

PRODUCT CHARACTERISTICS

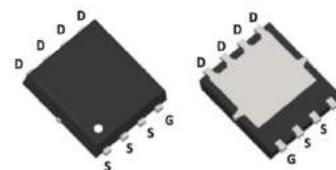
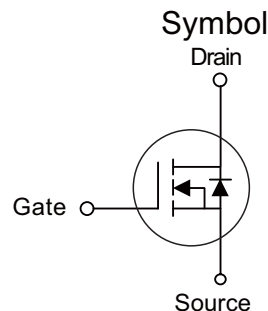
V_{DS}	100V
$R_{DS(on)typ}(V_{GS}=10V)$	11.6m Ω
$R_{DS(on)typ}(V_{GS}=4.5V)$	16.5m Ω
I_D	38A

APPLICATIONS

- * Power management in computing
- * Load switching, quick/wireless charging
- * Motor driving

FEATURES

- * Ultra low $R_{DS(on)}$
- * Low gate charge
- * Pb-free lead plating



PDFN5X6-8L

ORDER INFORMATION

Order codes		Package	Packing
Halogen- Free	Halogen		
N/A	MOT1514G	PDFN5X6	5000 pieces/Reel

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}\text{C}$ Unless Otherwise Noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous ⁽¹⁾	I_D	38	A
	Pulsed ⁽²⁾	I_{DM}	154	A
Avalanche Energy ⁽³⁾		E_{AS}	45	mJ
Power Dissipation ⁽⁴⁾		P_D	32	W
Operating Junction Temperature		T_J	-55-150	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal resistance junction to ambient	θ_{JA}	3.9	$^{\circ}\text{C/W}$

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{V}$, $V_{GS} = 0\text{V}$	-	-	1.0	μA
		$T_J = 55^{\circ}\text{C}$	-	-	5.0	
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	1.2	1.9	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$	-	11.6	14	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}$, $I_D = 15\text{A}$	-	16.5	22	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$	-	57	-	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	$T_C = 25^{\circ}\text{C}$	-	-	32	A
Dynamic characteristics ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$, $f = 1\text{MHz}$	-	1535	-	pF
Output Capacitance	C_{oss}		-	335	-	pF
Reverse Transfer Capacitance	C_{rss}		-	8.2	-	pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$	-	1.9	-	Ω
Switching characteristics ⁽⁵⁾						
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0$ to 10V $V_{DS} = 50\text{V}$, $I_D = 20\text{A}$	-	26	-	nC
Total Gate Charge (@ $V_{GS} = 4.5\text{V}$)	Q_g		-	14.0	-	nC
Gate Source Charge	Q_{gs}		-	4.3	-	nC
Gate Drain Charge	Q_{gd}		-	6.8	-	nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$ $R_L = 2.5\Omega$, $R_{GEN} = 6\Omega$	-	7.5	-	ns
Turn-On Rise Time	t_r		-	15.8	-	ns
Turn-Off DelayTime	$t_{D(off)}$		-	31	-	ns
Turn-Off Fall Time	t_f		-	28	-	ns
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	43	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	35	-	nC

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max} = 150^{\circ}\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 100\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DS} = 30\text{V}$] while its value is limited by $T_{J_Max} = 150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

■ TYPICAL CHARACTERISTICS

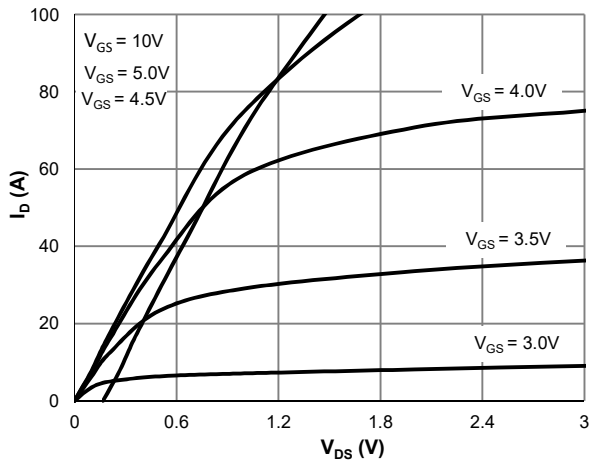


Figure 1: Saturation Characteristics

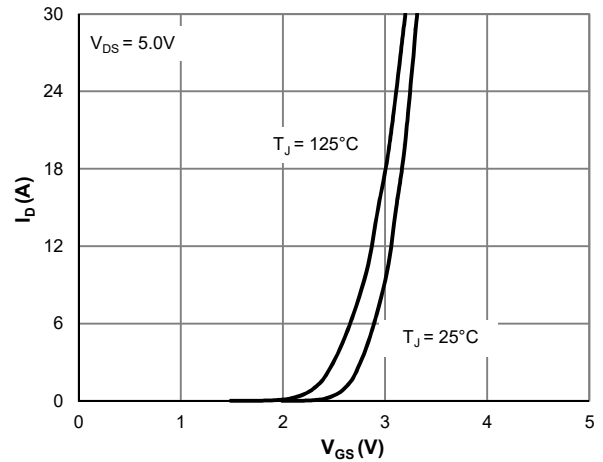


Figure 2: Transfer Characteristics

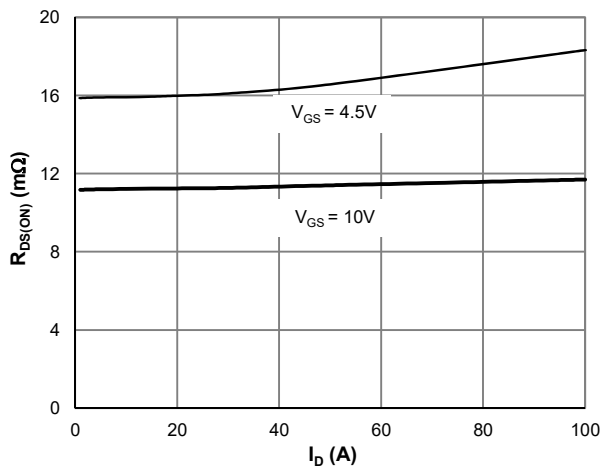


Figure 3: $R_{DS(ON)}$ vs. Drain Current

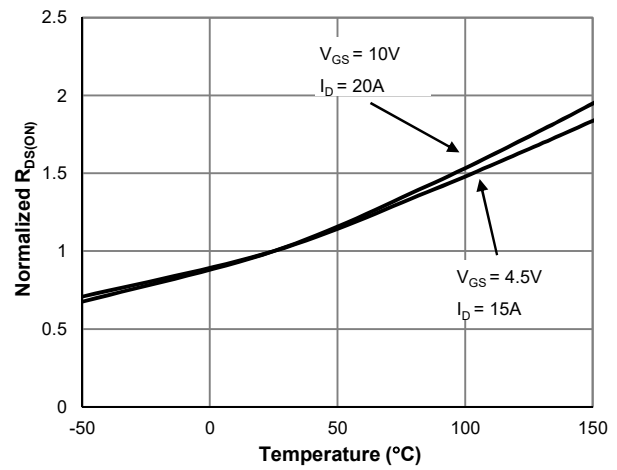


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

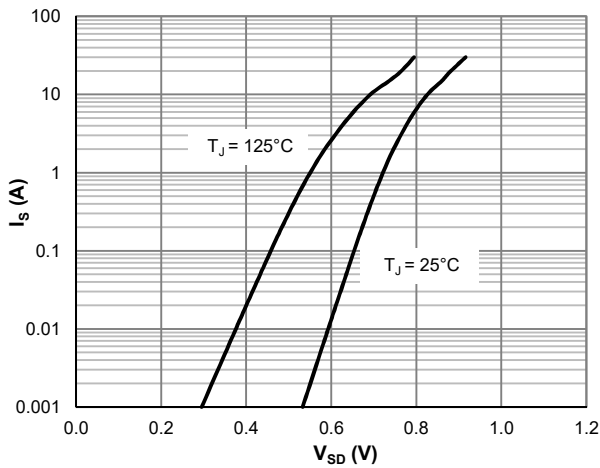


Figure 5: Body-Diode Characteristics

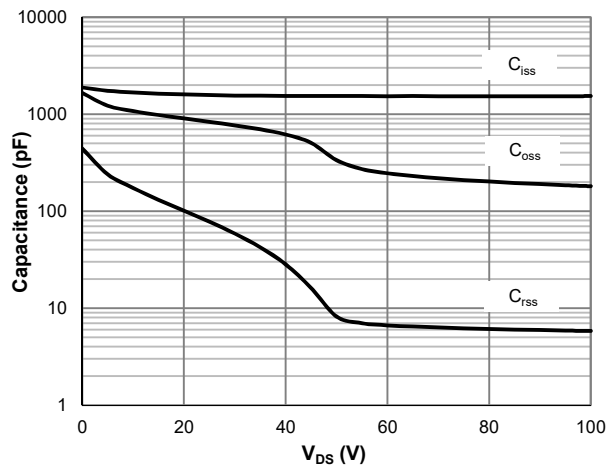


Figure 6: Capacitance Characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

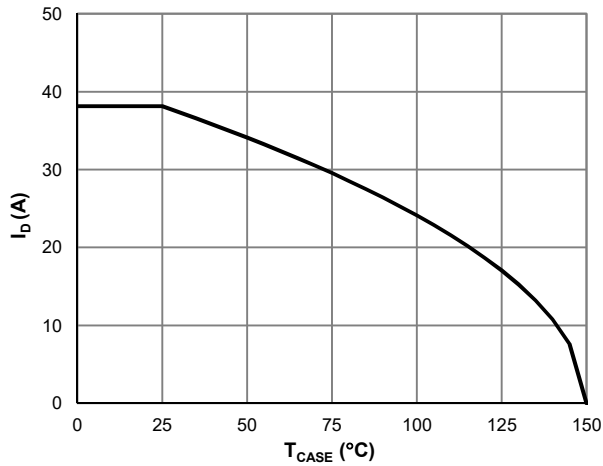


Figure 7: Current De-rating

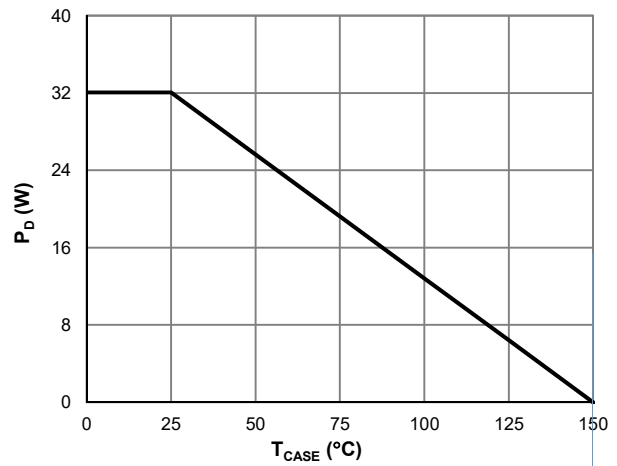


Figure 8: Power De-rating

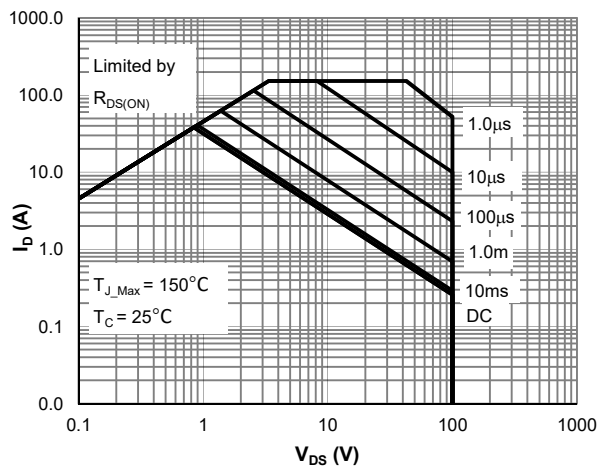


Figure 9: Maximum Safe Operating Area

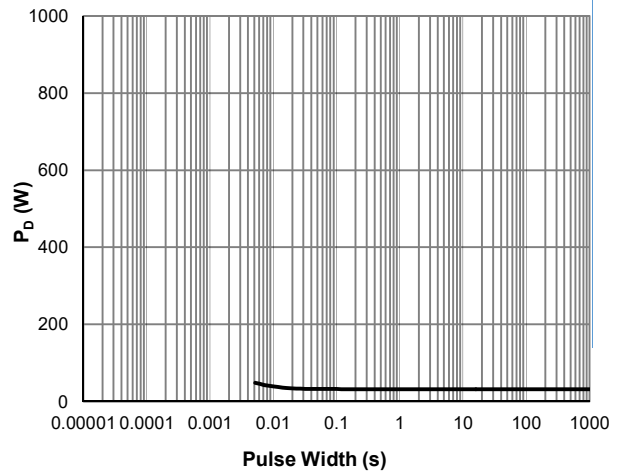


Figure 10: Single Pulse Power Rating, Junction-to-Case

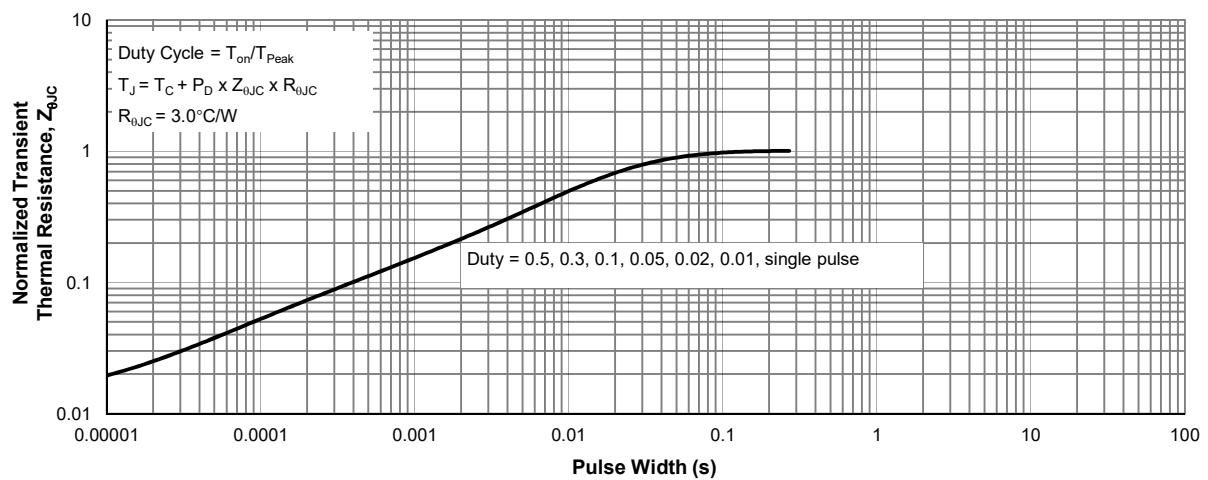
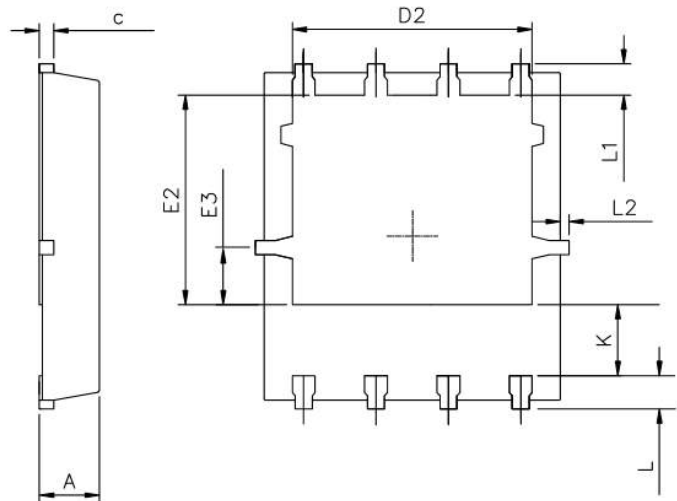
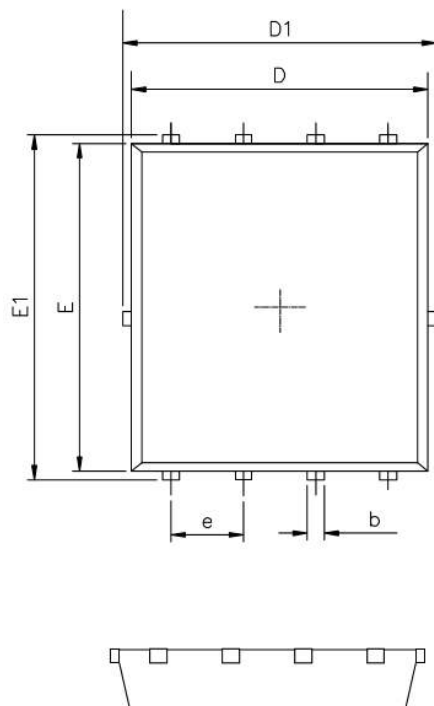
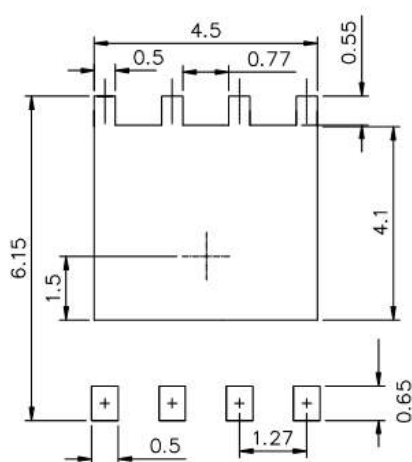


Figure 11: Normalized Maximum Transient Thermal Impedance

■ PDFN5X6-8L Package Mechanical Data



RECOMMENDED LAND PATTERN



UNIT:mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50