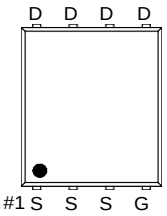
N -Channel High Density Trench MOSFET

Features:

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

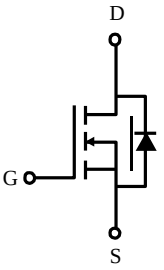
PDFN3333



G. GATE
D. DRAIN
S. SOURCE

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(on)}$ (mΩ) Max	I_D
40V	6.5@ V_{GS} = 10V	45A
	10.5@ V_{GS} = 4.5V	



ABSOLUTE MAXIMUM RATINGS (TA = 25 ℃ 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	45	A
	TC=100℃		29	
Pulsed Drain Current (Note 1)		I_{DM}	180	
Avalanche Current		I_{AS}	37	
Single Pulse Avalanche Energy	L = 0.1mH	E_{AS}	68	mJ
Maximum Power Dissipation (Note 1)	TC=25℃	P_D	20.8	W
	TC=100℃		13.2	
Operating Junction and Storage Temperature Range		T_J,T_{STG}	- 55 to 150	℃

TYPICAL THERMAL CHARACTERISTICS (Note 1)

Thermal Resistance,Junction-to-Case	R_{thJC}	6	℃/W
Thermal Resistance Junction-Ambient	R_{thJA}	65	℃/W

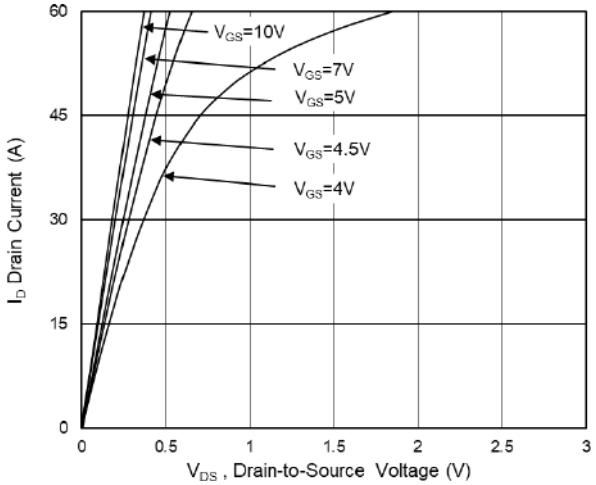
Note：
1. Pule width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS (TA = 25 ℃ unless otherwise noted)

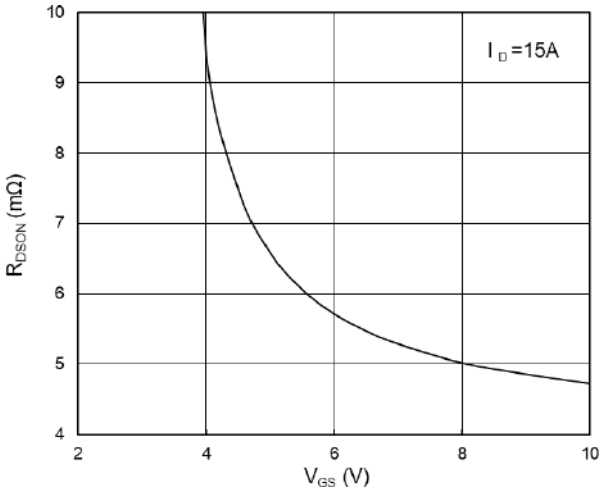
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V , I_D = 250uA	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32V , V_{GS} = 0V, Tj = 25℃			1	uA
		V_{DS} = 32V , V_{GS} = 0V , Tj = 100℃			10	
Gate-Body Leakage	I_{GSS}	V_{GS} = ±20V , V_{DS} = 0V			±100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , I_D = 250uA	1	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10V , I_D = 15 A		4.5	6.5	mΩ
		V_{GS} = 4.5V , I_D = 15 A		8	10.5	mΩ
Forward Transconductance	gfs	V_{DS} = 5V , I_D= 12A		12		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS} = 20V , V_{GS} = 0V f = 1.0MHz		1072		pF
Output Capacitance	C_{OSS}			479		pF
Reverse Transfer Capacitance	C_{RSS}			49		pF
Gate Resisance	Rg	V_{DS} = 0V , V_{GS} = 0V , f = 1.0MHz		1.9		Ω
SWITCHING CHARACTERISTICS (Note 3)						
Turn-On Delay Time	$td_{(ON)}$	V_{DD} = 20V , I_D = 15A , V_{GS} = 10V R_{GS} = 3 Ω		11.5		nS
Rise Time	tr			9.2		nS
Turn-Off Delay Time	$td_{(OFF)}$			23.8		nS
Fall Time	tf			15.4		nS
Total Gate Charge (10V)	Qg	V_{DS} = 20V, I_D = 15A V_{GS} = 10V		19.8		nC
Total Gate Charge (4.5V)	Qg			12.5		nC
Gate-Source Charge	Qgs			3.9		nC
Gate-Drain Charge	Qgd			4.7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Current	I_S			45		A
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS} = 0V , I_S = I_F		0.75	1.2	V

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

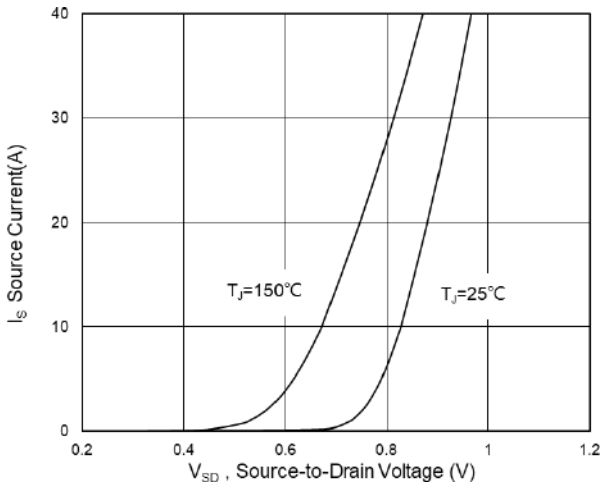
Typical Characteristics



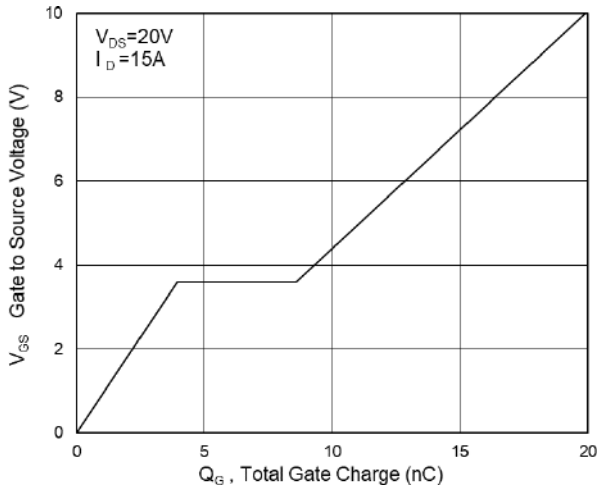
Typical Output Characteristics



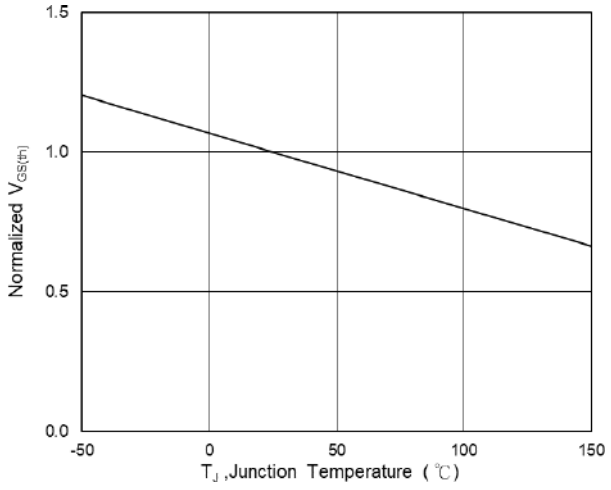
On-Resistance vs G-S Voltage



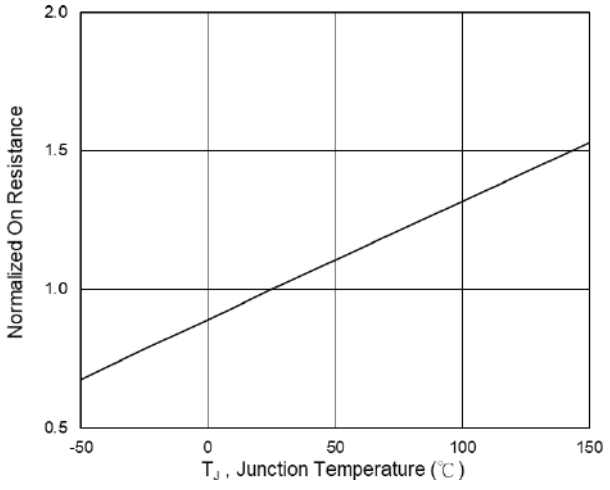
Source Drain Forward Characteristics



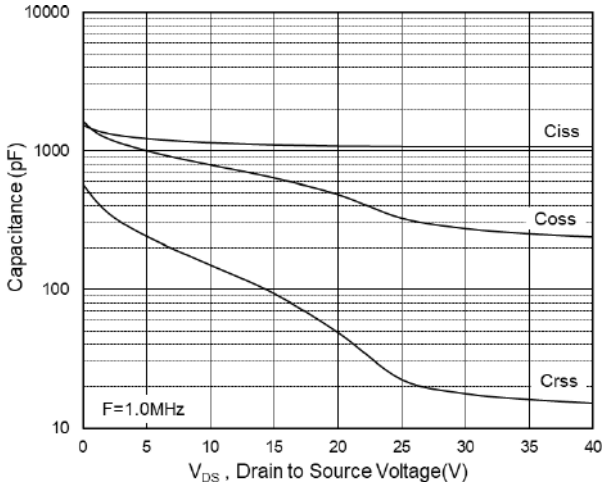
Gate-Charge Characteristics



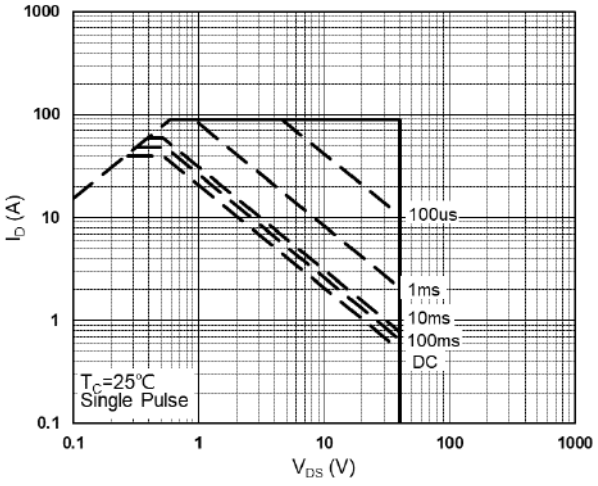
Normalized $V_{GS(th)}$ vs T_J



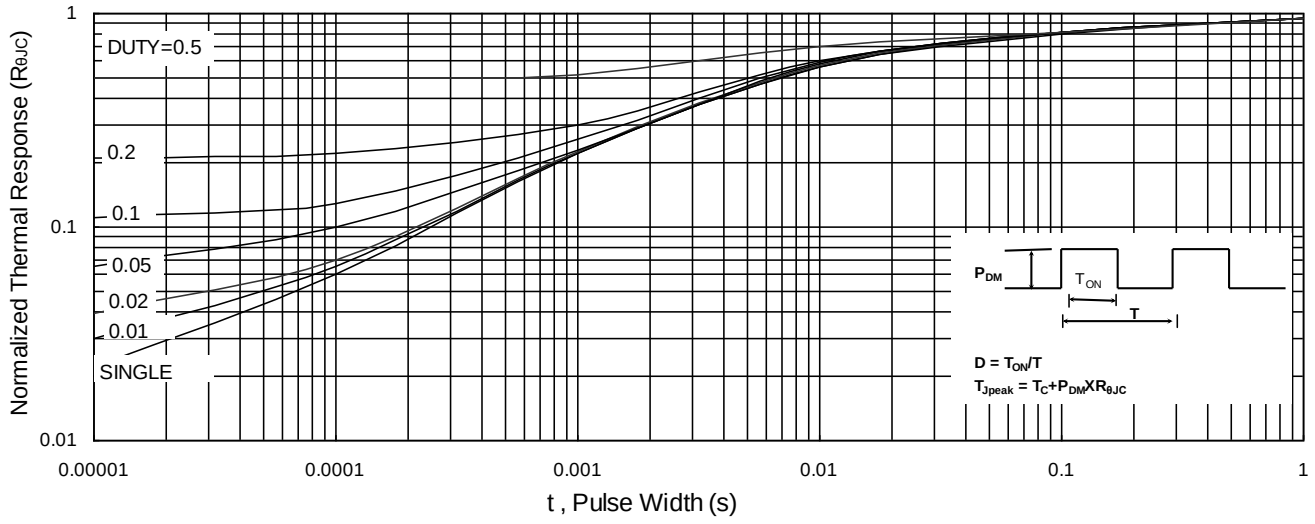
Normalized R_{DSON} vs T_J



Capacitance



Safe Operating Area



Normalized Maximum Transient Thermal Impedance