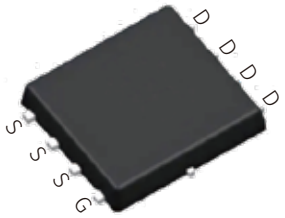
FEATURES

- Advanced trench cell design
- Low Thermal Resistance



PDFN3×3-8L

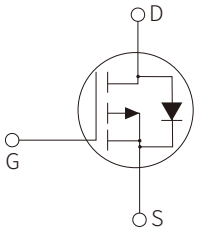
APPLICATION

- Motor Drivers
- DC - DC Converter

Marking

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003



Schematic Symbol

ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage T_C=25°C		V_{DS}	-40	V
Pulsed Source Current T_C=25°C,V_{GS}=-10V		I_{DM}*,**	-120	A
Drain Current V_{GS}=-10V	T_C=25°C	I_D*	-40	A
	T_C=100°C		-19	A
Gate-Source Voltage T_C=25°C		V_{GS}	±20	V
Total Power Dissipation T_C=25°C		P_{tot}*	20	W
Diode Forward Current T_C=25°C		I_S	-40	A
Junction Temperature		T_J	-55 to 150	°C
Storage Temperature		T_{STG}	-55 to 150	°C
Single Pulsed Avalanche Energy V_{DD}= -40V , L=1 mH		E_{AS}*	210	mJ
Thermal Resistance- Junction to Case		$R_{\theta JC}$*	6	°C/W

Notes:
* Surface Mounted on 1 in² pad area, t ≤10 sec
** Pulse width≤300 us, duty cycle≤ 2 %
*** Limited by bonding wire

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_{DS}=-250μA	-1		-3	V
Zero Gate Voltage Source Current	I_{DSS}	V_{DS}=-32V,V_{GS}=0V			-1	μA
Gate Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS}=0V			±100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$[a]	V_{GS}=-10V,I_D=-15A		8	10	mΩ
		V_{GS}=-4.5V,I_D=-10A		10	12	mΩ
Diode Characteristics						
Diode Forward Voltage	V_{SD}[a]	I_{SD}=-15A,V_{GS}=0V			-1.3	V
Reverse Recovery Time	t_{rr}	I_{SD}=-15A, dI_{SD}/dt=100A/μs		17		nS
Reverse Recovery Charge	Q_{rr}			12		nC
Dynamic Characteristics[b]						
Input capacitance	C_{iss}	V_{GS}=0V,V_{DS}=-20V, Frequency = 1 MHz		3351		pF
Output capacitance	C_{oss}			300		pF
Reverse transfer capacitance	C_{rss}			270		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-20V,V_{GEN}=-10V R_G= 3.9Ω, R_L=1.33Ω, I_D=-15A		95		nS
Turn-on Rise Time	t_r			3.5		nS
Turn-Off Delay Time	$t_{d(off)}$			34		nS
Turn-Off Fall Time	t_f			3		nS
Gate Charge Characteristics[b]						
Total Gate Charge	Q_g	V_{DS}=-20V,V_{GS}=-10V,I_{DS}=-15A		77		nC
Gate-Source Charge	Q_{gs}			7		nC
Gate-Drain Charge	Q_{gd}			16		nC

Notes:
a : Pulse test ; pulse width≤300μs, duty cycle≤2 %
b : Guaranteed by design, not subject to production testing

PARAMETER CHARACTERISTIC CURVE

Figure1: Power Capability

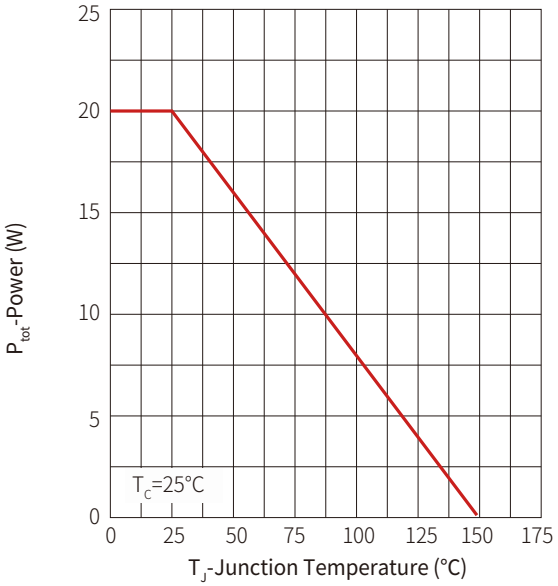


Figure2: Current Capability

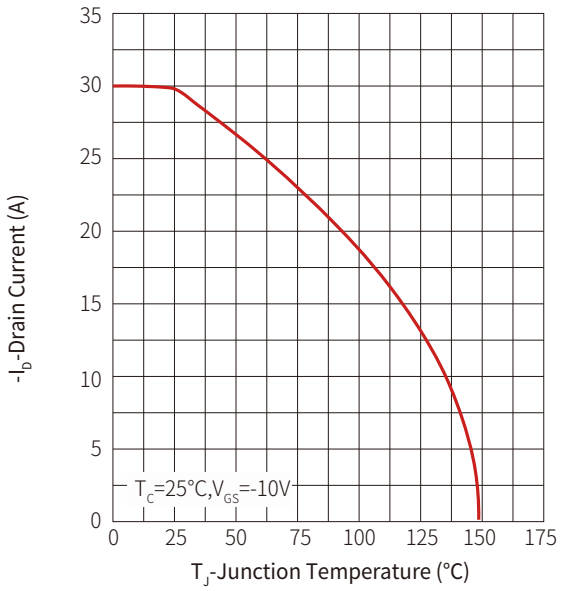


Figure3: Safe operating Area

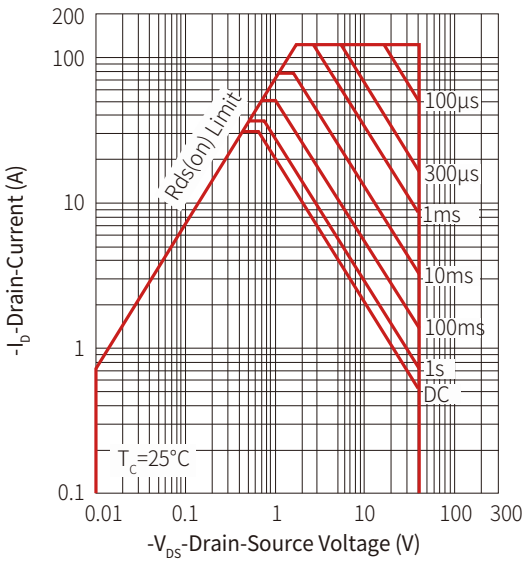


Figure 4: Transient Thermal Impedance

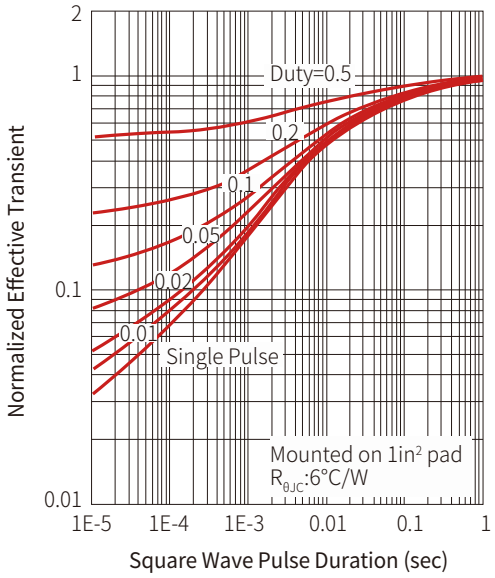


Figure 5:Output Characteristics

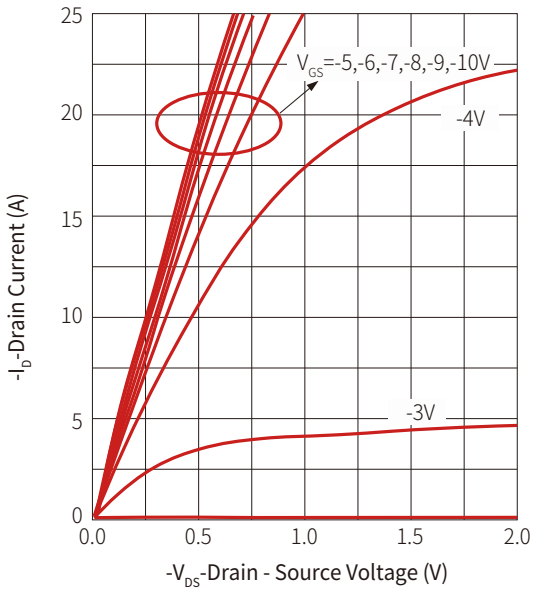


Figure 6: Drain-Source On Resistance

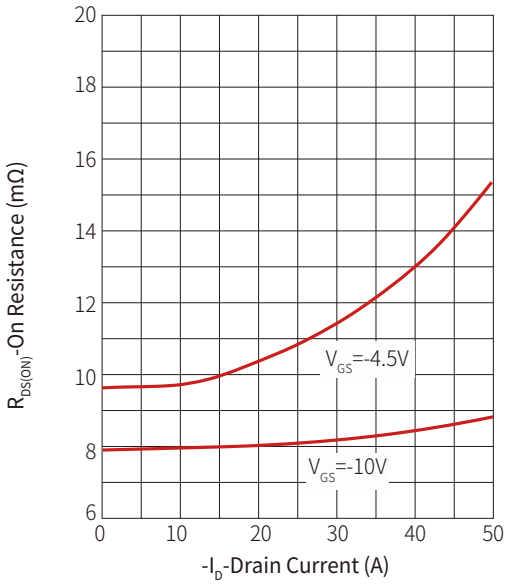


Figure 7:Transfer Characteristics

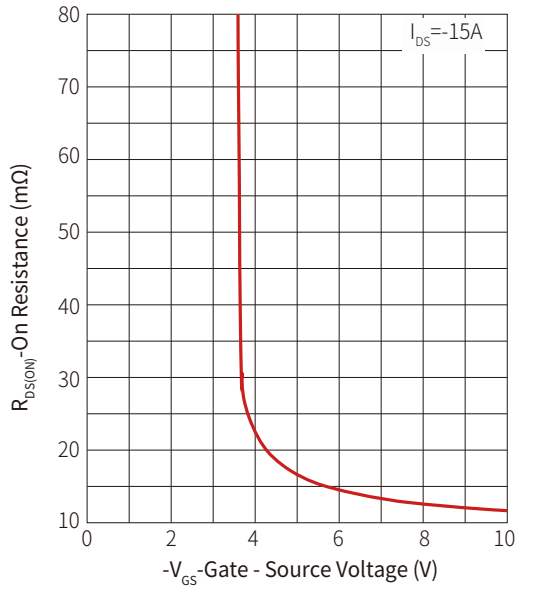


Figure 8: Normalized Threshold Voltage

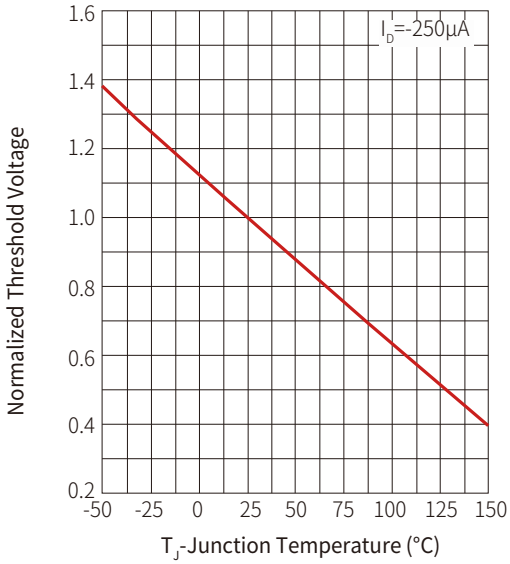


Figure 9:Normalized On Resistance

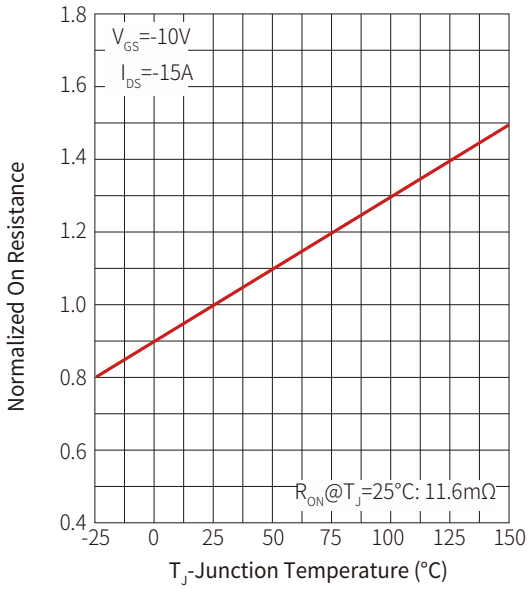


Figure 10: Diode Forward Current

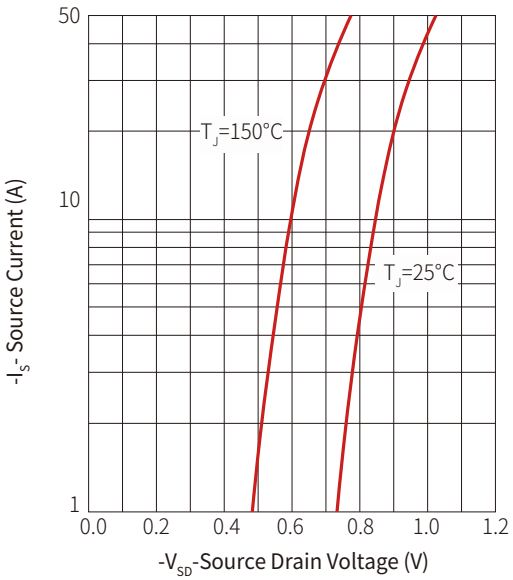


Figure 11:Capacitance

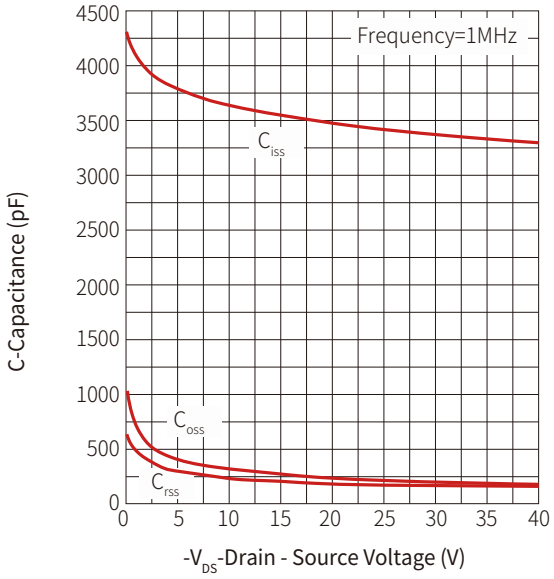
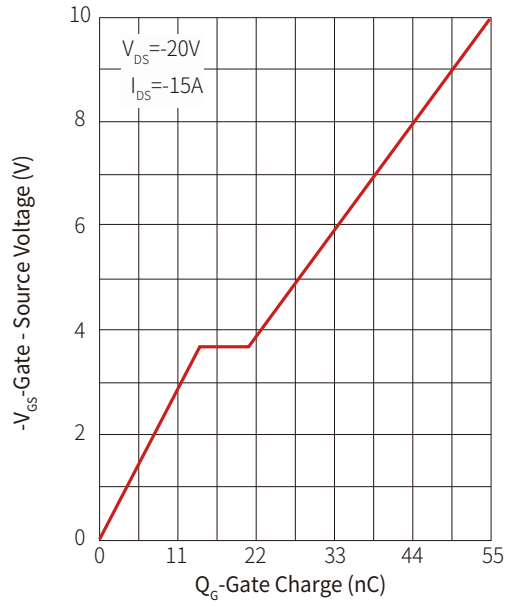
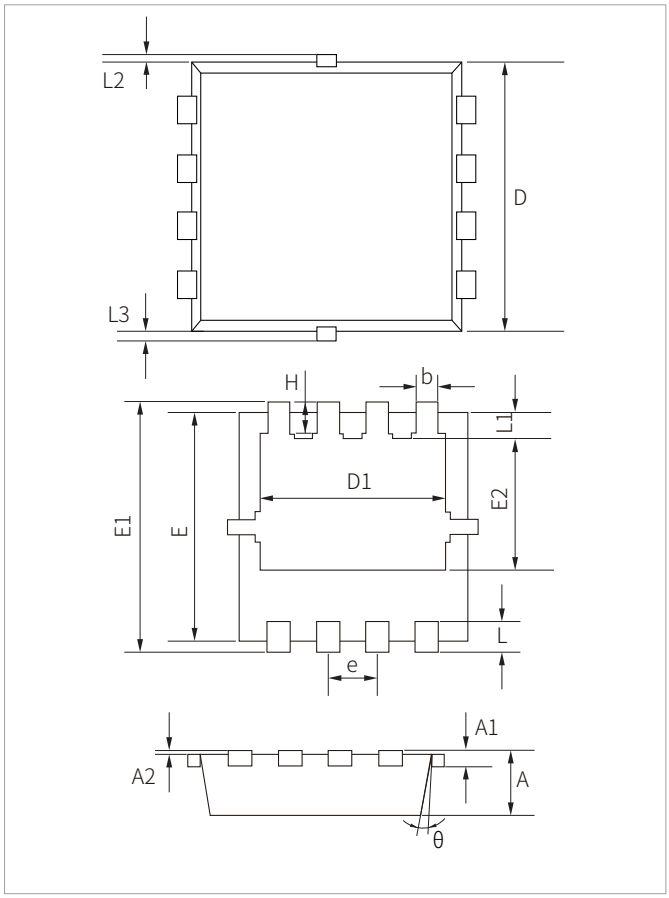


Figure 12: Gate Charge



PDFN3x3-8L PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152REF		0.006REF	
A2	0~0.05		0~0.002	
D	2.900	3.300	0.114	0.130
D1	2.250	2.650	0.089	0.104
E	2.900	3.300	0.114	0.130
E1	3.150	3.550	0.124	0.140
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM40P04Q	PDFN3x3-8L	5000PCS	13”

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