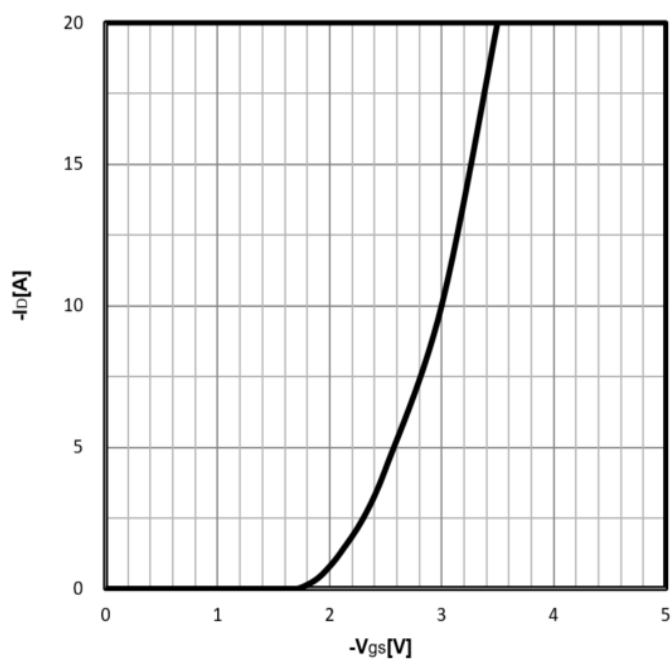
Typ. drain-source on resistance

$$R_{DS(on)} = f(-I_D)$$



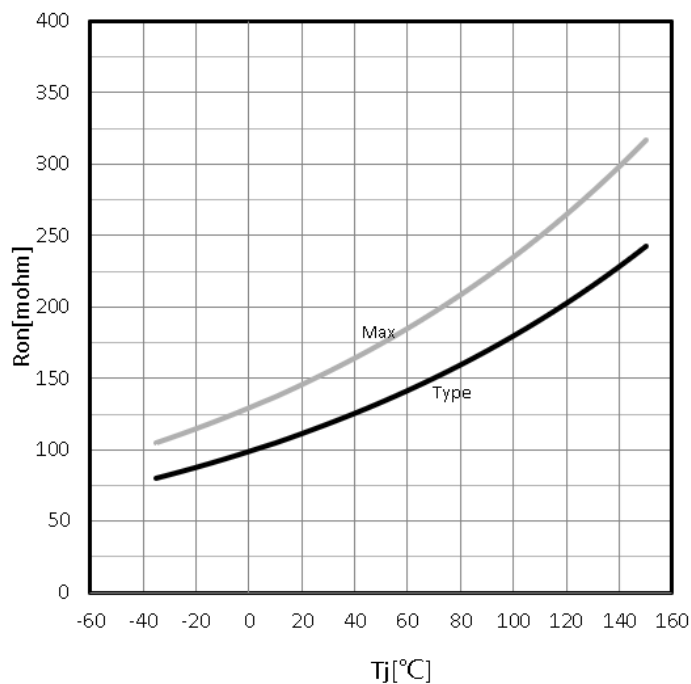
Typ. transfer characteristics

$$-I_D = f(-V_{GS})$$



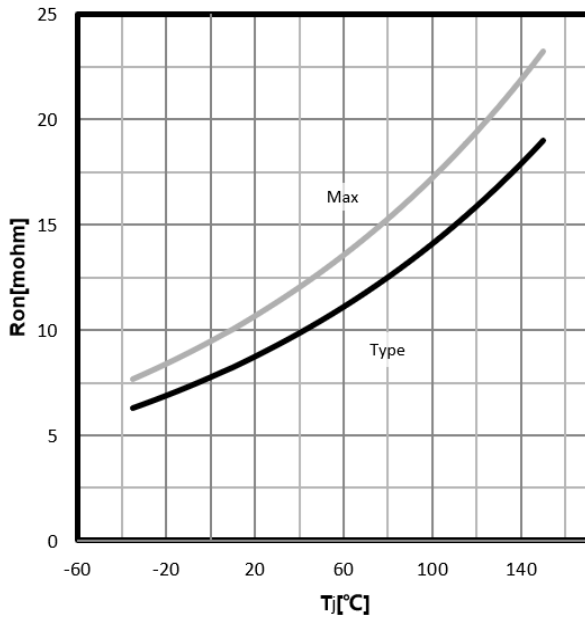
Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -5A; V_{GS} = -10V$$



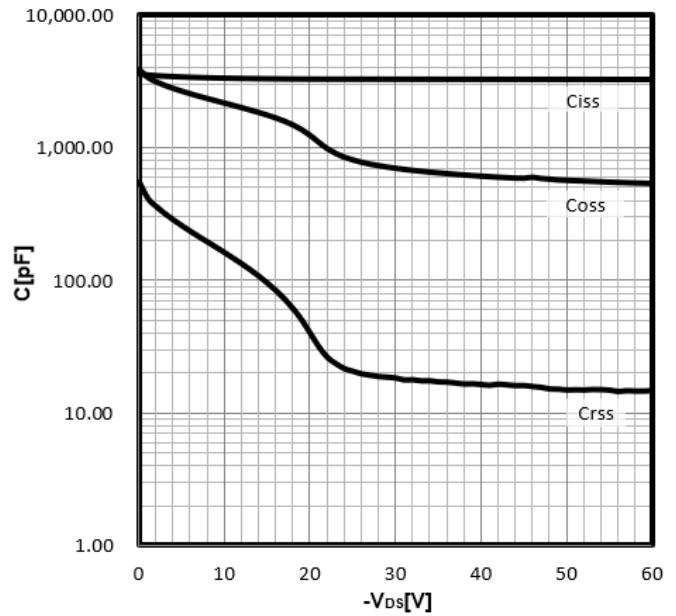
Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -20A; V_{GS} = -10V$$



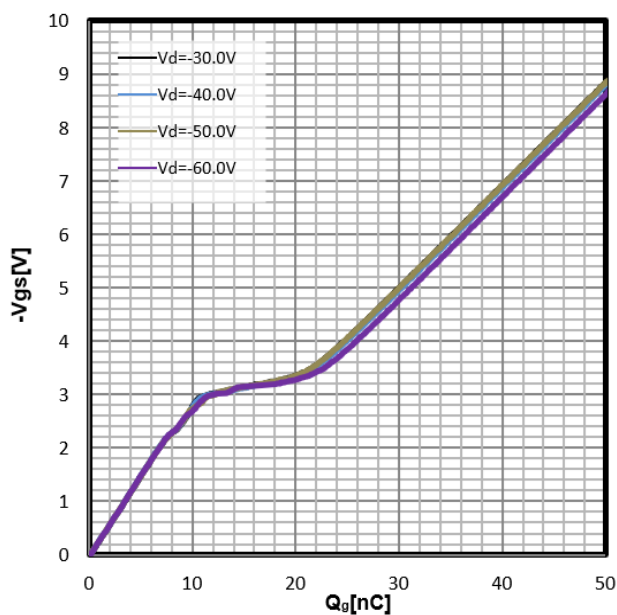
Typ. capacitances

$$C = f(V_{DS}); V_{GS} = 0V; f = 1MHz$$



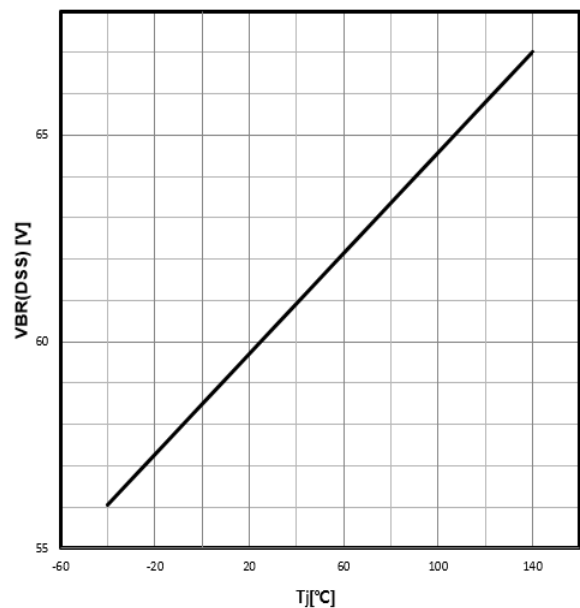
Typ. gate charge

$$V_{GS} = f(Q_{gate}); I_D = -20A$$

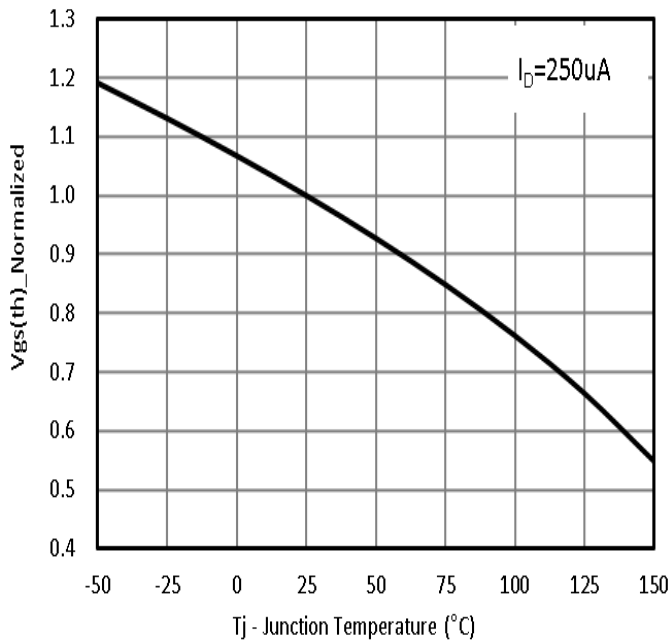


Drain-source breakdown voltage

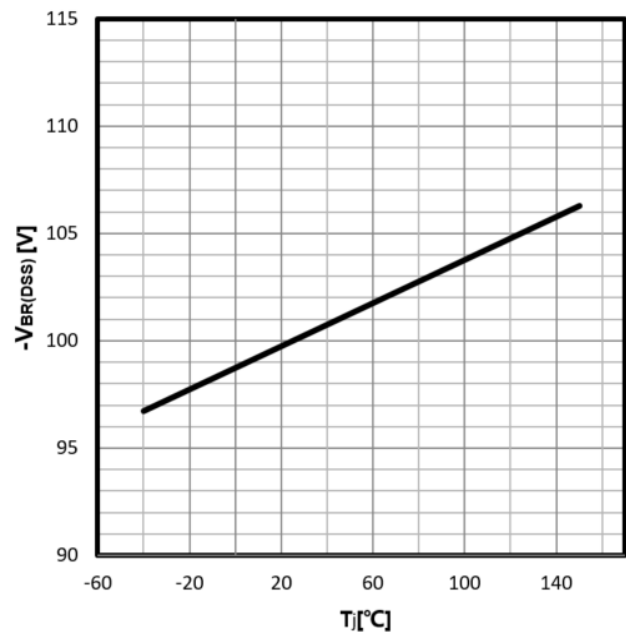
$$V_{BR(DSS)} = f(T_j); I_D = -250\mu A$$



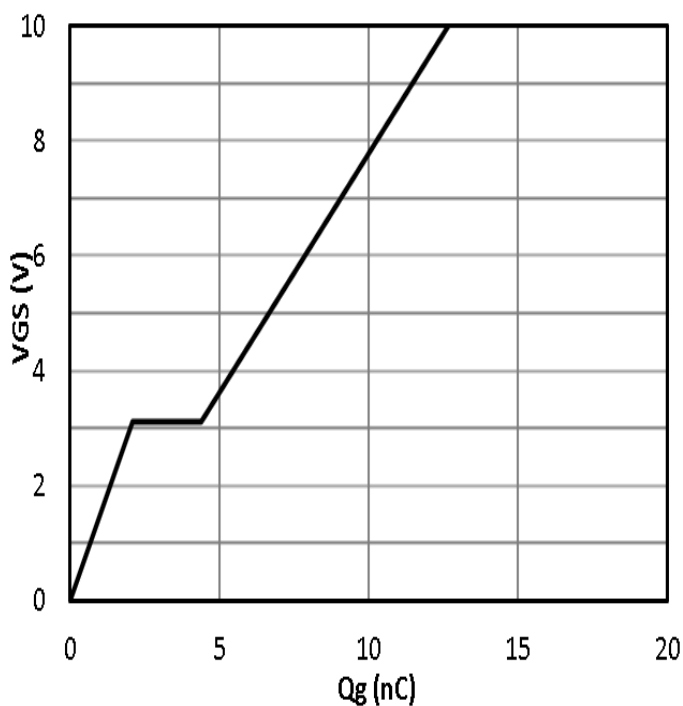
Gate Threshold Voltage
 $-V_{TH}=f(T_j); I_D=-250\mu A$



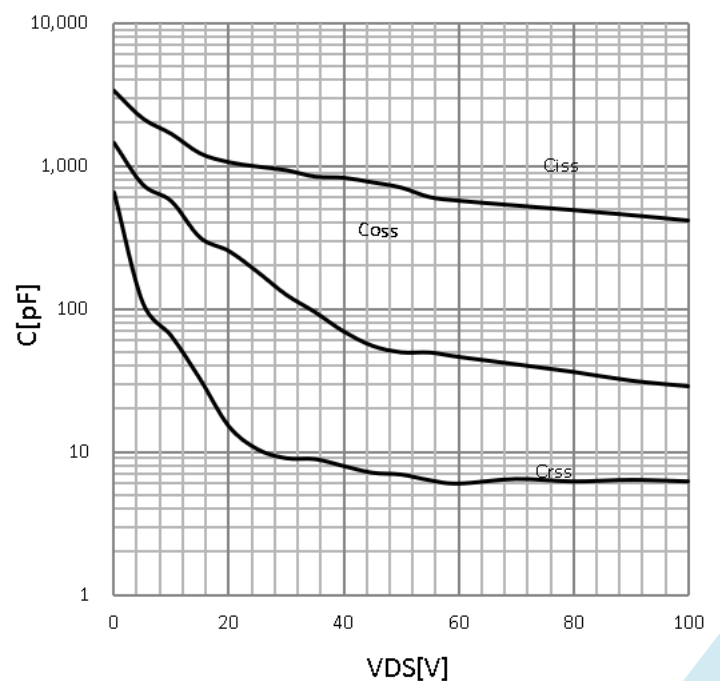
Drain-source breakdown voltage
 $-V_{BR(DSS)}=f(T_j); I_D=-250\mu A$



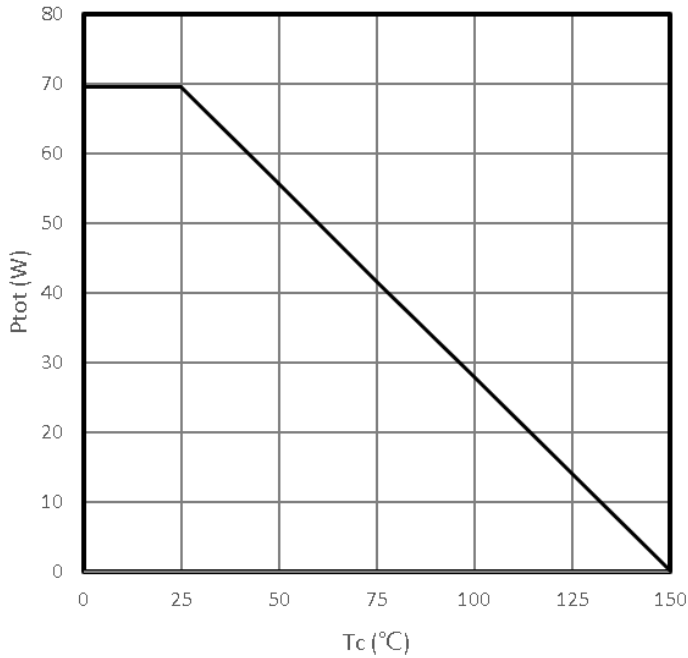
Typ. gate charge
 $-V_{GS}=f(Q_g); I_D=-5A$



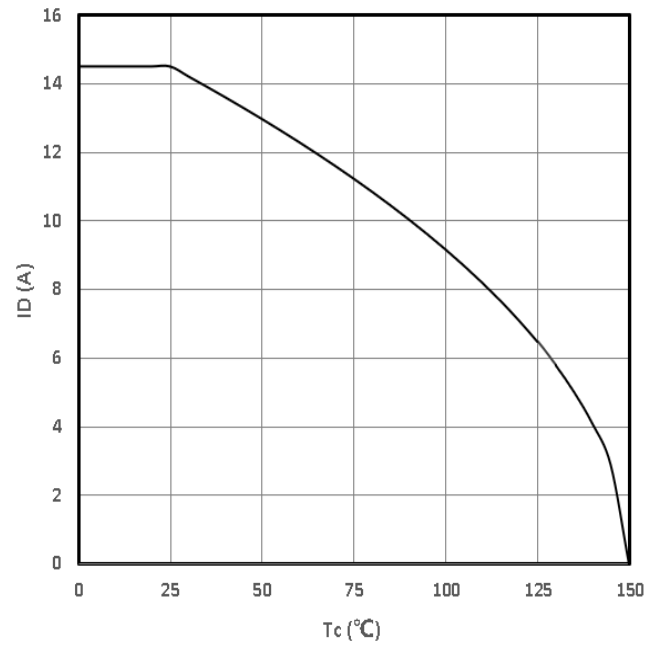
Typ. capacitances
 $C=f(-V_{DS}); V_{GS}=0V; f=1MHz$



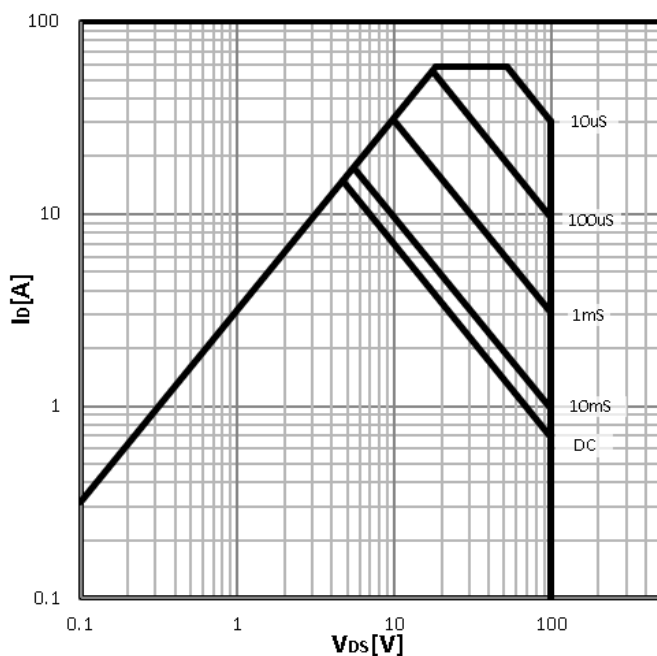
Power Dissipation
 $P_{tot}=f(T_C)$



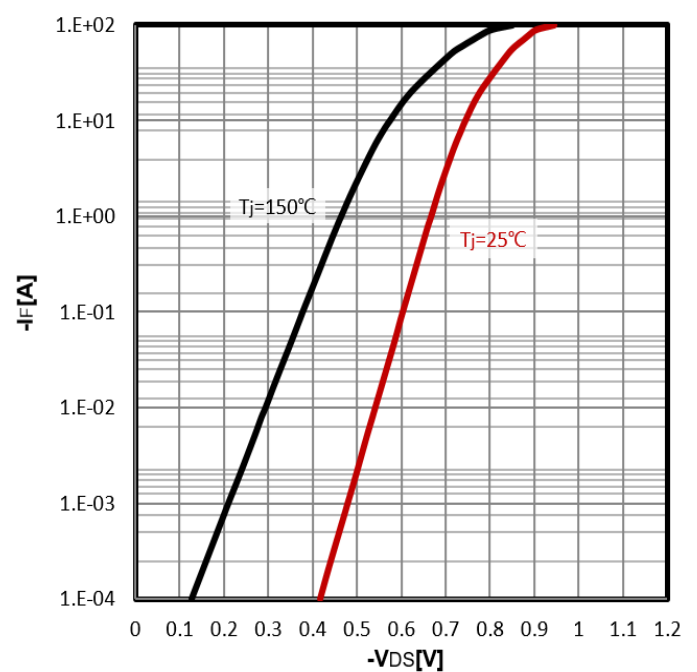
Maximum Drain Current
 $-I_D=f(T_C)$



Safe operating area
 $-I_D=f(-V_{DS})$

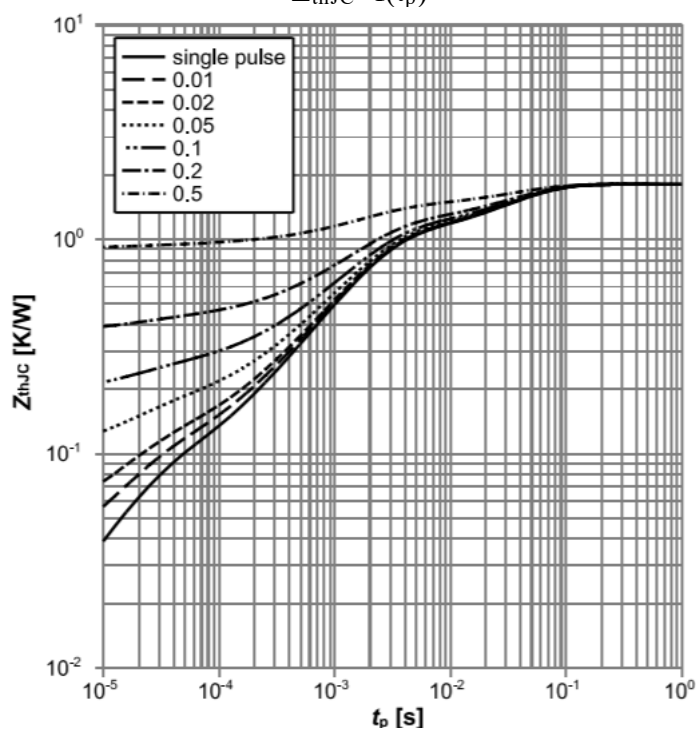


Body Diode Forward Voltage Variation
 $-I_F=f(-V_{DS})$



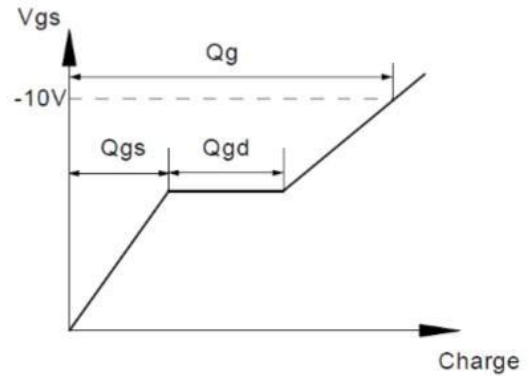
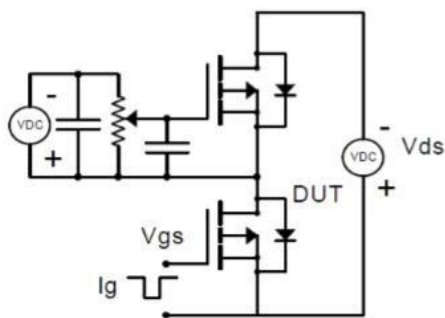
Max. transient thermal impedance

$$Z_{thJC}=f(t_p)$$

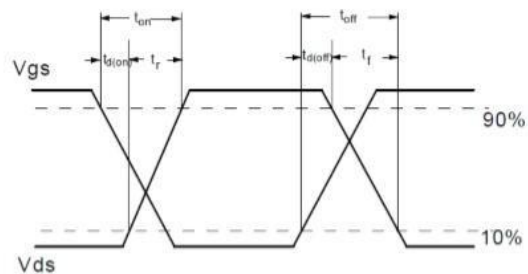
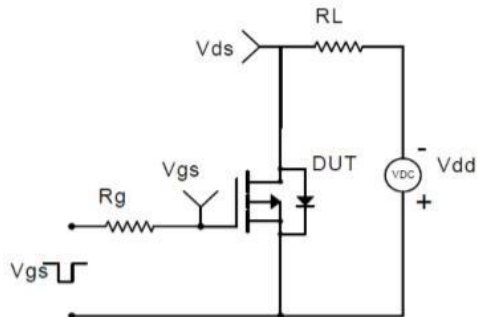


Test Circuit and Waveform:

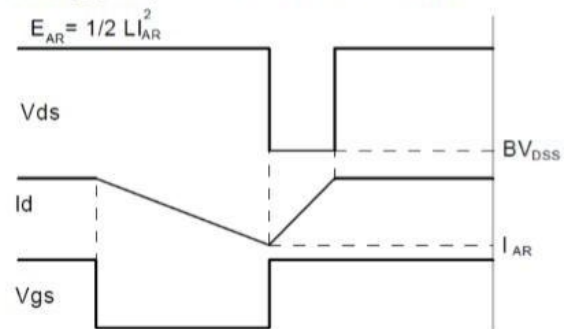
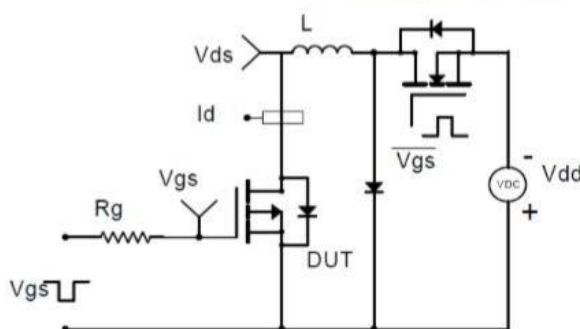
Gate Charge Test Circuit & Waveform



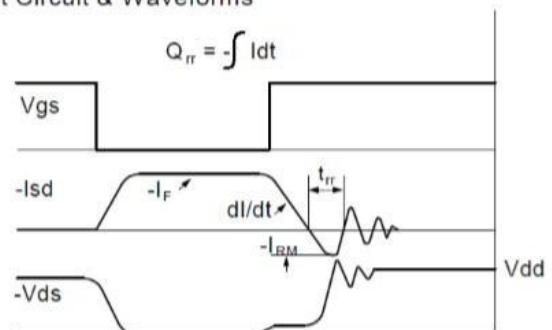
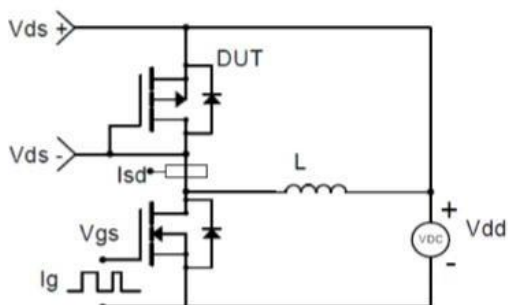
Resistive Switching Test Circuit & Waveforms



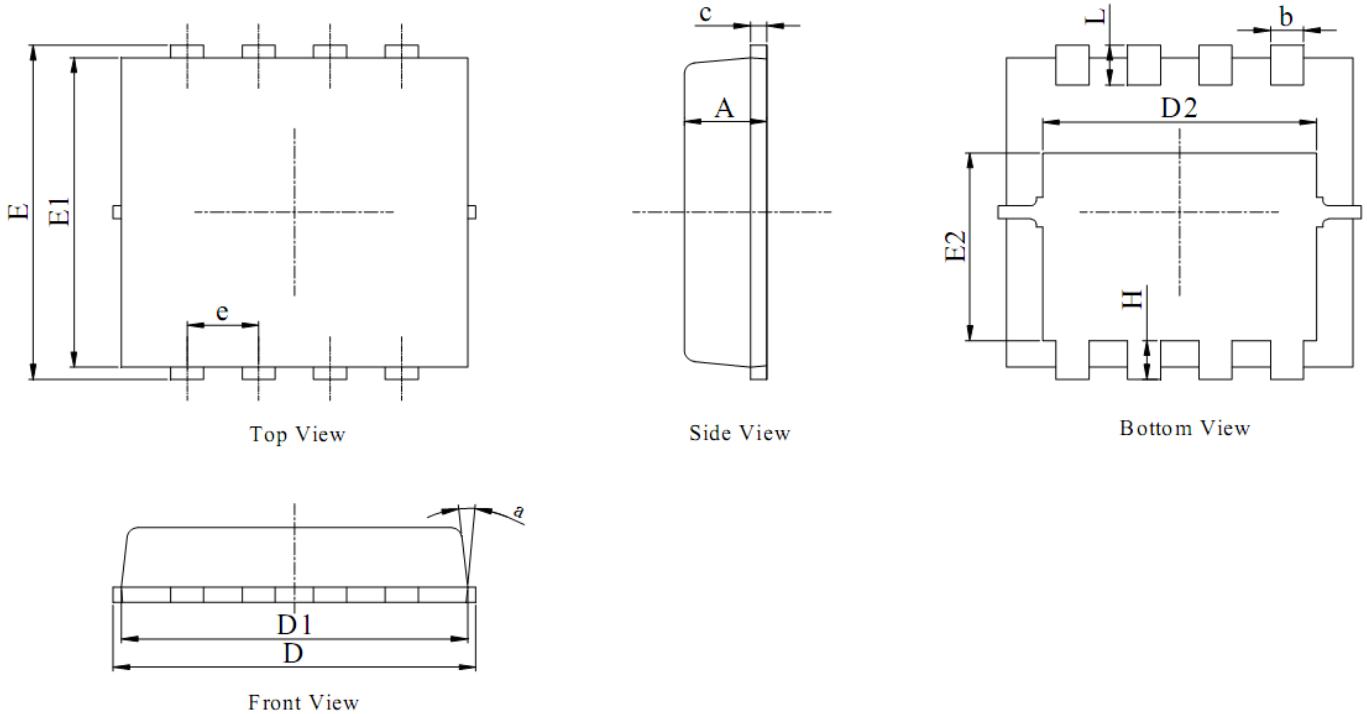
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



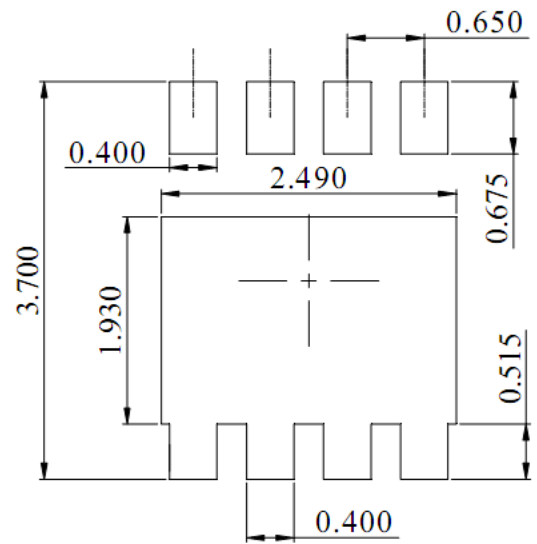
Package Mechanical Data-PDFN3333-8L-Single



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMENSIONS IN MILLIMETER (ANGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| DIM. | MILLIMETER | | |
|------|------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.20 | 0.25 |
| D | 3.00 | 3.15 | 3.25 |
| D1 | 2.95 | 3.05 | 3.15 |
| D2 | 2.39 | 2.49 | 2.59 |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 2.95 | 3.05 | 3.15 |
| E2 | 1.70 | 1.80 | 1.90 |
| e | 0.65 BSC | | |
| H | 0.30 | 0.40 | 0.50 |
| L | 0.25 | 0.40 | 0.50 |
| a | --- | --- | 15° |



DIMENSIONS:MILLIMETERS