

Features

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- Fast Switching Speed

Applications

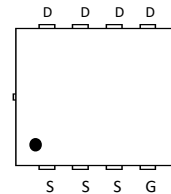
- Motor Drive
- Li- Battery Protection
- Power Management Functions

Mechanical Data

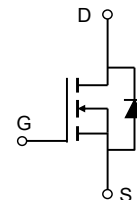
- Case: PDFN3333-8L
- Case Material: "Green" Molding Compound.
UL-Flammability Classification Rating 94V-0.
- Moisture Sensitivity: Level 1 per J-STD-020.

Product Summary

V_{DS}	$R_{DS(ON_TYP)}$	I_{D_MAX}
30V	1.5m Ω @ $V_{GS} = 10V$	119A
	2.4m Ω @ $V_{GS} = 4.5V$	



Top View
Pin Configuration



Device Symbol

Maximum Ratings (@ $T_A = 25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	30	V
Gate - Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ⁽¹⁾	$T_C = 25^\circ\text{C}$	I_D	119	A
	$T_C = 100^\circ\text{C}$		75	A
Pulsed Drain Current ⁽²⁾		I_{DM}	475	A
Single Pulse Avalanche Current	$L = 0.1\text{mH}$	I_{AS}	39	A
Single Pulse Avalanche Energy		E_{AS}	76	mJ
Power Dissipation ⁽⁴⁾	$T_C = 25^\circ\text{C}$	P_D	38	W
	$T_C = 100^\circ\text{C}$		16	W
Junction & Storage Temperature Range		T_J, T_{STG}	-55 ~ +150	$^\circ\text{C}$

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient ⁽³⁾	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case ⁽⁴⁾	$R_{\theta JC}$	3.2	$^\circ\text{C/W}$

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse test : Pulse width $\leq 100\mu\text{s}$, duty cycle $\leq 2\%$.
3. Device mounted on 1 inch FR4 PCB with 2oz.Copper.
4. Device mounted on infinite heatsink.

N-Channel Electrical Characteristics (@ $T_A = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	—	—	1.0	μA
		$T_J = 55^{\circ}C$	—	—	10.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	—	—	± 100	nA
On Characteristics ⁽⁵⁾						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.2	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 20A$	—	1.5	1.8	m Ω
		$V_{GS} = 4.5V, I_D = 15A$	—	2.4	3.0	m Ω
Forward Transconductance	g_{fs}	$V_{DS} = 5.0V, I_D = 20A$	—	33	—	S
Diodes Forward Voltage	V_{SD}	$I_S = 2.0A, V_{GS} = 0V$	—	0.7	1.2	V
Dynamic Characteristics ⁽⁶⁾						
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$	—	2517	—	pF
Output Capacitance	C_{oss}		—	1731	—	pF
Reverse Transfer Capacitance	C_{rss}		—	142	—	pF
Switching Characteristics ⁽⁶⁾						
Turn-On DelayTime	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 15V$ $I_D = 20A, R_{GEN} = 3\Omega$	—	5.4	—	ns
Rise Time	t_r		—	11	—	ns
Turn-Off DelayTime	$t_{d(off)}$		—	29	—	ns
Fall Time	t_f		—	12	—	ns
Total Gate Charge Total	Q_g	$V_{DS} = 15V, I_D = 20A$ $V_{GS} = 0 \text{ to } 10V$	—	39	—	nC
Gate-Source Charge	Q_{gs}		—	7.2	—	nC
Gate Drain Charge	Q_{gd}		—	7.4	—	nC
Gate Resistance	R_g	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	—	1.3	—	Ω
Drain-Source Diode Characteristics ⁽⁶⁾						
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20A, dI/dt = 100A/\mu s,$	—	46	—	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_J = 25^{\circ}C$	—	37	—	nC
Diode Forward Current	I_S	$T_A = 25^{\circ}C$	—	—	119	A

Notes:

5. Measured under pulsed conditions. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

6. Guaranteed by design, not subject to production

Typical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

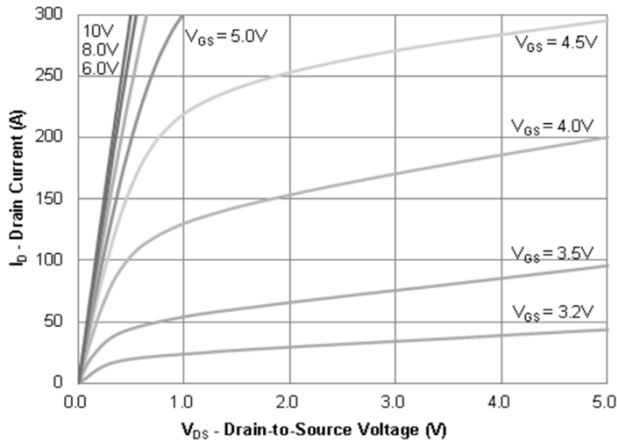


Figure 1: Output Characteristics

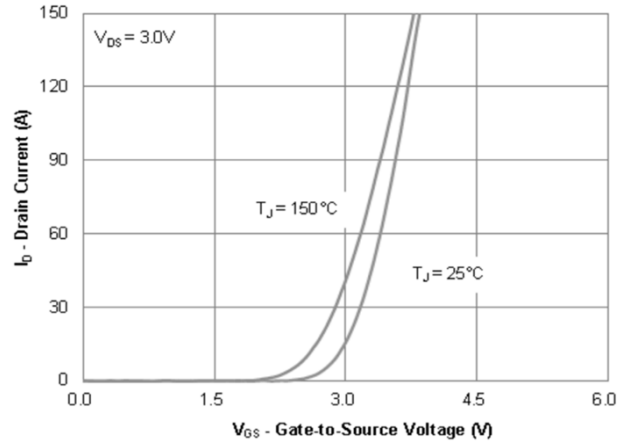


Figure 2: Transfer Characteristics

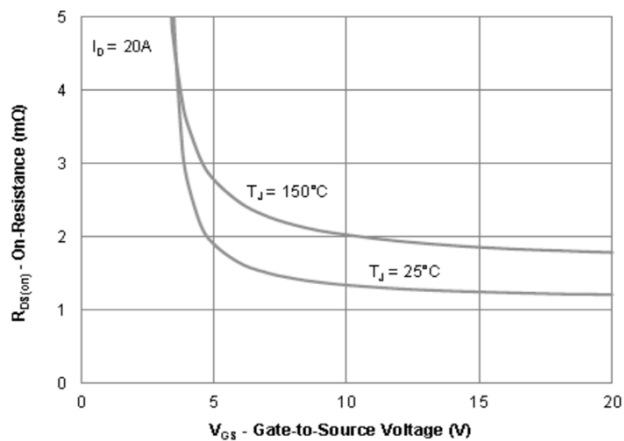


Figure 3: On-Resistance vs. Gate-Source Voltage

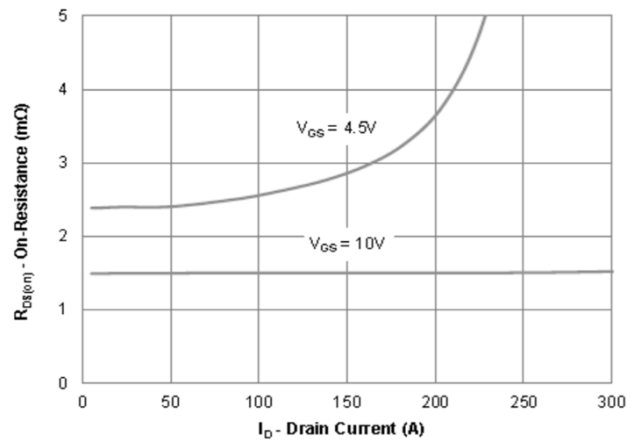


Figure 4: On-Resistance vs. Gate-Source Voltage

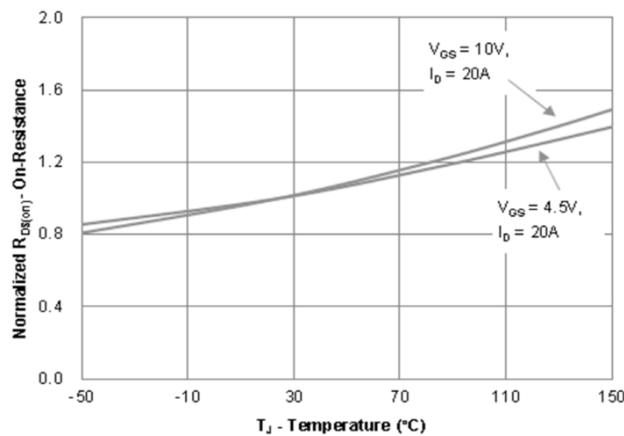


Figure 5: On-Resistance vs. Junction Temperature

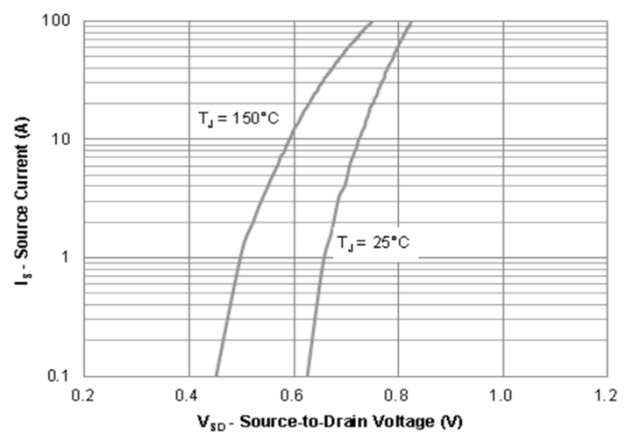


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

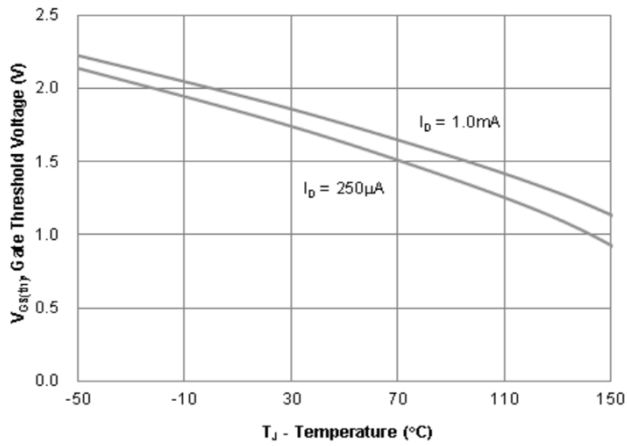


Figure 7: Gate Threshold Variation vs. Junction Temperature

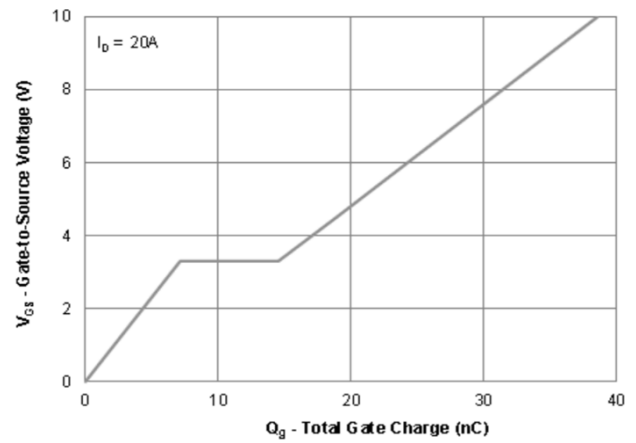


Figure 8: Gate Charge Characteristics

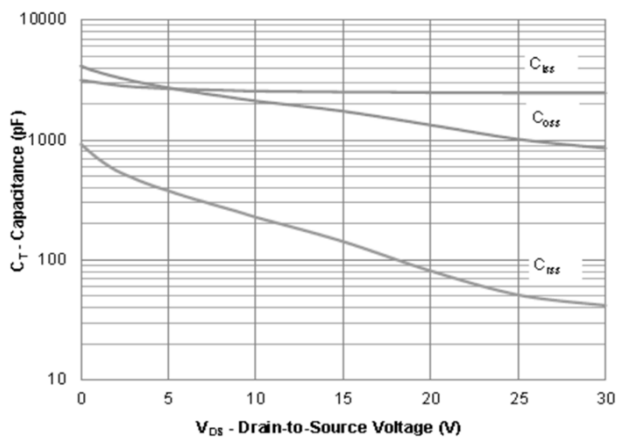


Figure 9: Capacitance Characteristics

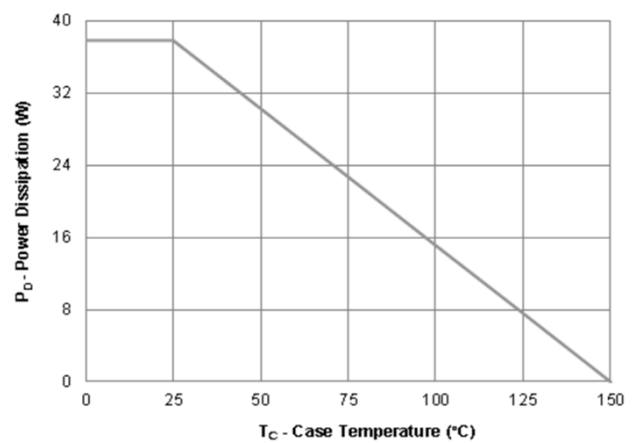


Figure 10: Power Derating

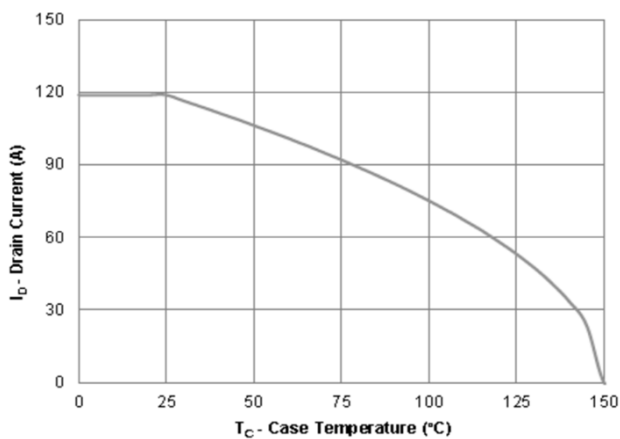


Figure 11: Current Derating

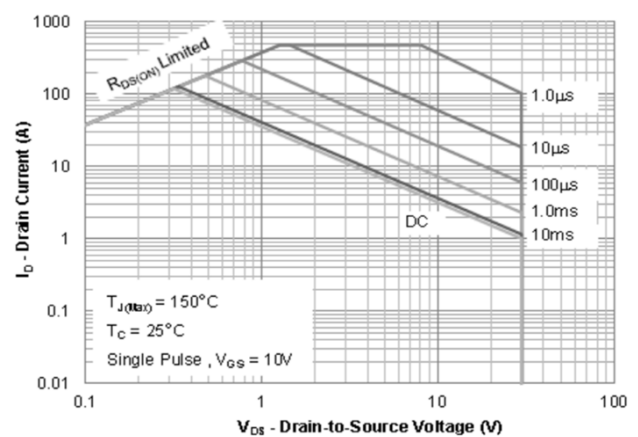


Figure 12: Safe Operating Area

Typical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

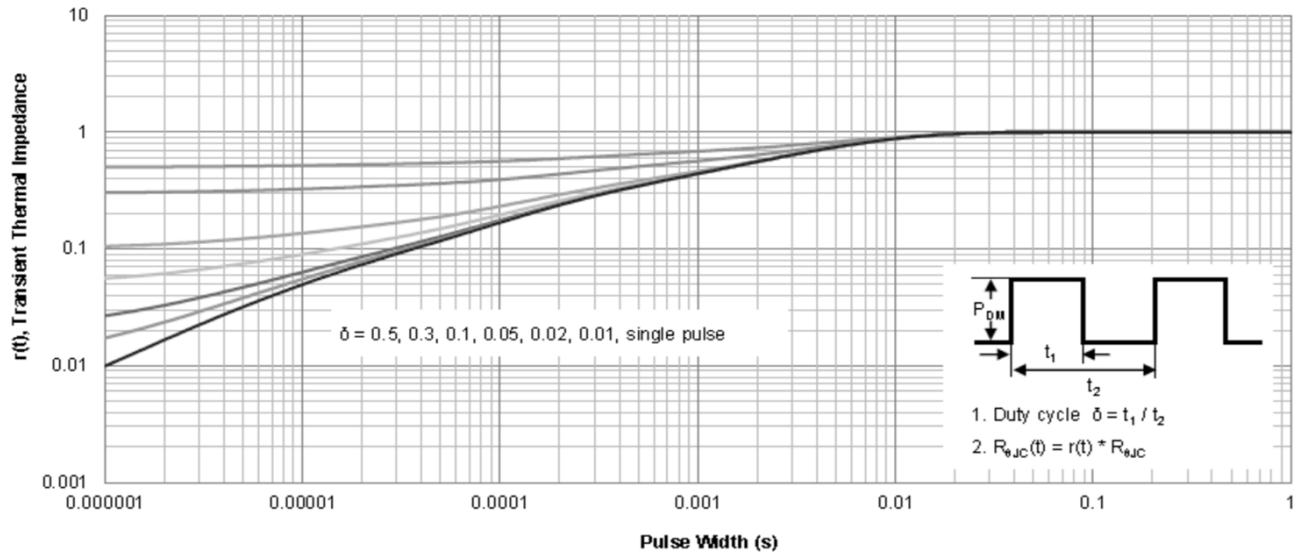
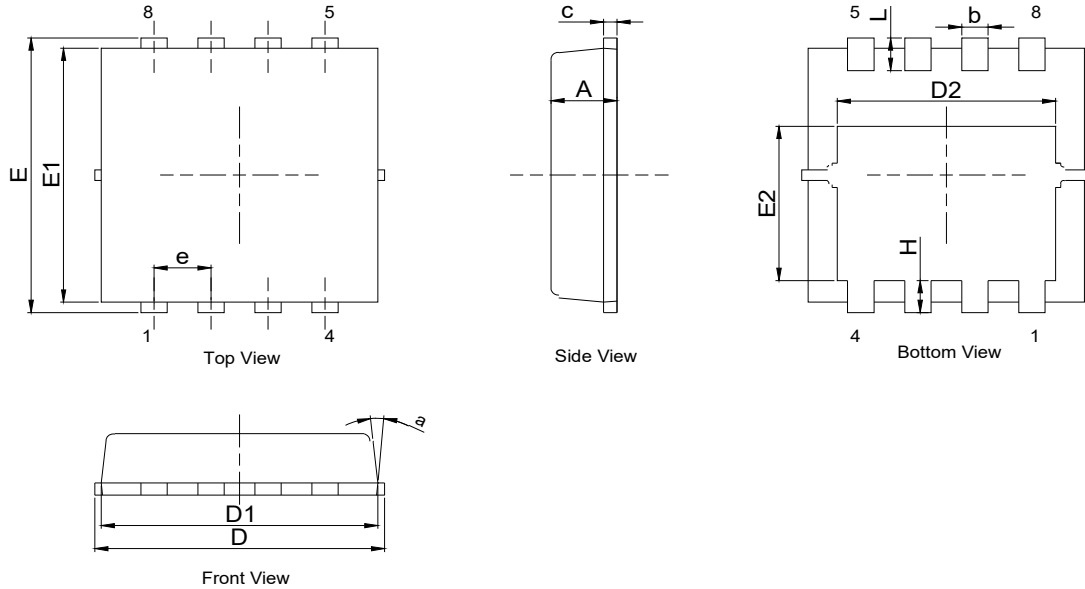


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN3333-8L Package Information

Package Outline

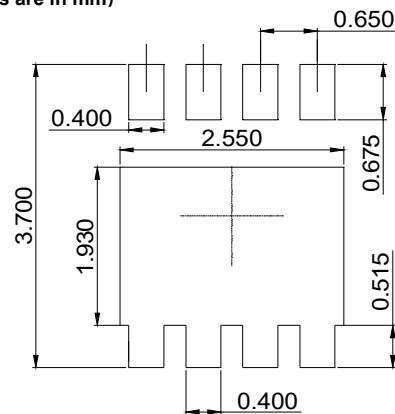


NOTES:

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

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.80	0.90
b	0.20	0.30	0.40
c	0.10	0.15	0.20
D	3.20	3.30	3.40
D1	3.05	3.15	3.25
D2	2.35	2.59	2.69
E	3.20	3.35	3.45
E1	2.85	3.05	3.15
E2	1.65	1.80	1.90
e	0.65 BSC		
H	0.25	--	0.60
L	0.25	0.40	0.50
a	--	--	15°

Recommended Footprint (Dimensions are in mm)



DIMENSIONS:MILLIMETERS