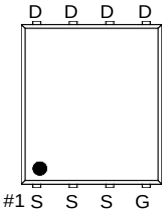
N-Channel High Density Trench MOSFET

FEATURES

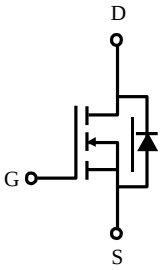
- Super high dense cell trench design for low $R_{DS(on)}$.
- Rugged and reliable.
- Surface Mount package.

PDFN3333



G. GATE
D. DRAIN
S. SOURCE

PRODUCT SUMMARY		
$V_{(BR)DSS}$	$R_{DS(on)}$ (mΩ) Max	I_D
40V	4@ V_{GS} = 10V	75A
	5.9@ V_{GS} = 4.5V	



ABSOLUTE MAXIMUM RATINGS (TA = 25 °C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	TC=25℃	I_D	75	A
	TC=100℃		47	
Pulsed Drain Current (Note 1)		I_{DM}	208	
Avalanche Current		I_{AS}	28	
Single Pulse Avalanche Energy	L = 0.1mH	E_{AS}	116	mJ
Maximum Power Dissipation (Note 1)	TC=25ºC	P_D	37	W
	TC=100ºC		14.7	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	- 55 to 150	°C

TYPICAL THERMAL CHARACTERISTICS (Note 1)

Thermal Resistance,Junction-to-Case	R_{thJC}	2.6	°C/W
Thermal Resistance Junction-Ambient	R_{thJA}	47	°C/W

Note：

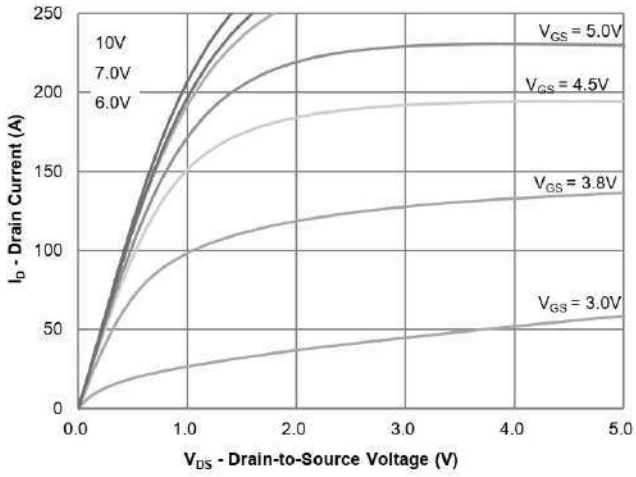
1. Pule width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)

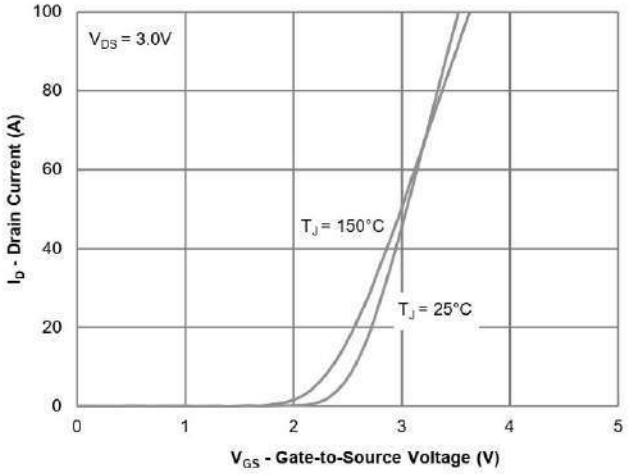
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V , I_D = 250uA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32V , V_{GS} = 0V, Tj = 25℃			1	uA
		V_{DS} = 32V , V_{GS} = 0V , Tj = 55℃			10	
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20V , V_{DS} = 0V			±100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , I_D = 250uA	1	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10V , I_D = 20 A		3.3	4	mΩ
		V_{GS} = 4.5V , I_D = 15 A		4.7	5.9	mΩ
Forward Transconductance	gfs	V_{DS} = 4.5V , I_D= 20A		28		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS} = 20V , V_{GS} = 0V f = 1.0MHz		953		pF
Output Capacitance	C_{OSS}			598		pF
Reverse Transfer Capacitance	C_{RSS}			25		pF
Gate Resisance	Rg	V_{DS} = 0V , V_{GS} = 0V , f = 1.0MHz		5		Ω
SWITCHING CHARACTERISTICS (Note 3)						
Turn-On Delay Time	$td_{(ON)}$	V_{DD} = 20V , I_D = 20A , V_{GS}= 10V R_{GS}= 3 Ω		2.2		nS
Rise Time	tr			12		nS
Turn-Off Delay Time	$td_{(OFF)}$			21		nS
Fall Time	tf			13		nS
Total Gate Charge (10V)	Qg	V_{DS} = 20V, I_D = 20A V_{GS} = 10V		14.5		nC
Total Gate Charge (4.5V)	Qg			7		nC
Gate-Source Charge	Qgs			2.8		nC
Gate-Drain Charge	Qgd			2.2		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Current	I_S				75	A
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS} = 0V , I_S = I_F		0.7	1.2	V

Note：
2. Pulse Test Pulse width ≤ 300usec , Duty Cycle ≤ 2%
3. Independent of operating production testing .

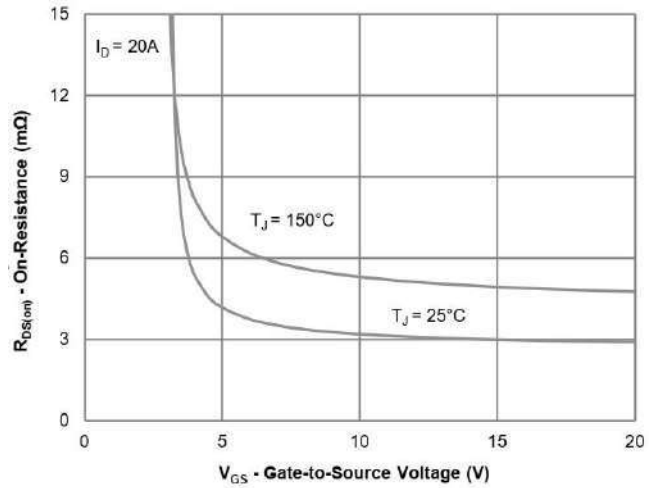
Typical Electrical and Thermal Characteristics



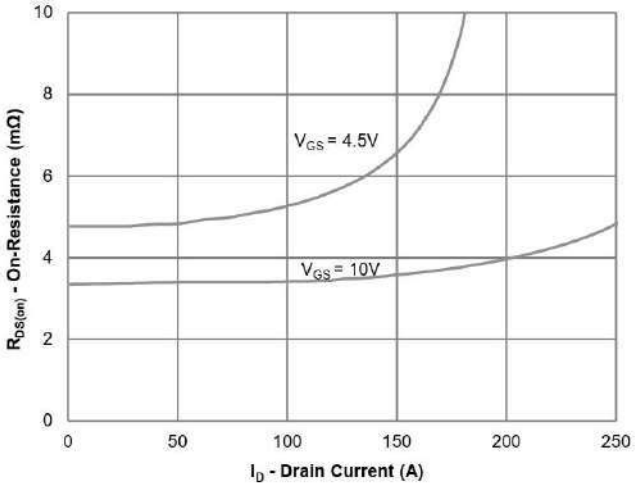
Output Characteristics



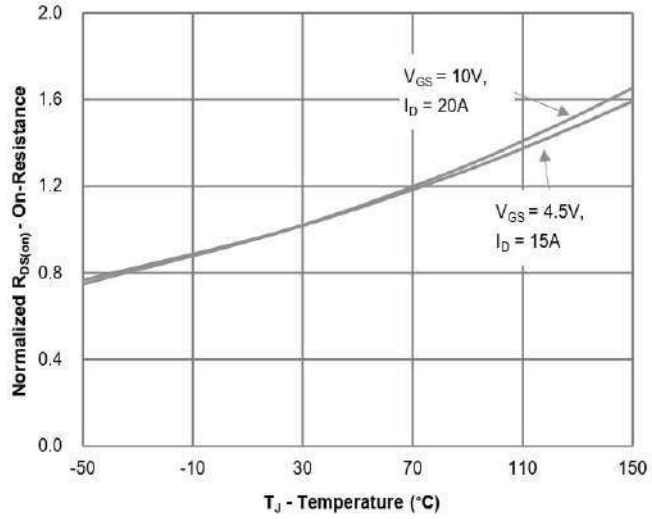
Transfer Characteristics



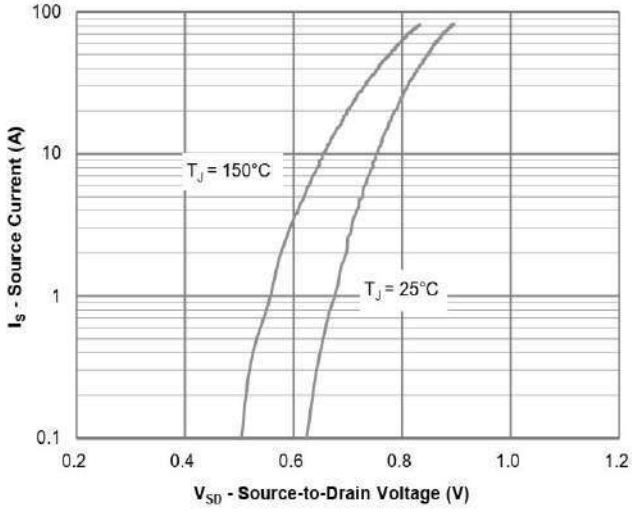
On-Resistance vs. Gate-Source Voltage



On-Resistance vs. Gate-Source Voltage

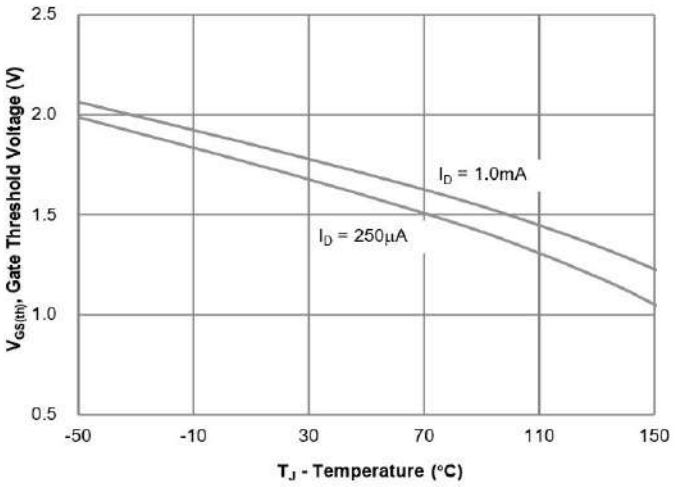


On-Resistance vs. Junction Temperature

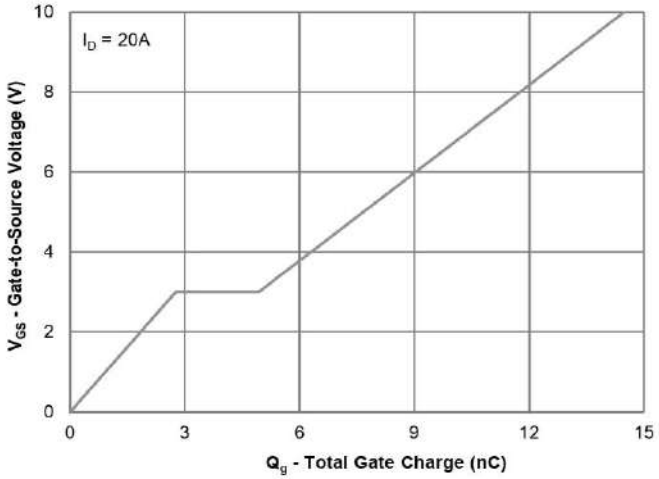


Source-Drain Diode Forward Voltage

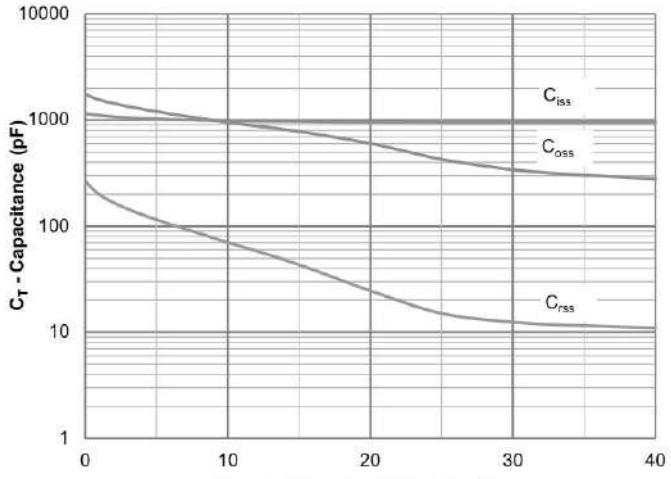
Typical Electrical and Thermal Characteristics



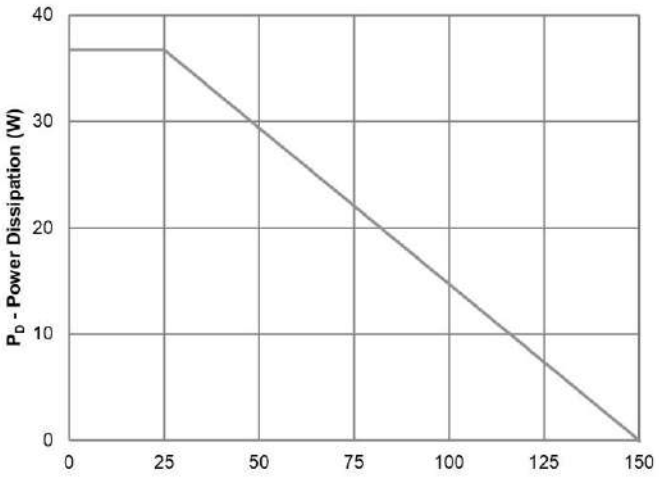
Gate Threshold Variation vs. Junction Temperature



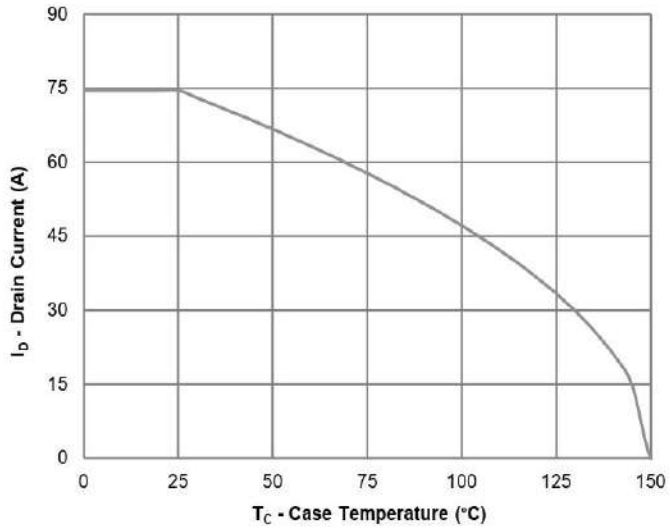
Gate Charge Characteristics



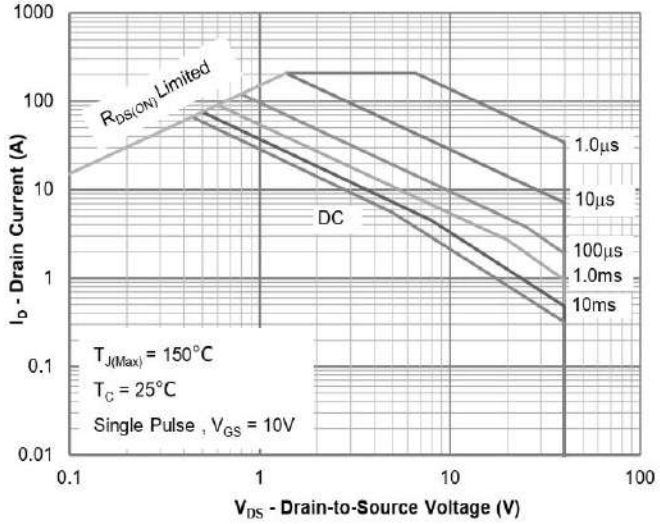
Capacitance Characteristics



Power Derating

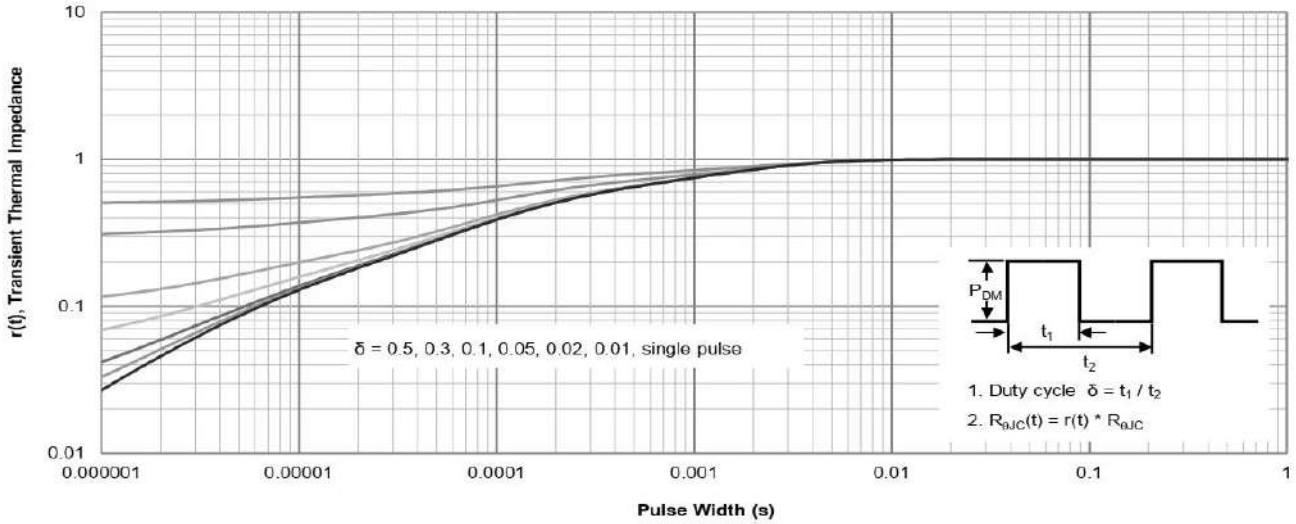


Current Derating

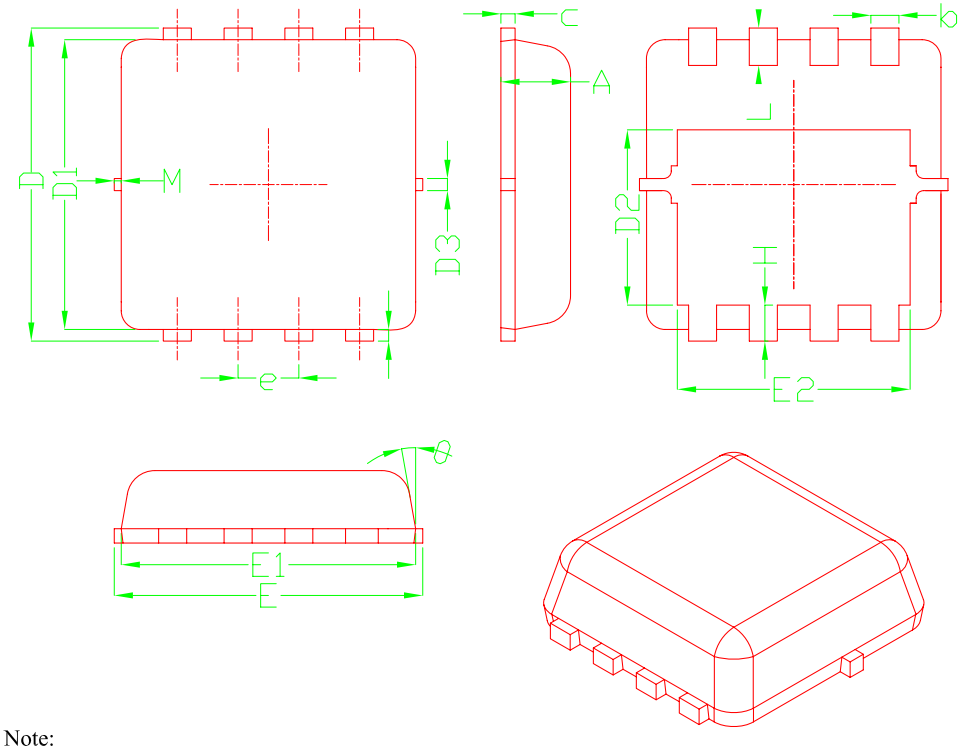


Safe Operating Area

Typical Electrical and Thermal Characteristics



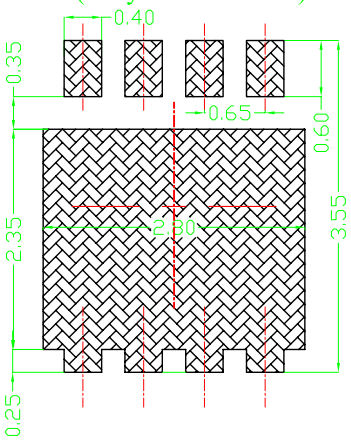
Normalized Maximum Transient Thermal Impedance



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15

* Not specified

Land Pattern
(Only for Reference)



Note:

1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs.
   Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body
   Exclusive Of Mold Flash, Tie Bar Burrs, Gate Burrs And Interlead Flash,
   But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.