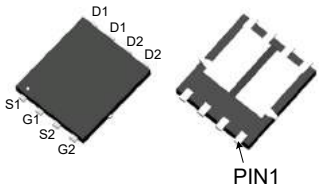
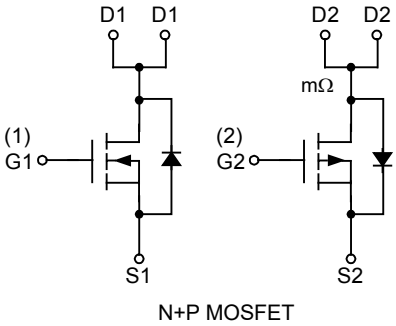
■ PRODUCT CHARACTERISTICS

V_{DSS}	40V	V_{DSS}	-40V
R_{DS} (on)typ(@V_{GS} =10 V)	15mΩ	R_{DS} (on)typ(@V_{GS}=-10 V)	31mΩ
R_{DS} (on)typ(@V_{GS} =4.5 V)	22mΩ	R_{DS} (on)typ(@V_{GS}=-4.5V)	38mΩ
I_D	15A	I_D	-15A

Pin description





■ FEATURES

Excellent Gate Charge x $R_{DS(ON)}$ Product(FOM)

Very Low On-resistance $R_{DS(ON)}$

Fast Switching Speed

■ APPLICATION

Battery Protection

Load Switch

Power Management

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-free	Halogen		
N/A	MOT4648J	PDFN3X3	5000Pieces/Reel

■ ABSOLUTE MAIMUM RATINGS (@ T_C = 25°C unless otherwise specified)

Parameter		Symbol	N-channel	P-channel	Unit.
Drain-to-Source Voltage		V_{DS}	40	-40	V
Gate-to-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_C = 25°C	I_D	15	-15	A
	T_C = 100°C	I_D	9	-9	A
Pulsed Drain Current		I_{DM}	56	-56	A
Single Pulsed Avalanche Energy		E_{AS}	20	20	mJ
Power Dissipation		P_D	14	14	W
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	64	64	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	8.8	8.8	°C/W
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	°C

■ N-ELECTRICAL CHARACTERISTICS (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Off characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 14A	-	15	22	mΩ
		V_{GS} = 4.5V, I_D = 10A	-	20	30	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	1061	-	pF
Output Capacitance	C_{oss}		-	74	-	pF
Reverse Transfer Capacitance	C_{rss}		-	62	-	pF
Total Gate Charge	Q_g	V_{GS} = 0 to 10V V_{DD} = 20V, I_D = 5A	-	23	-	nC
Gate Source Charge	Q_{gs}		-	3.5	-	nC
Gate Drain("Miller") Charge	Q_{gd}		-	4	-	nC
Switching characteristics						
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 20V I_D= 5A, R_{GEN} = 3Ω	-	6	-	ns
Turn-On Rise Time	t_r		-	6	-	ns
Turn-Off DelayTime	$t_{d(off)}$		-	24	-	ns
Turn-Off Fall Time	t_f		-	3	-	ns
Drain-source diode characteristics						
Drain to Source Diode Forward Current	I_S		-	-	14	A
Drain to Source Diode Forward Current	I_{SM}		-	-	56	A
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 14A	-	-	1.2	V
Body Diode Reverse Recovery Time	trr	I_F=5A,di/dt=100A/μs	-	10	-	ns
Body Diode Reverse Recovery Charge	Qrr		-	5	-	nC

■ P-ELECTRICAL CHARACTERISTICS (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Off characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = -250μA, V_{GS} = 0V	-40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	-	-	-1.0	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.2	-1.8	-2.3	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -5A	-	31	40	mΩ
		V_{GS} = -4.5V, I_D = -3A	-	38	49	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	-	1117	-	pF
Output Capacitance	C_{oss}		-	89	-	pF
Reverse Transfer Capacitance	C_{rss}		-	74	-	pF
Total Gate Charge	Q_g	V_{GS} = 0 to -10V V_{DD} = -20V, I_D = -5A	-	22	-	nC
Gate Source Charge	Q_{gs}		-	4	-	nC
Gate Drain("Miller") Charge	Q_{gd}		-	4	-	nC
Switching characteristics						
Turn-On DelayTime	$t_{d(on)}$	V_{GS} = -10V, V_{DD} = -20V I_D= -5A, R_{GEN} = 3Ω	-	5	-	ns
Turn-On Rise Time	t_r		-	2	-	ns
Turn-Off DelayTime	$t_{d(off)}$		-	54	-	ns
Turn-Off Fall Time	t_f		-	25	-	ns
Drain-source diode characteristics						
Drain to Source Diode Forward Current	I_S		-	-	-14	A
Drain to Source Diode Forward Current	I_{SM}		-	-	-56	A
Drain to Source Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = -14A	-	-	-1.2	V
Body Diode Reverse Recovery Time	trr	I_F=-5A,di/dt=100A/μs	-	13	-	ns
Body Diode Reverse Recovery Charge	Qrr		-	7	-	nC

■ N-TYPICAL CHARACTERISTICS

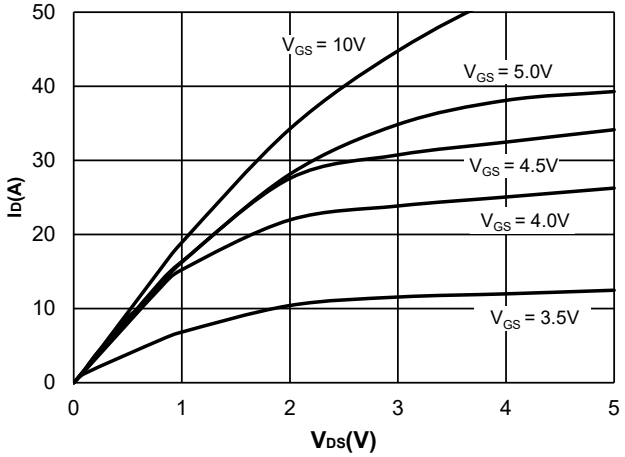


Figure 1: Output Characteristics

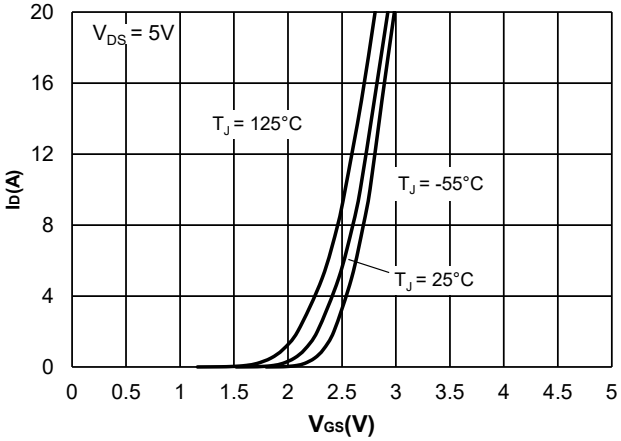


Figure 2: Typical Transfer Characteristics

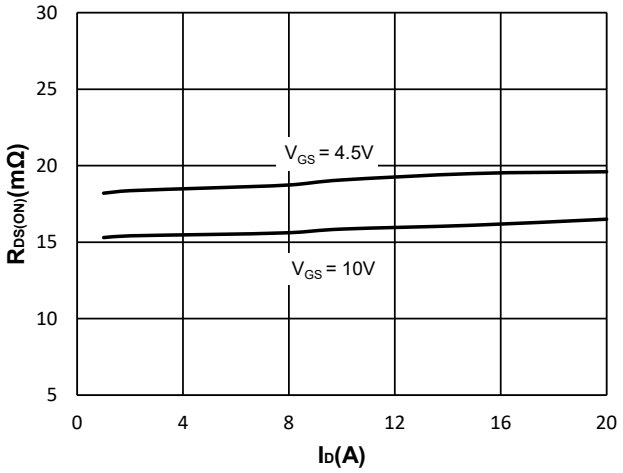


Figure 3: On-resistance vs. Drain Current

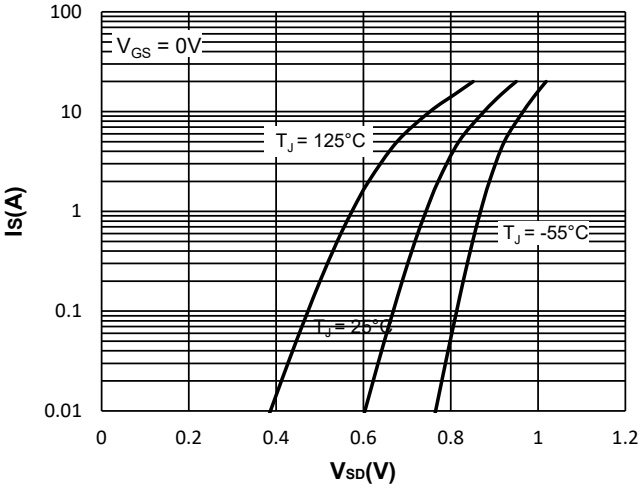


Figure 4: Body Diode Characteristics

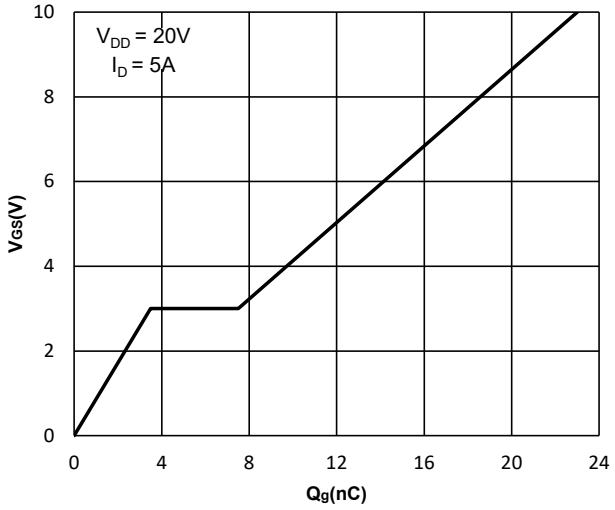


Figure 5: Gate Charge Characteristics

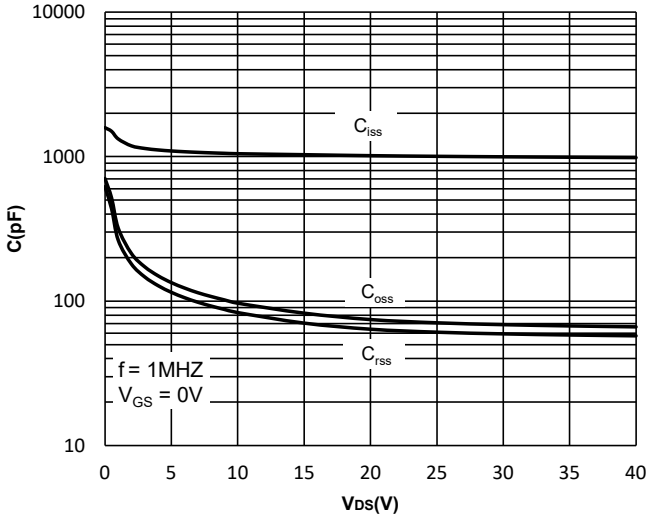


Figure 6: Capacitance Characteristics

■ N-TYPICAL CHARACTERISTICS(Cont.)

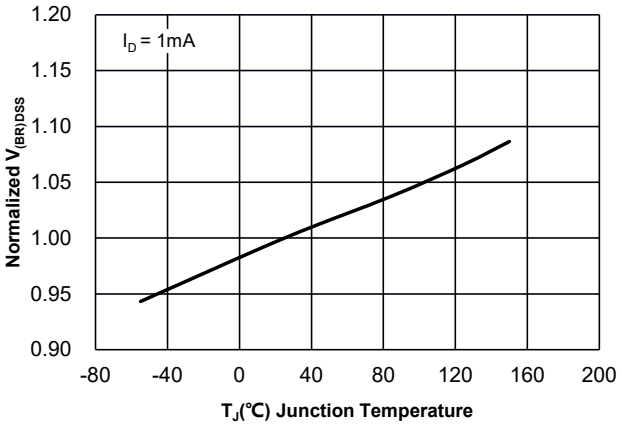


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

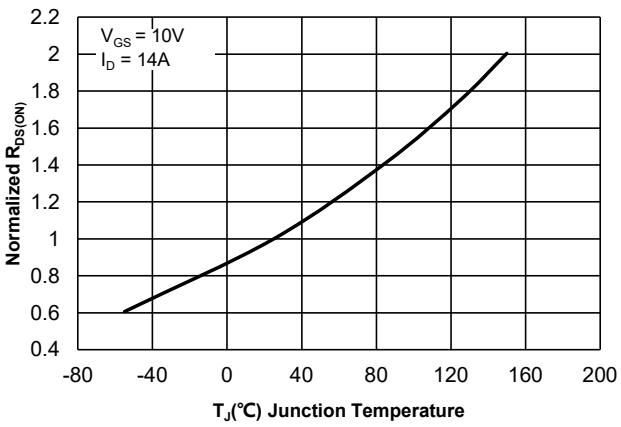


Figure 8: Normalized on Resistance vs. Junction Temperature

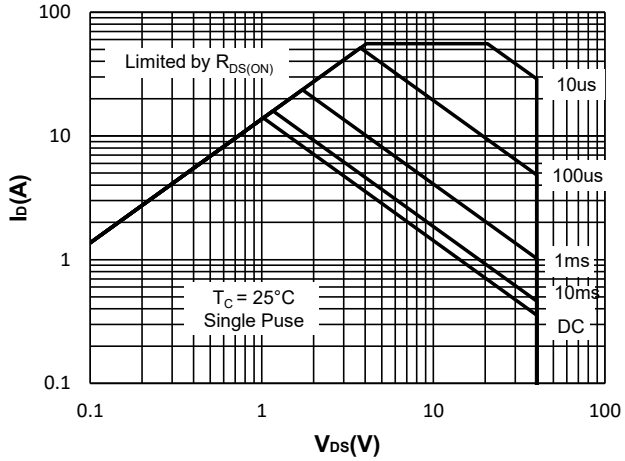


Figure 9: Maximum Safe Operating Area

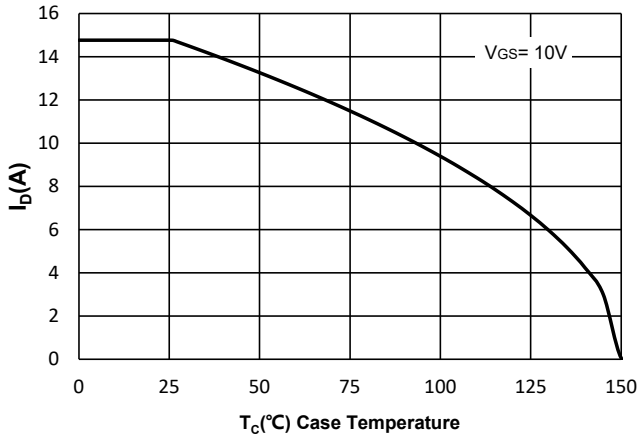


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

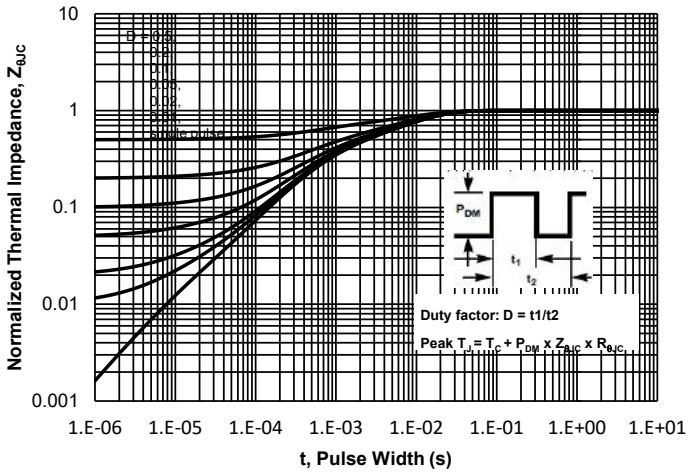


Figure 11: Normalized Maximum Transient Thermal Impedance

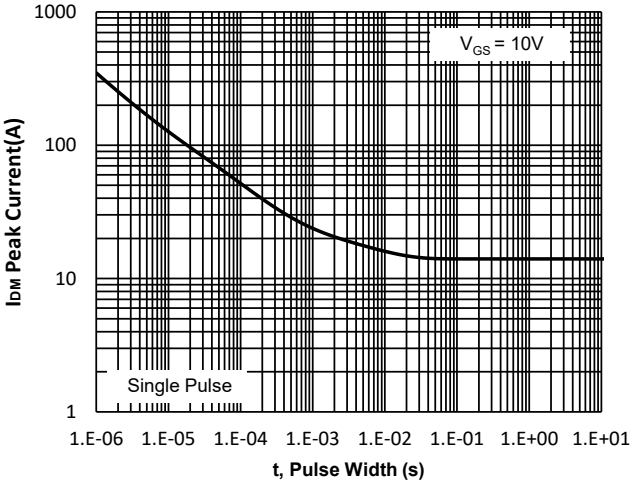


Figure 12: Peak Current Capacity

■ P-TYPICAL CHARACTERISTICS

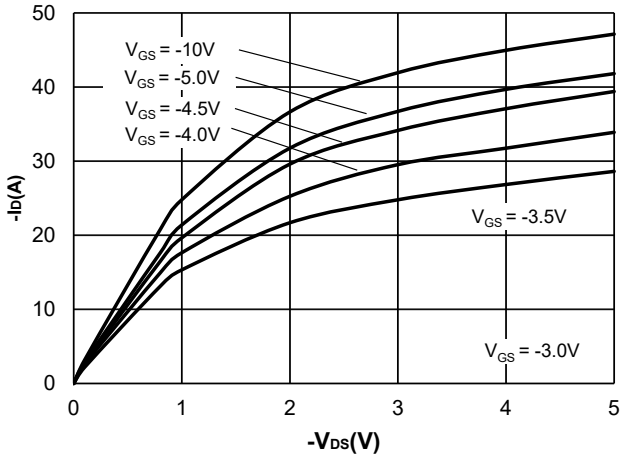


Figure 1: Output Characteristics

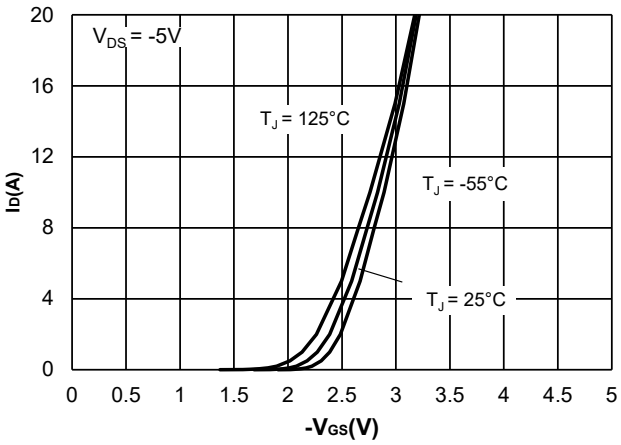


Figure 2: Typical Transfer Characteristics

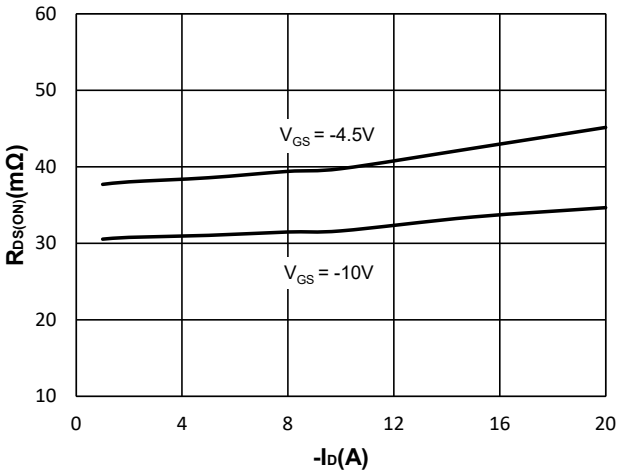


Figure 3: On-resistance vs. Drain Current

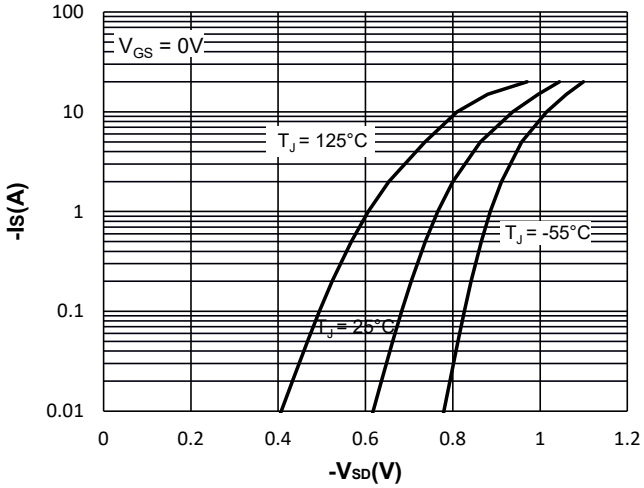


Figure 4: Body Diode Characteristics

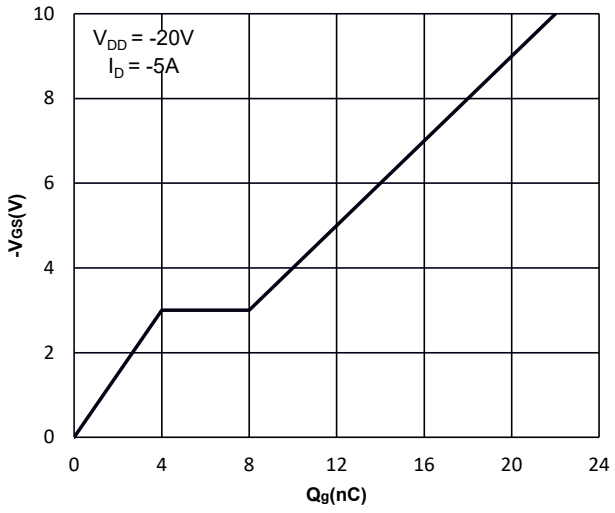


Figure 5: Gate Charge Characteristics

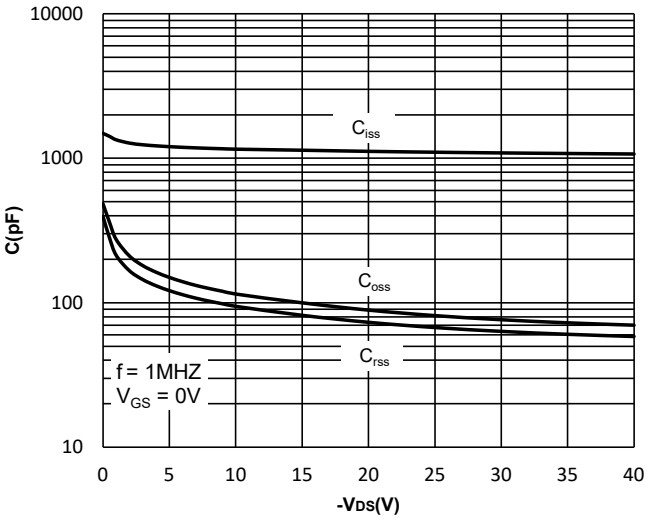


Figure 6: Capacitance Characteristics

■ P-TYPICAL CHARACTERISTICS(Cont.)

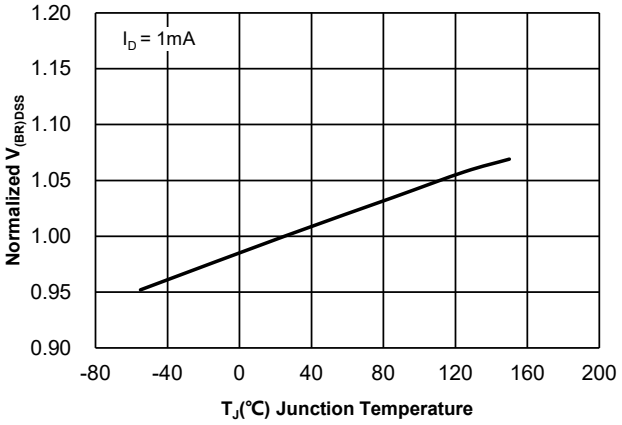


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

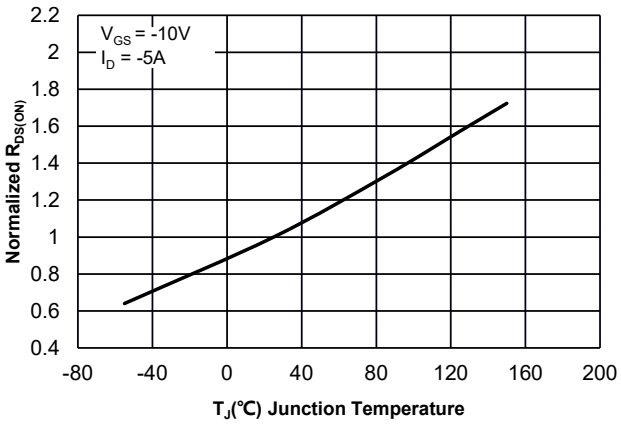


Figure 8: Normalized on Resistance vs. Junction Temperature

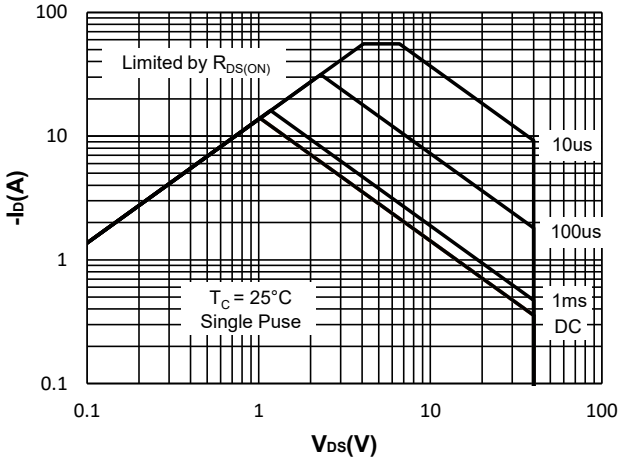


Figure 9: Maximum Safe Operating Area

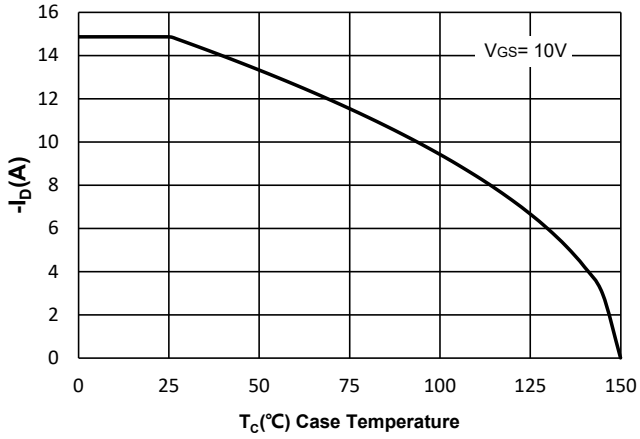


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

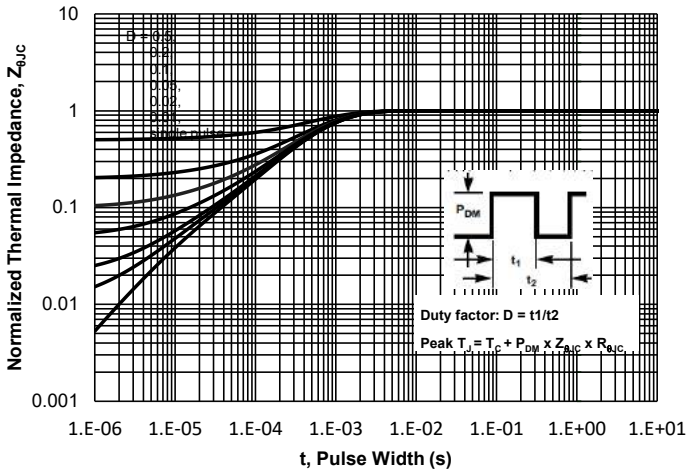


Figure 11: Normalized Maximum Transient Thermal Impedance

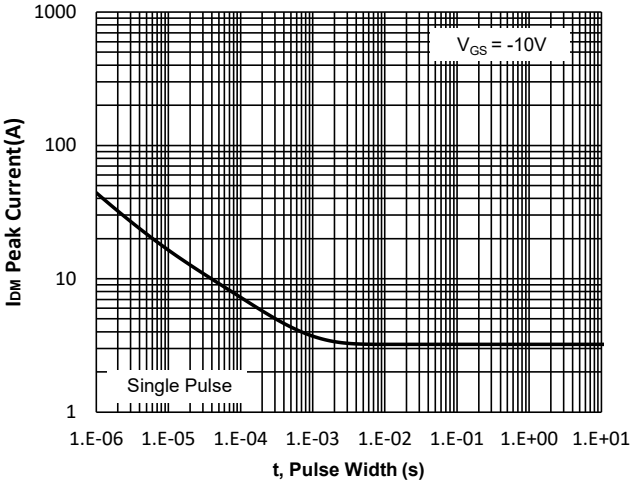
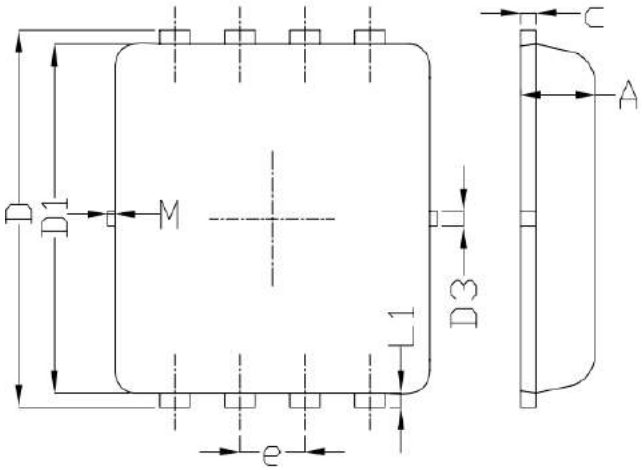
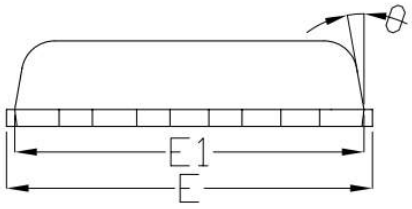
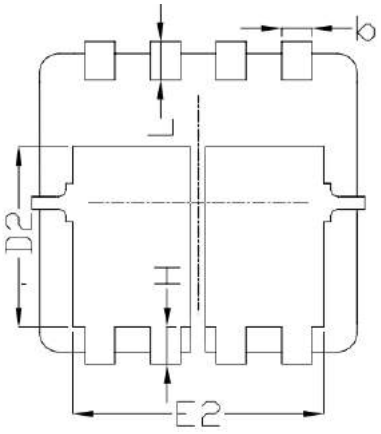


Figure 12: Peak Current Capacity

■ 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	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			