

■ PRODUCT CHARACTERISTICS

VDSS	60V
$R_{DS(on)typ}(@V_{GS}=10\text{ V})$	4.7mΩ
$R_{DS(on)typ}(@V_{GS}=4.5\text{ V})$	6.5mΩ
ID	69A

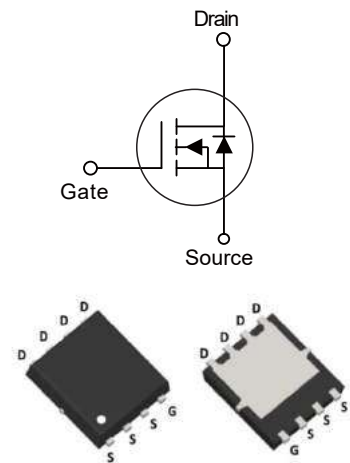
■ FEATURES

Advanced Trench Technology  
Excellent  $R_{DS(ON)}$  and Low Gate Charge  
Lead free product is acquired

■ APPLICATION

PWM Applications  
Load Switch  
Power Management

Symbol



■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT6142J	PDFN3X3-8L	5000 pieces /Reel

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

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	$V_{DS}$	60	V	
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current	$T_C = 25^\circ\text{C}$	$I_D$	69	A
	$T_C = 100^\circ\text{C}$	$I_D$	43	A
Pulsed Drain Current	$I_{DM}$	276	A	
Avalanche Energy	$E_{AS}$	182	mJ	
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	70	W
	$T_C = 100^\circ\text{C}$	$P_D$	26	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.78	$^\circ\text{C/W}$	
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$	

■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Static parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	60	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48\text{V}$ , $V_{GS} = 0\text{V}$	-	-	1.0	$\mu\text{A}$
		$T_J = 55^\circ\text{C}$	-	-	5.0	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}$ , $V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	1	-	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$ , $I_D = 20\text{A}$	-	4.7	5.7	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}$ , $I_D = 15\text{A}$	-	6.5	7.5	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5\text{V}$ , $I_D = 20\text{A}$	10	-	-	S
Diode Forward Voltage	$V_{SD}$	$I_S = 1\text{A}$ , $V_{GS} = 0\text{V}$	-	0.70	1.0	V
Diode Continuous Current	$I_S$	$T_C = 25^\circ\text{C}$	-	-	39	A
<b>Dynamic parameters</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 20\text{V}$ , $f = 1\text{MHz}$	-	1900	-	pF
Output Capacitance	$C_{OSS}$		-	750	-	pF
Reverse Transfer Capacitance	$C_{RSS}$		-	56	-	pF
Gate Resistance	$R_g$	$V_{GS} = 0\text{V}$ , $V_{DS} = 0\text{V}$ , $f = 1\text{MHz}$	-	5.0	-	$\Omega$
<b>Switching parameters</b>						
Total Gate Charge (@ $V_{GS} = 10\text{V}$ )	$Q_g$	$V_{GS} = 0$ to $10\text{V}$ $V_{DS} = 30\text{V}$ , $I_D = 20\text{A}$	-	39	-	nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$ )	$Q_g$		-	18.4	-	nC
Gate Source Charge	$Q_{gs}$		-	8.4	-	nC
Gate Drain Charge	$Q_{gd}$		-	6.8	-	nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 30\text{V}$ $R_L = 1.5\Omega$ , $R_{GEN} = 3\Omega$	-	8.8	-	ns
Turn-On Rise Time	$t_r$		-	30	-	ns
Turn-Off DelayTime	$t_{D(off)}$		-	41	-	ns
Turn-Off Fall Time	$t_f$		-	18.9	-	ns
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	42	-	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = 20\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{s}$	-	38	-	nC

■ TYPICAL CHARACTERISTICS

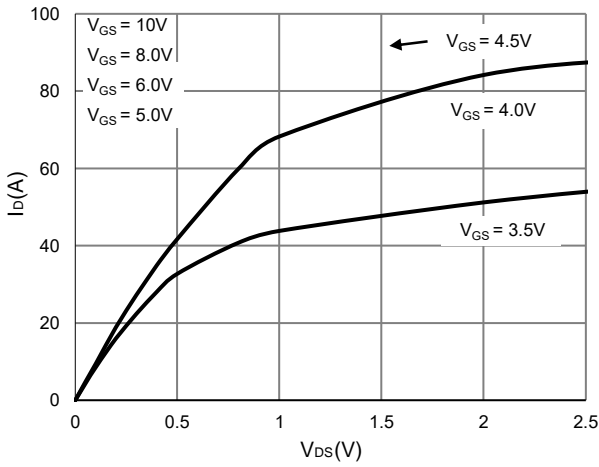


Figure 1: Saturation characteristics

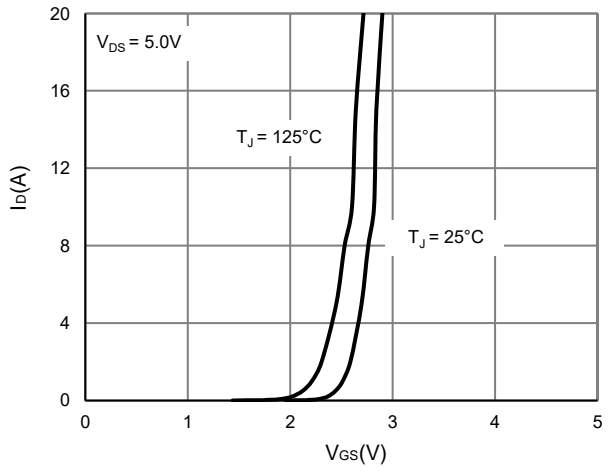


Figure 2: Transfer characteristics

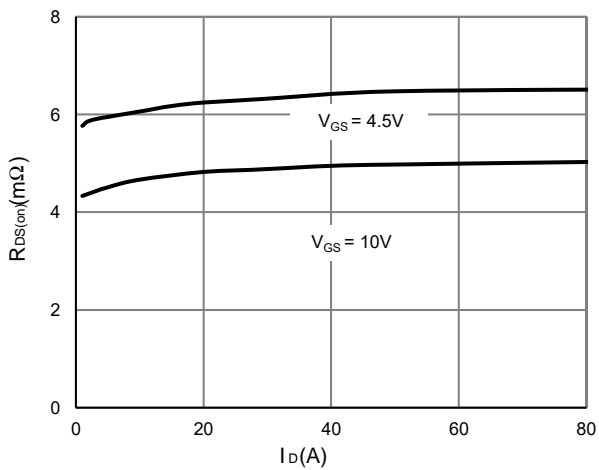


Figure 3:  $R_{DS(on)}$  vs. drain current

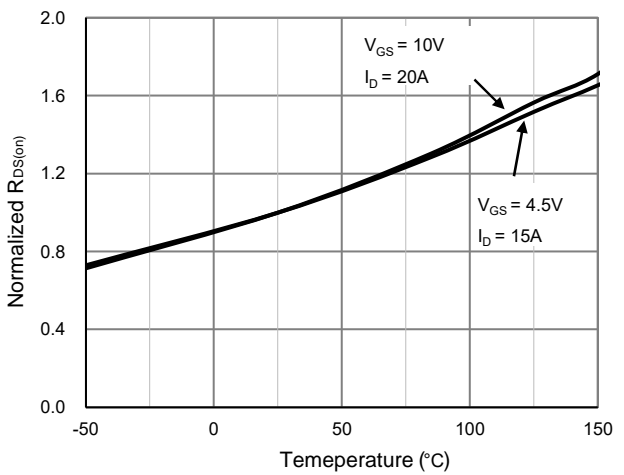


Figure 4:  $R_{DS(on)}$  vs. junction temperature

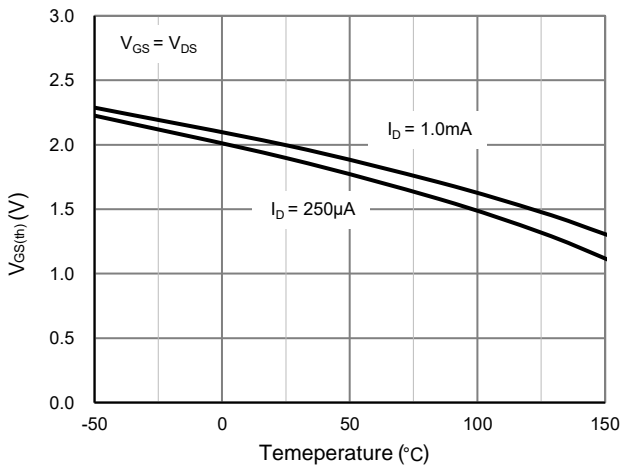


Figure 5:  $V_{GS(th)}$  vs. junction temperature

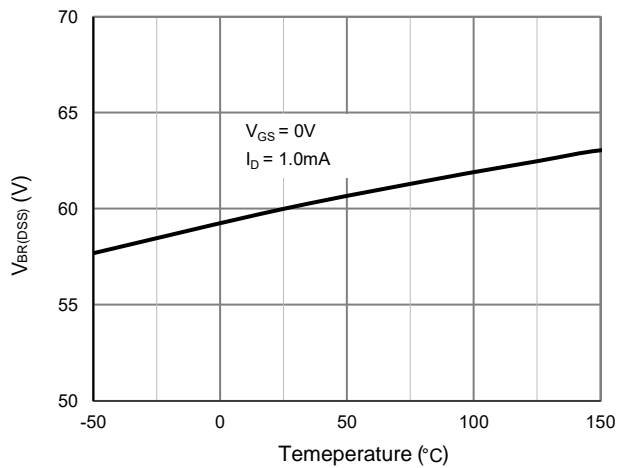


Figure 6:  $V_{BR(DSS)}$  vs. junction temperature

■ TYPICAL CHARACTERISTICS(Cont.)

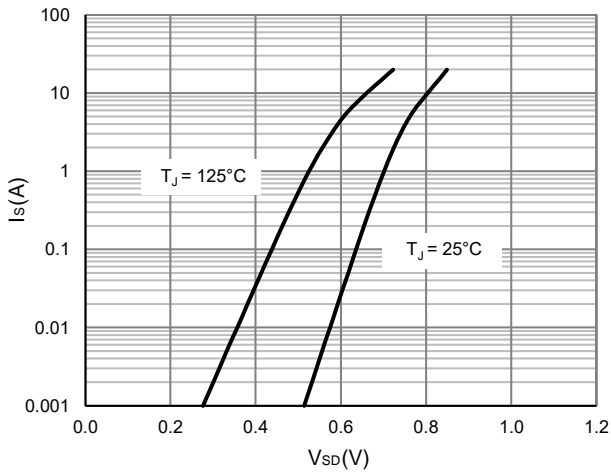


Figure 7: Body-diode characteristics

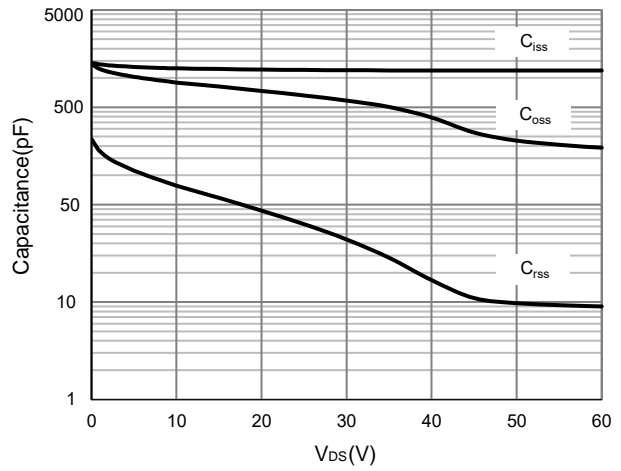


Figure 8: Capacitance characteristics

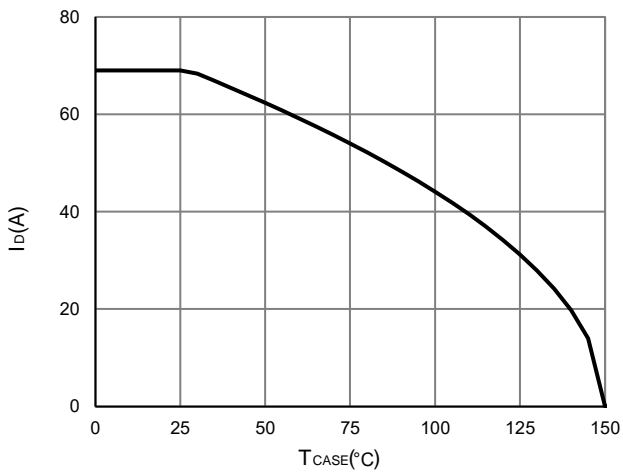


Figure 9: Current de-rating

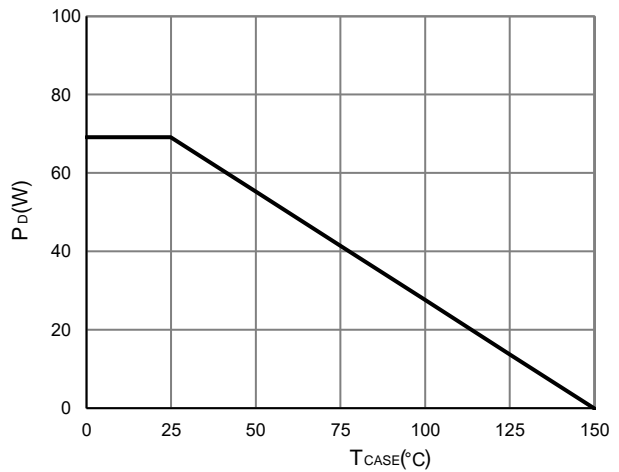


Figure 10: Power de-rating

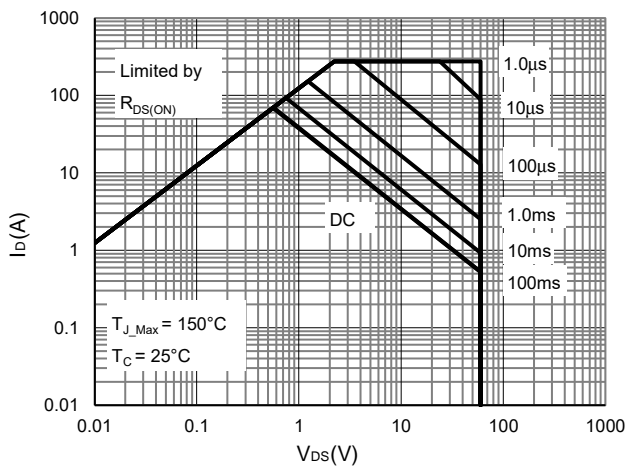
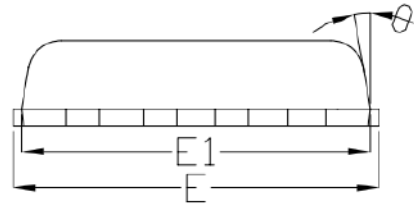
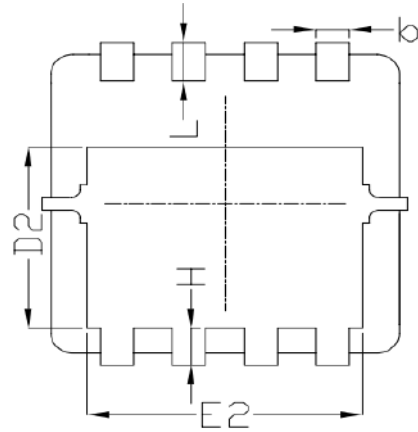
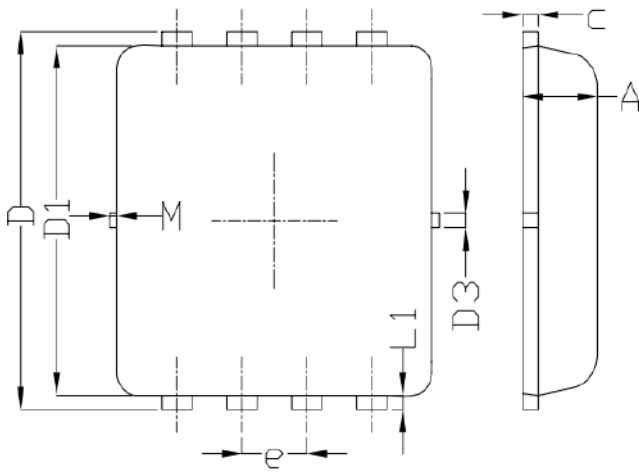
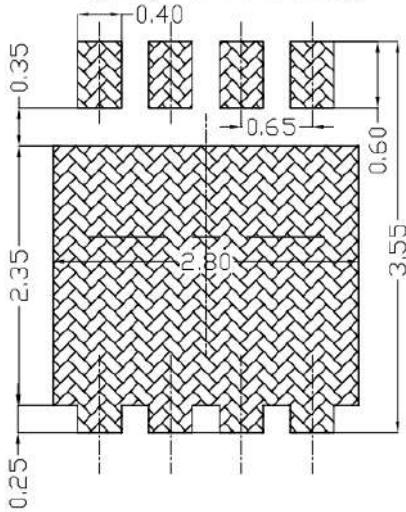


Figure 11: Maximum safe operating area

■ PDFN3X3-8L Package Mechanical Data



Land Pattern  
(Only for Reference)



SYMBOL	DIMENSIONAL REOMTS		
	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

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