

■ PRODUCT CHARACTERISTICS

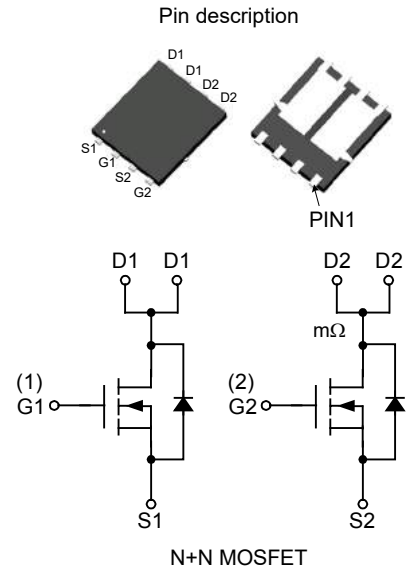
$V_{DS}$	40V
$R_{DS(ON)Typ}(V_{GS} @ =10V)$	10 m $\Omega$
$R_{DS(ON)Typ}(V_{GS} @ =4.5V)$	15m $\Omega$
$I_D$	40A

■ FEATURES

- Low  $R_{DS(ON)}$
- Low gate charge
- Pb-free lead plating
- Halogen-free and ROHS-compliant

■ APPLICATIONS

- Motor driving in power tool
- E-vehicle robotics



■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT4913J	PDFN3X3	5000Pieces/Reel

■ ABSOLUTE MAXIMUM RATINGS( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	$V_{DS}$	40	V	
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain	$I_D$	$T_C = 25^\circ\text{C}$	40	A
		$T_C = 100^\circ\text{C}$	26	A
Pulsed Drain Current	$I_{DM}$	155	A	
Avalanche Energy	$E_{AS}$	22	mJ	
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	20	W
		$T_C = 100^\circ\text{C}$	8.1	W
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$	

■ THERMAL PERFORMANCE

Parameter	Symbol	Min	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	60	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.1	6.2	$^\circ\text{C/W}$

**■ Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise specified)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	40	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V	-	-	1.0	μA
		T <sub>J</sub> = 55°C	-	-	5.0	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.2	-	2.5	V
Static Drain-Source ON-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A	-	10	13	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 15A	-	15	19	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 5A	-	95	-	S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	0.75	1.0	V
Diode Continuous Current	I <sub>S</sub>	T <sub>C</sub> = 25°C	-	-	20	A
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 20V, f = 1MHz	-	1227	-	pF
Output Capacitance	C <sub>oss</sub>		-	526	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	55	-	pF
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz	-	2.7	-	Ω
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> = 0 to 10V V <sub>DS</sub> = 20V, I <sub>D</sub> = 20A	-	40	-	nC
Gate Source Charge	Q <sub>gs</sub>		-	4.4	-	nC
Gate Drain Charge	Q <sub>gd</sub>		-	13	-	nC
Turn-On DelayTime	t <sub>D(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 20V R <sub>L</sub> = 1Ω, R <sub>GEN</sub> = 6Ω	-	5	-	nS
Turn-On Rise Time	t <sub>r</sub>		-	7	-	nS
Turn-Off DelayTime	t <sub>D(off)</sub>		-	23	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	14.8	-	nS
Body Diode Reverse Recovery Time	t <sub>rr</sub>		I <sub>F</sub> = 5A, dI <sub>F</sub> /dt = 100A/μS	-	26	-
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = 5A, dI <sub>F</sub> /dt = 100A/μS	-	14	-	nC

■ TYPICAL CHARACTERISTICS

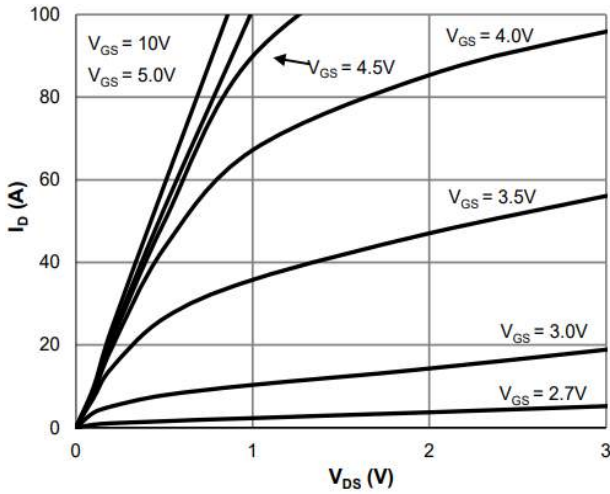


Figure 1: Saturation Characteristics

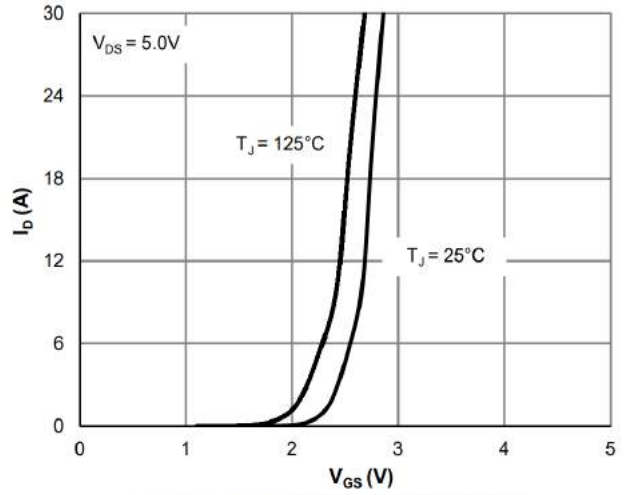


Figure 2: Transfer Characteristics

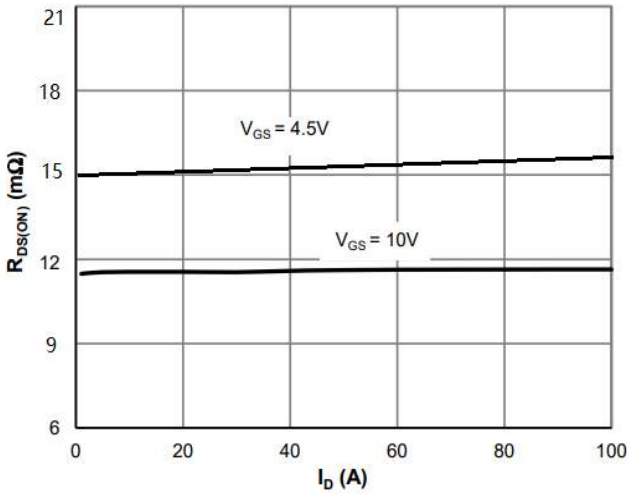


Figure 3:  $R_{DS(ON)}$  vs. Drain Current

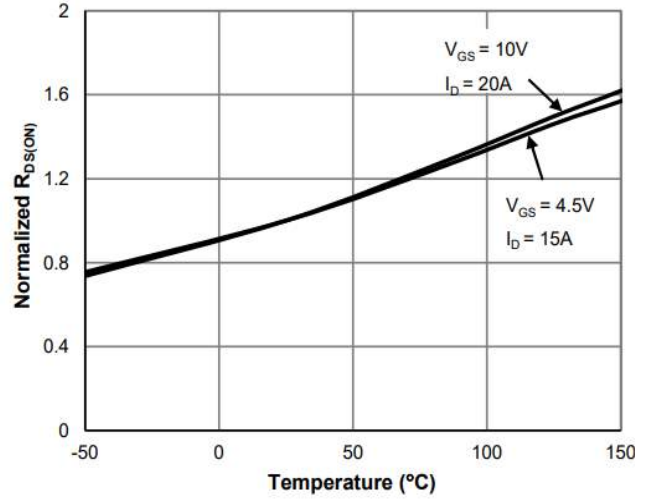


Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature

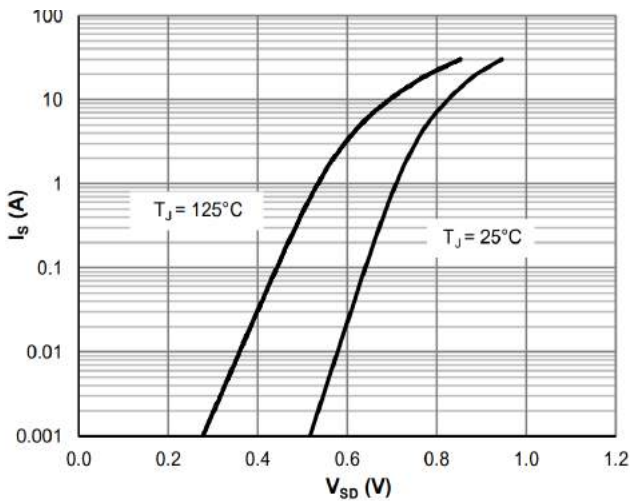


Figure 5: Body-Diode Characteristics

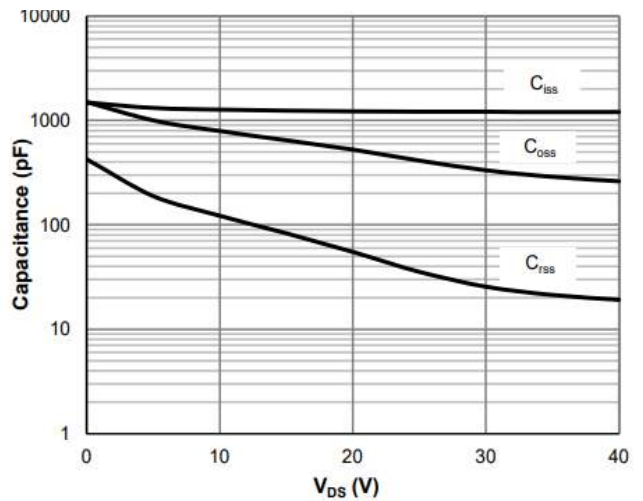


Figure 6: Capacitance Characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

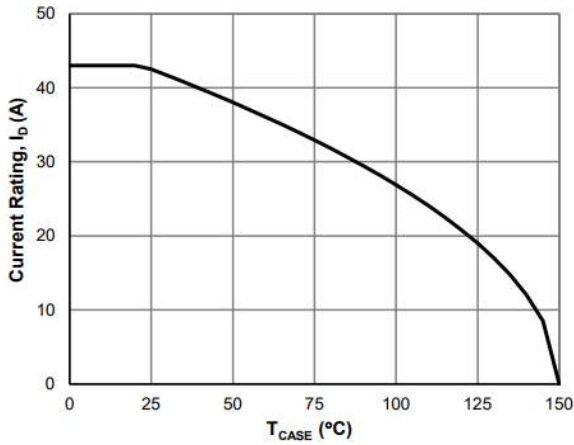


Figure 7: Current De-rating

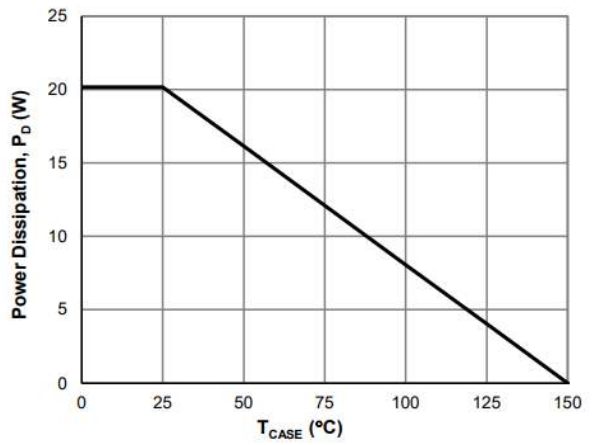


Figure 8: Power De-rating

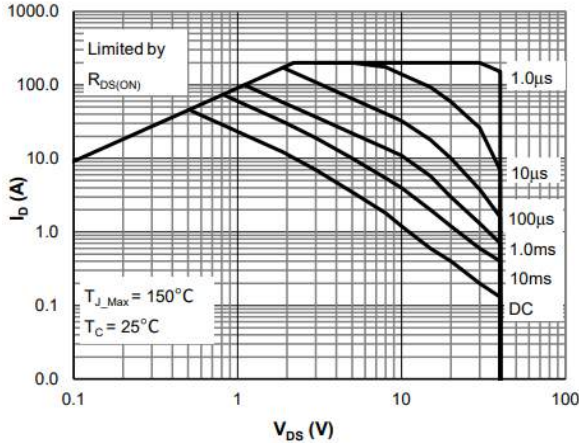


Figure 9: Maximum Safe Operating Area

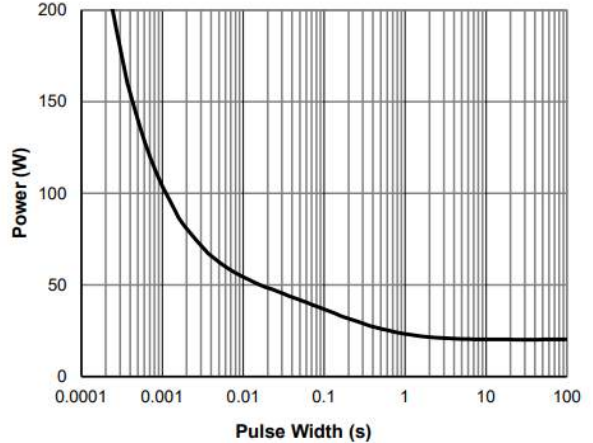


Figure 10: Single Pulse Power Rating, Junction-to-Case

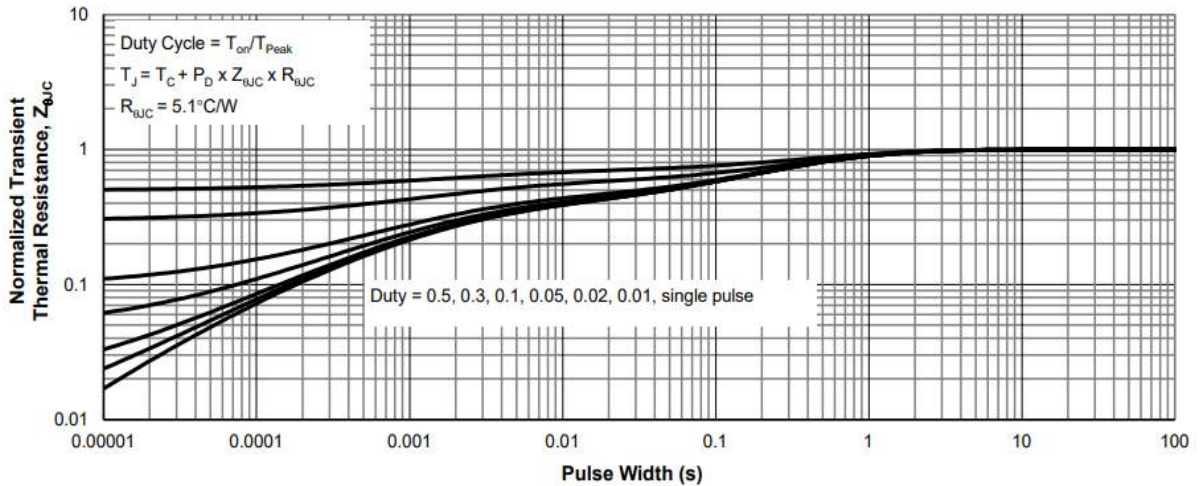
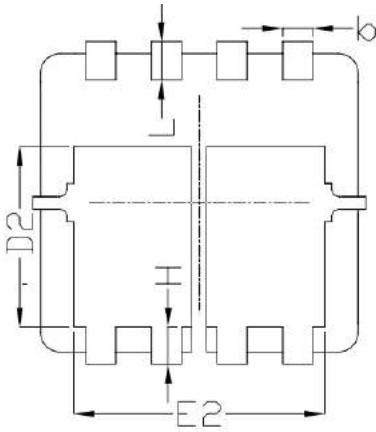
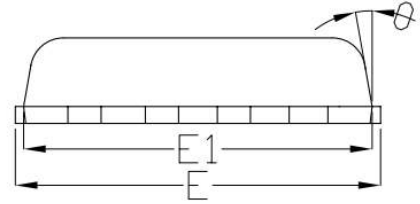
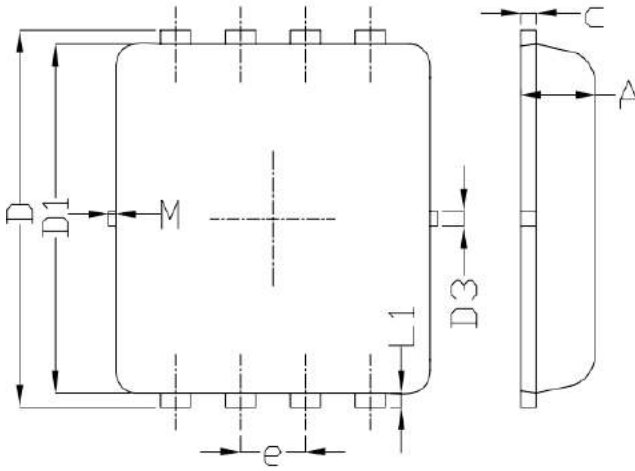


Figure 11: Normalized Maximum Transient Thermal Impedance

■ PDFN3X3-8L Package Mechanical Data



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	---
$\theta$	---	10°	12°
M	*	*	0.15
* Not specified			