P-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ) (Typ.)	I_D (A)	Q_g (Typ.)
- 40	8.5 at V_{GS} = - 10 V	- 55[d]	43 nC
	11 at V_{GS} = - 4.5 V	- 40[d]	

FEATURES

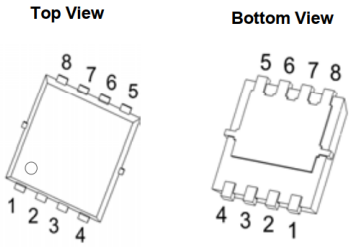
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

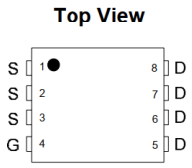
RoHS COMPLIANT

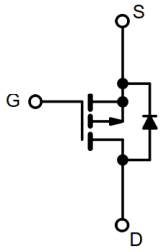
APPLICATIONS

- Battery, Load and Adaptor Switches
  - Notebook Computers
  - Notebook Battery Packs

PDFN3.3X3.3-8L







P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 55[d]	A
	T_C = 70 °C		- 45[d]	
	T_A = 25 °C		- 28[a, b]	
	T_A = 70 °C		- 18[a, b]	
Pulsed Drain Current (t = 100 µs)		I_{DM}	- 220	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 55[d]	
	T_A = 25 °C		- 4.3[a, b]	
Avalanche Current	L = 0.1 mH	I_{AS}	- 48	
Single-Pulse Avalanche Energy		E_{AS}	102	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	98	W
	T_C = 70 °C		60	
	T_A = 25 °C		5.5[a, b]	
	T_A = 70 °C		3.2[a, b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)[e, f]			260	

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[b, f]	t ≤ 10 s	R_{thJA}	21	25	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	2	2.6	

Notes:
a. Package limited.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 2 s.
d. See solder profile The PDFN3.3X3.3 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
f. Maximum under steady state conditions is 80 °C/W.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0, I_D = - 250 µA	- 40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 20		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1		- 3	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 32 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 32 V, V_{GS} = 0 V, T_J = 55 °C			- 5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ - 10 V, V_{GS} = - 10 V	- 55			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 15 A		8.5	9.8	mΩ
		V_{GS} = - 4.5 V, I_D = - 15 A		11	14.5	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 10 V, I_D = - 15 A		65		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 20 V, V_{GS} = 0 V, f = 1 MHz		3610		pF
Output Capacitance	C_{oss}			299		
Reverse Transfer Capacitance	C_{rss}			197		
Total Gate Charge	Q_g	V_{DS} = - 20 V, V_{GS} = - 10 V, I_D = - 15 A		43		nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			18		
Gate Resistance	R_g	f = 1 MHz		17		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 1.5 Ω I_D = - 15 A, V_{GEN} = - 10 V, R_g = 1 Ω		18		ns
Rise Time	t_r			13		
Turn-Off DelayTime	$t_{d(off)}$			55		
Fall Time	t_f			11		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 1.5 Ω I_D = - 15 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		63		
Rise Time	t_r			65		
Turn-Off DelayTime	$t_{d(off)}$			50		
Fall Time	t_f			22		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	T_C = 25 °C			- 55	A
Pulse Diode Forward Current (100 µs)	I_{SM}				- 220	
Body Diode Voltage	V_{SD}	I_S = - 1 A, V_{GS} = 0		- 0.6	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 15 A, dI/dt = 100 A/µs, T_J = 25 °C		26		ns
Body Diode Reverse Recovery Charge	Q_{rr}			15		nC
Reverse Recovery Fall Time	t_a			10		ns
Reverse Recovery Rise Time	t_b			14		

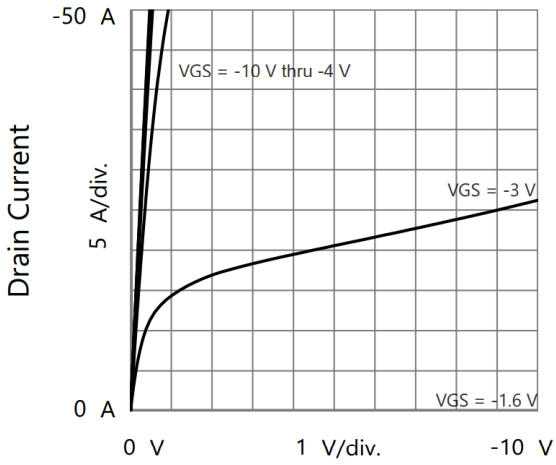
Notes:

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

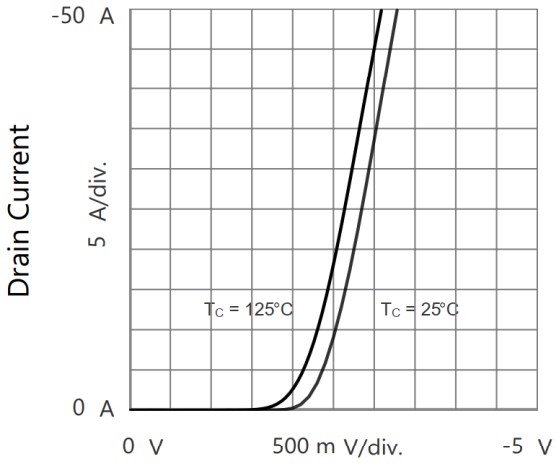
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

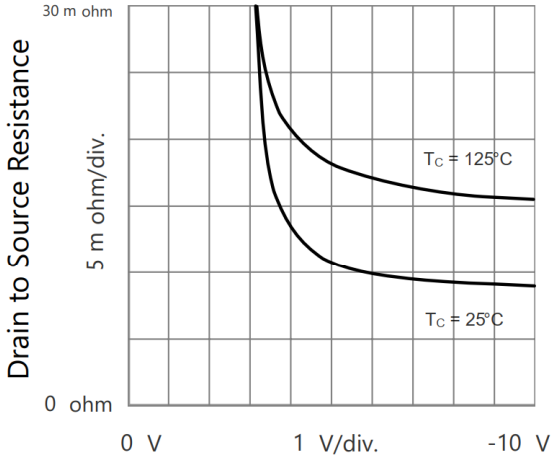
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



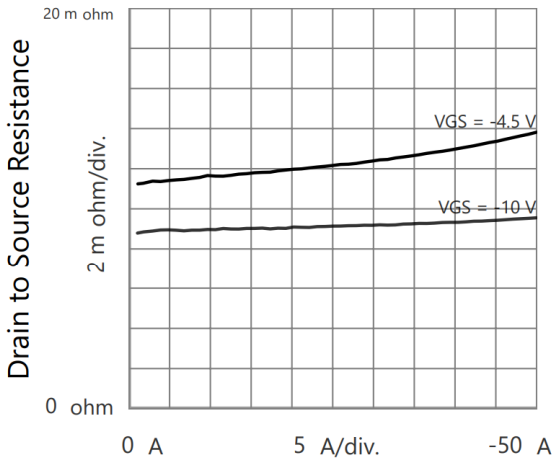
Drain to Source Voltage
Output Characteristics



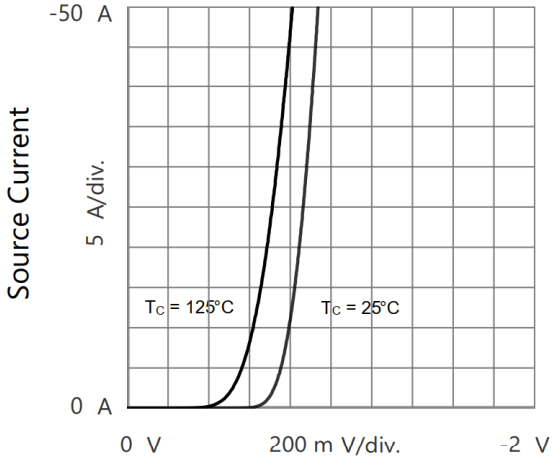
Gate to Source Voltage
Transfer Characteristics



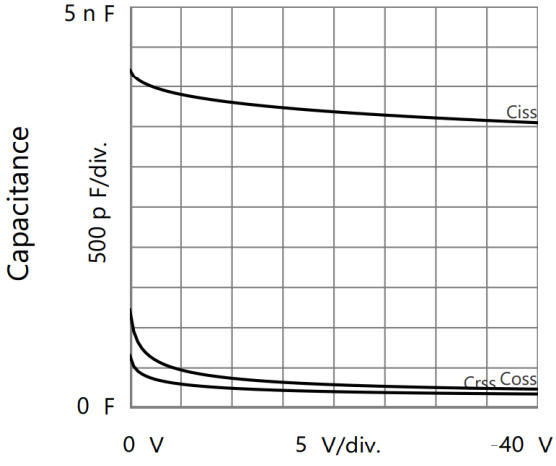
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

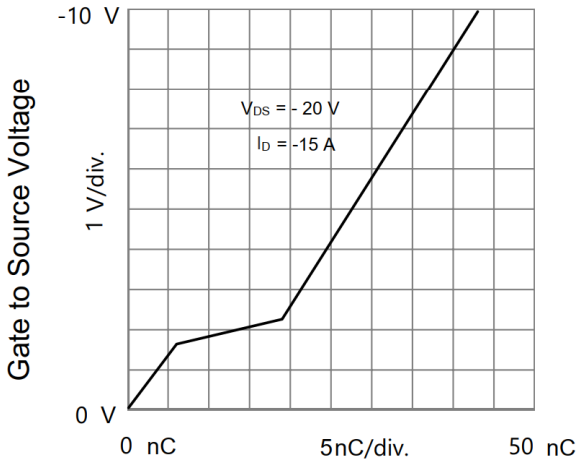


Source to Drain Voltage
Body Diode Forward Characteristics

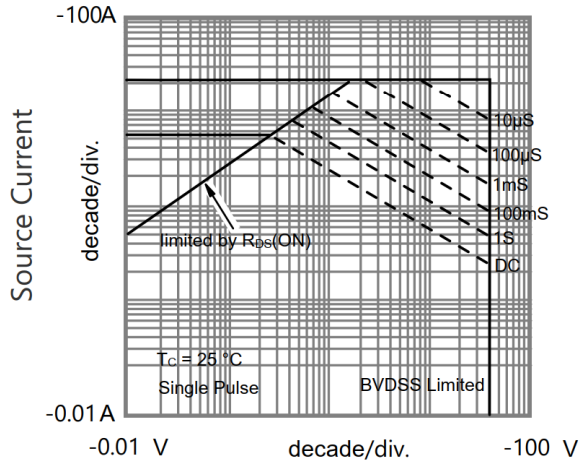


Drain to Source Voltage
Capacitances

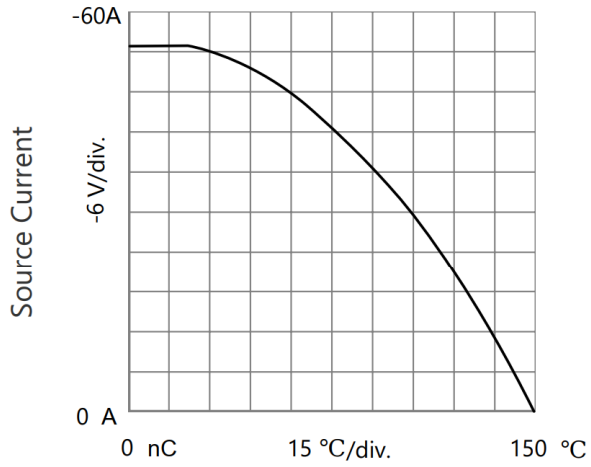
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



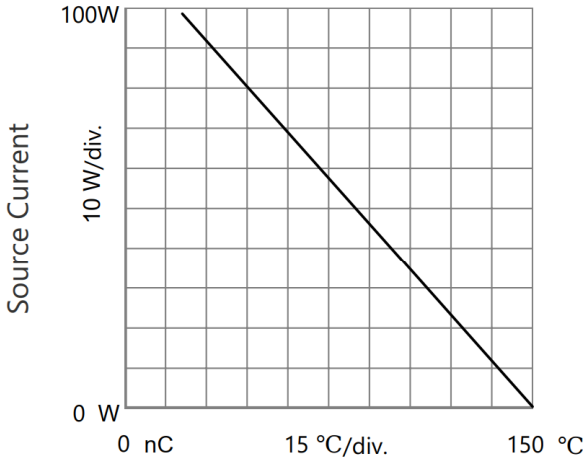
Gate to Source Voltage vs. GateCharge



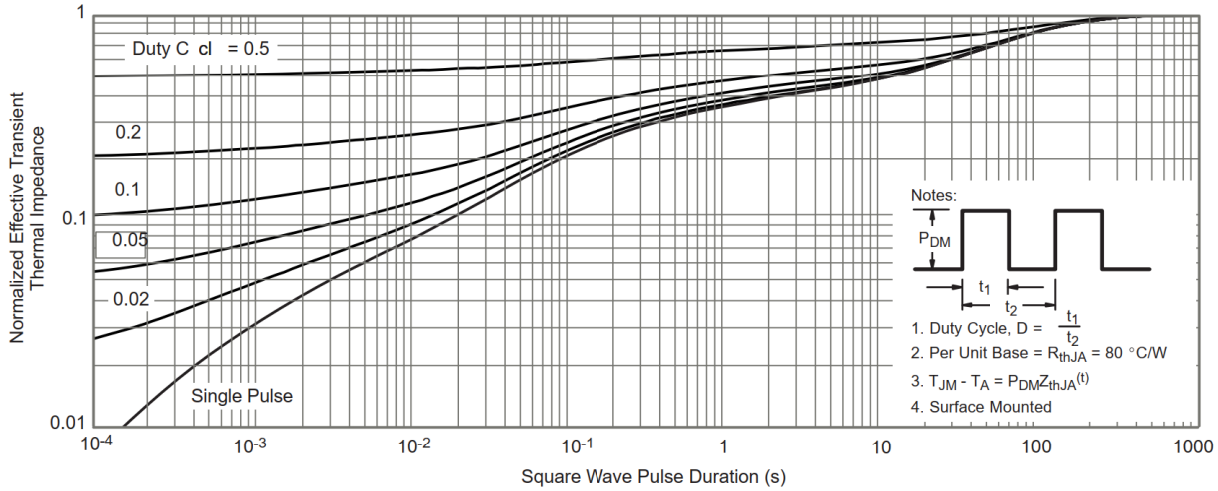
Safe Operating Area, Junction-to-Ambient



Current Derating

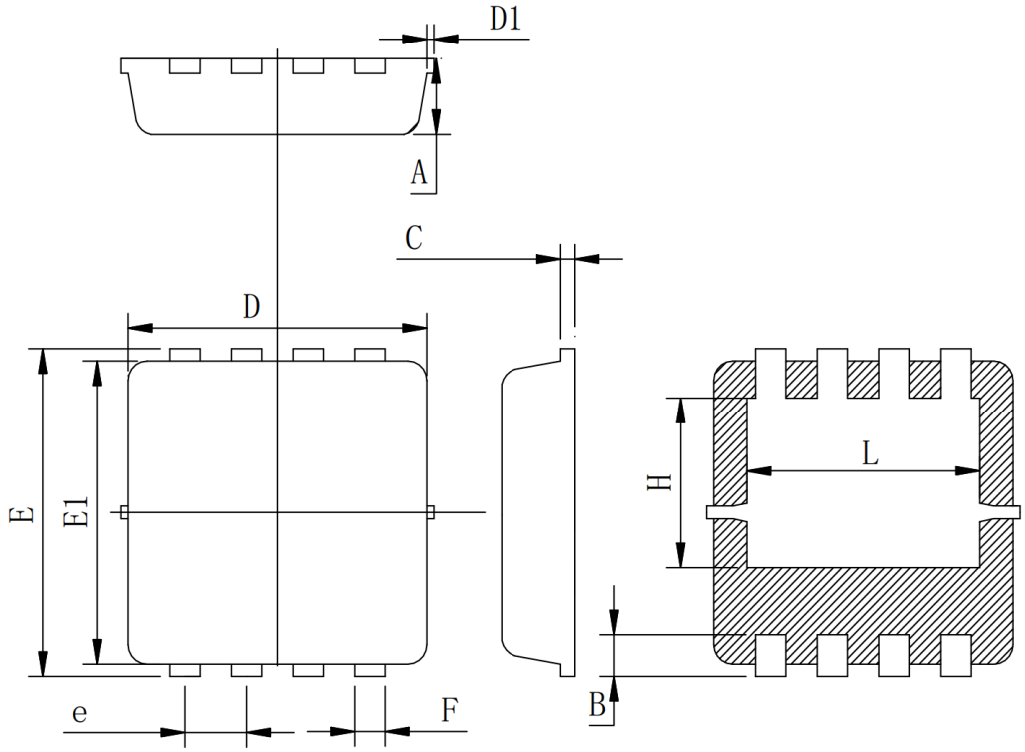


Current Derating



Normalized Thermal Transient Impedance, Junction-to-Ambient

PDFN 3.3X3.3 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	0.600	0.775	1.000
B	0.20	0.38	0.55
C	0.05	0.15	0.40
D	3.10	3.25	3.50
D1	-	-	0.15
E	3.15	3.35	3.50
E1	2.60	3.10	3.45
e	0.50	0.65	0.80
F	0.15	0.32	0.45
H	1.25	1.73	2.10
L	2.20	2.45	2.85

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