



Description

JMT N And P-Channel Enhancement Mode MOSFET

Features

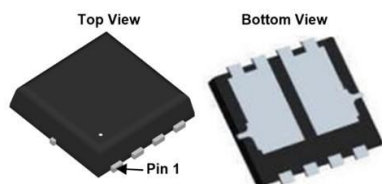
- N-Channel: 30V, 11A
 $R_{DS(ON)} < 16m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 25m\Omega @ V_{GS} = 4.5V$
- P-Channel: -30V, -11A
 $R_{DS(ON)} < 27m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 43m\Omega @ V_{GS} = -4.5V$
- Excellent Gate Charge x $R_{DS(ON)}$ Product(FOM)
- Very Low On-resistance $R_{DS(ON)}$
- Fast Switching Speed

Application

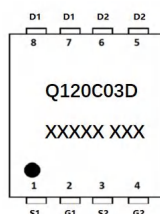
- Battery Protection
- Load Switch
- Power Management



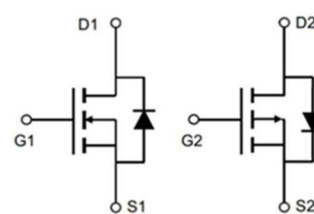
100% UIS TESTED!
100% ΔV_{ds} TESTED!



PDFN3x3-8L-D



Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
Q120C03D	JMTQ120C03D	TAPING	PDFN3x3-8L-D	13inch	5000	50000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max. N-Channel	Max. P-Channel	Units
V _{DSS}	Drain-Source Voltage	30	-30	V
V _{GSS}	Gate-Source Voltage	±20	±20	V
I _D	Continuous Drain Current	T _C = 25°C 11 T _C = 100°C 7.2	-11 -7.2	A
I _{DM}	Pulsed Drain Current ^{note1}	44	-44	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}	20	25	mJ
P _D	Power Dissipation	T _C = 25°C 3.3	5.6	W
R _{θJC}	Thermal Resistance, Junction to Case	38	22	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150		°C



N-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.4	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =10V, I _D =10A	-	12	16	mΩ
		V _{GS} =4.5V, I _D =5A	-	18	25	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	584	-	pF
C _{Oss}	Output Capacitance		-	112	-	pF
C _{rss}	Reverse Transfer Capacitance		-	96	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =10A, V _{GS} =10V	-	15	-	nC
Q _{gs}	Gate-Source Charge		-	4.7	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	3.6	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V, I _D =10A, V _{GS} =10V, R _{REN} =3Ω	-	5	-	ns
t _r	Turn-on Rise Time		-	8	-	ns
t _{d(off)}	Turn-off Delay Time		-	21	-	ns
t _f	Turn-off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	11	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	44	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =11A	-	0.8	1.2	V
trr	Body Diode Reverse Recovery Time	I _F =10A,	-	7	-	ns
Qrr	Body Diode Reverse Recovery	dI/dt=100A/μs	-	5.9	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : T_J=25°C, V_{DD}=15V, V_{GS}=10V, L=0.5mH, R_g=25Ω, I_{AS}=9A

T_J=25°C, V_{DD}= -15V, V_{GS}= -10V, L=0.5mH, R_g=25Ω, I_{AS}= -10A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



P-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} =0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.0	-1.5	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} = -10V, I _D = -10A	-	21	27	mΩ
		V _{GS} = -4.5V, I _D = -5A	-	31	43	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} =0V, f=1.0MHz	-	1200	-	pF
C _{Oss}	Output Capacitance		-	155	-	pF
C _{rss}	Reverse Transfer Capacitance		-	139	-	pF
Q _g	Total Gate Charge	V _{DS} = -15V, I _D = -8A, V _{GS} = -10V	-	52	-	nC
Q _{gs}	Gate-Source Charge		-	9.8	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	8.3	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -15V, I _D = -1A, V _{GS} = -10V, R _{GEN} =6Ω R _D =15Ω	-	13	-	ns
t _r	Turn-on Rise Time		-	15	-	ns
t _{d(off)}	Turn-off Delay Time		-	198	-	ns
t _f	Turn-off Fall Time		-	98	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-11	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-44	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -11A	-	-0.8	-1.2	V
trr	Reverse Recovery Time	T _J =25℃,	-	37	-	ns
Qrr	Reverse Recovery Charge	I _F =-2A, dI/dt=-100A/μs	-	36	-	nC



Typical Performance Characteristics-N

Figure1: Output Characteristics

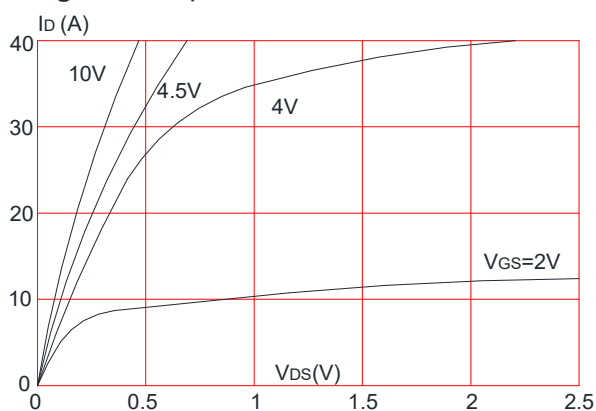


Figure 2: Typical Transfer Characteristics

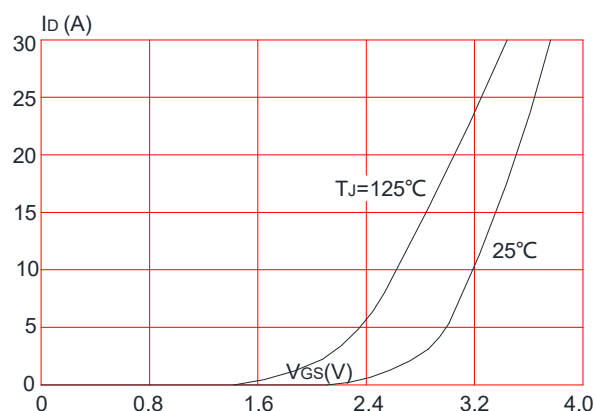


Figure 3: On-resistance vs. Drain Current

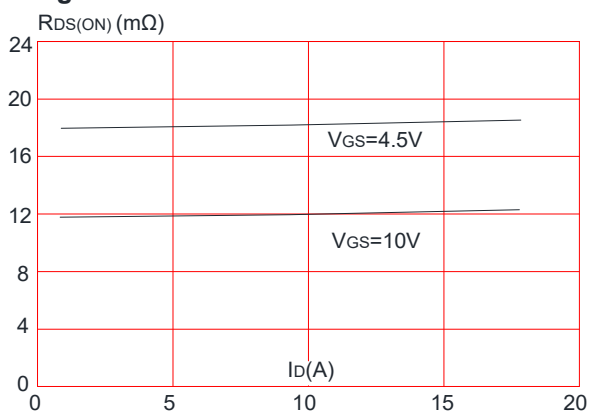


Figure 4: Body Diode Characteristics

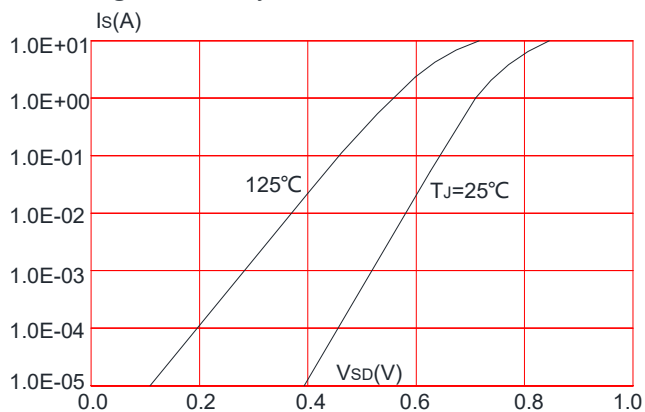


Figure 5: Gate Charge Characteristics

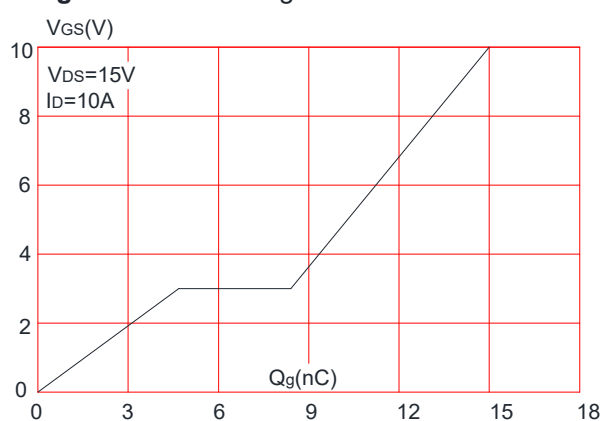


Figure 6: Capacitance Characteristics

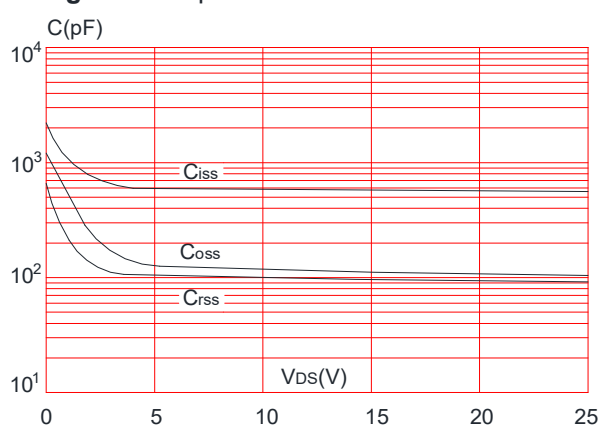


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

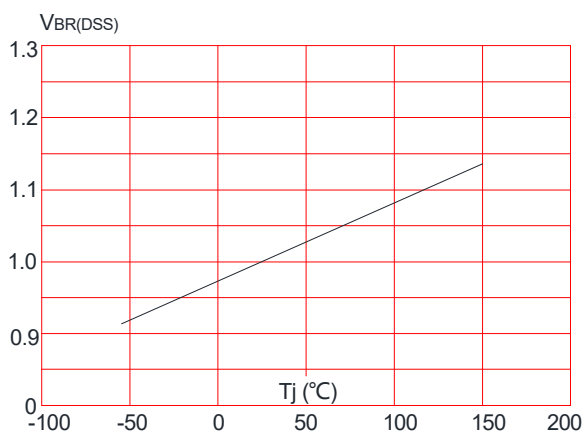


Figure 8: Normalized on Resistance vs. Junction Temperature

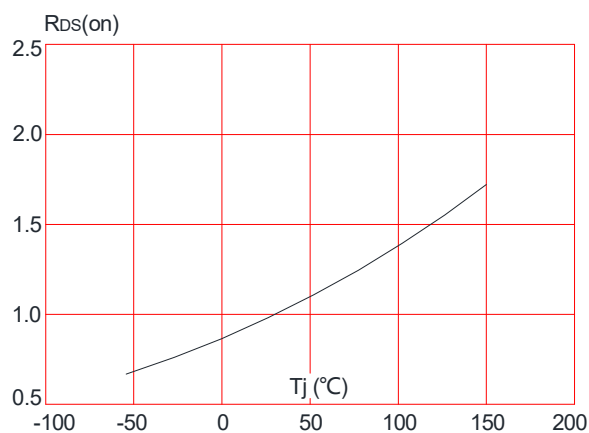


Figure 9: Maximum Safe Operating Area

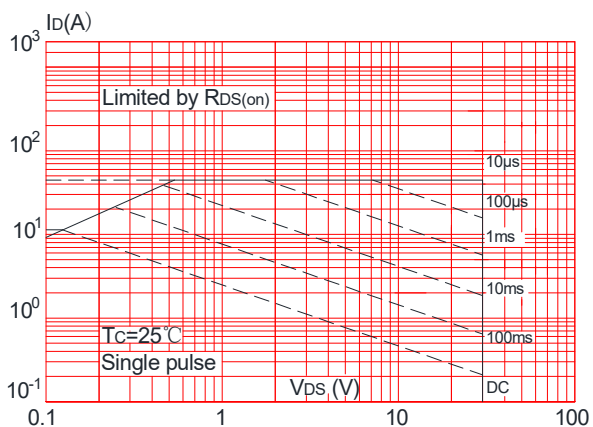


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

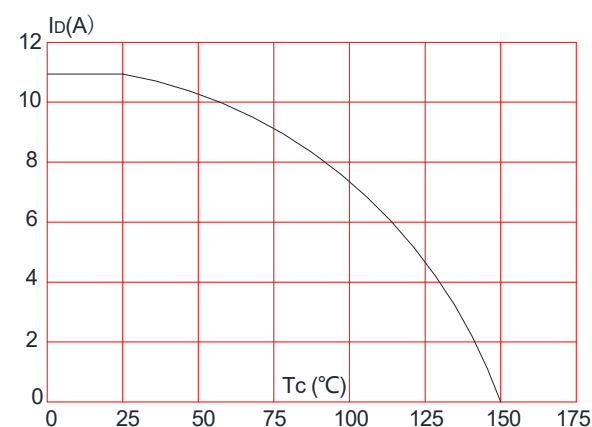
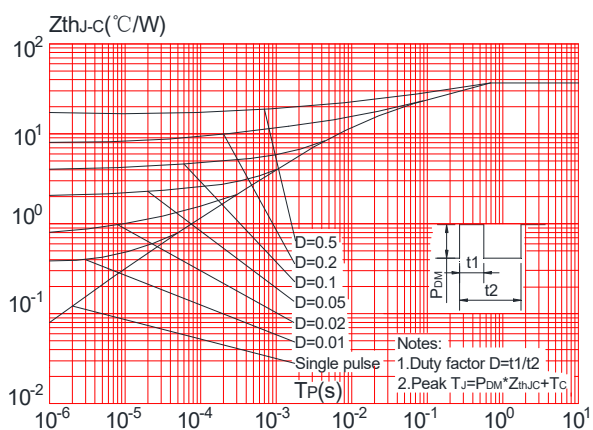


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit-N

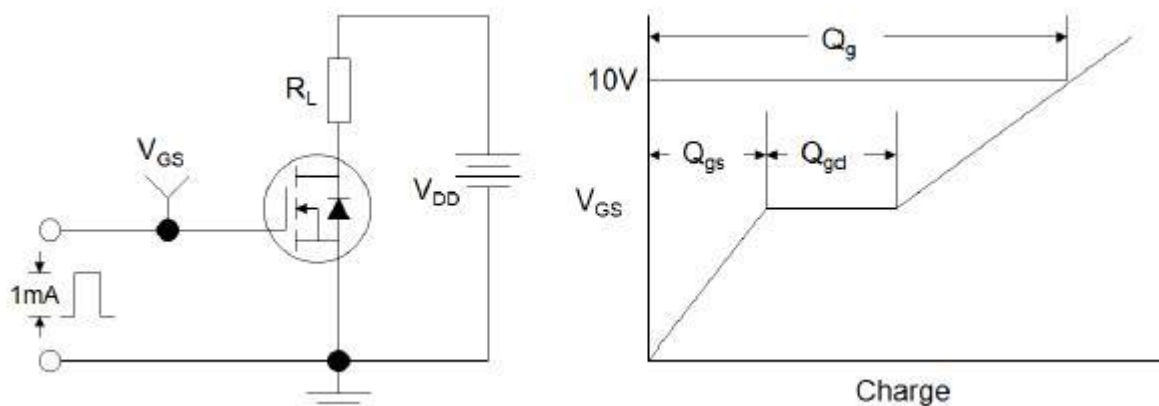


Figure1:Gate Charge Test Circuit & Waveform

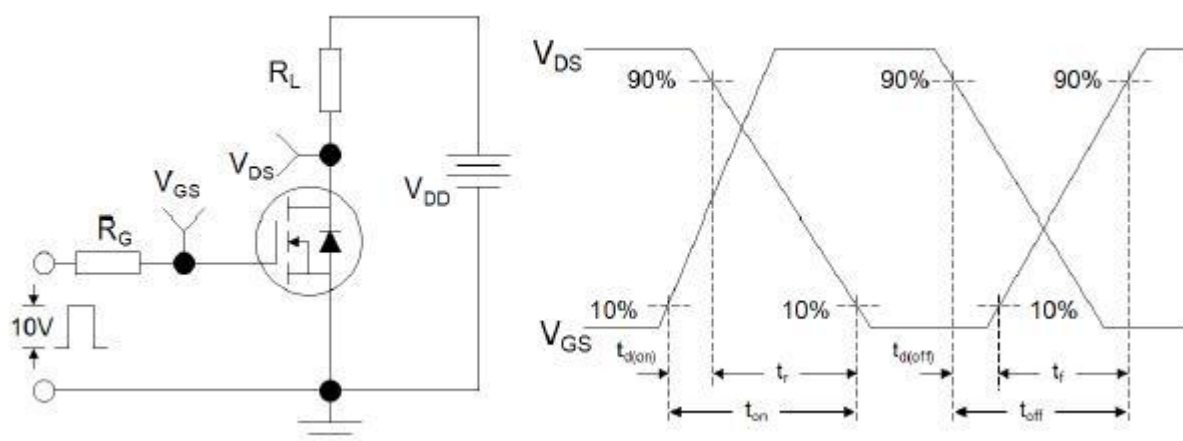


Figure 2: Resistive Switching Test Circuit & Waveforms

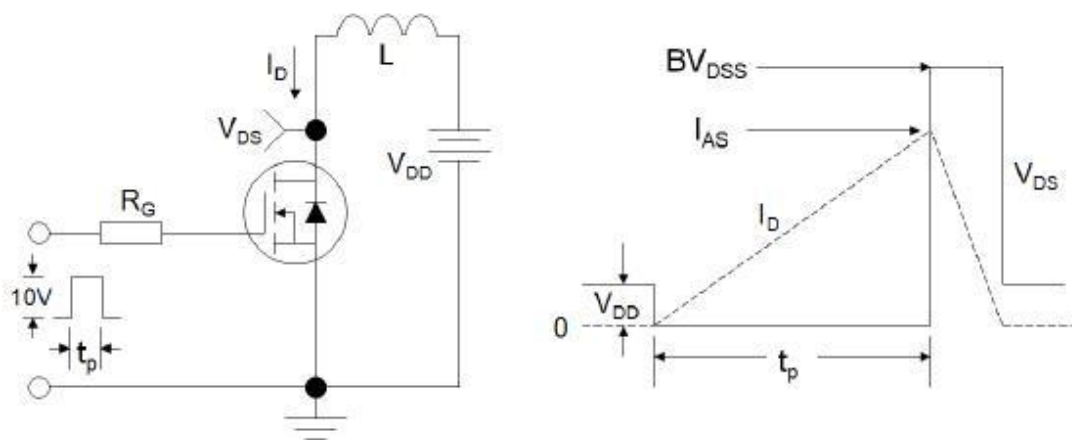


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics-P

Figure1: Output Characteristics

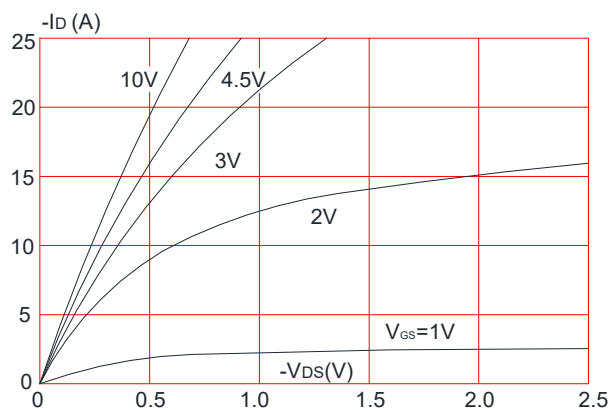


Figure 2: Typical Transfer Characteristics

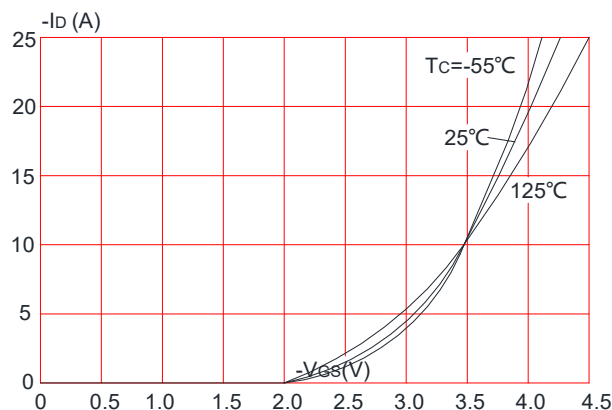


Figure 3: On-resistance vs. Drain Current

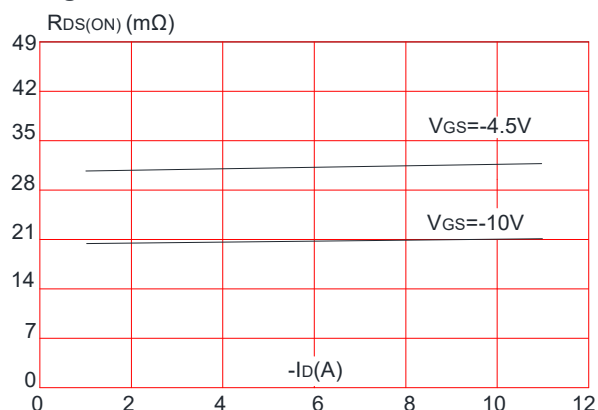


Figure 4: Body Diode Characteristics

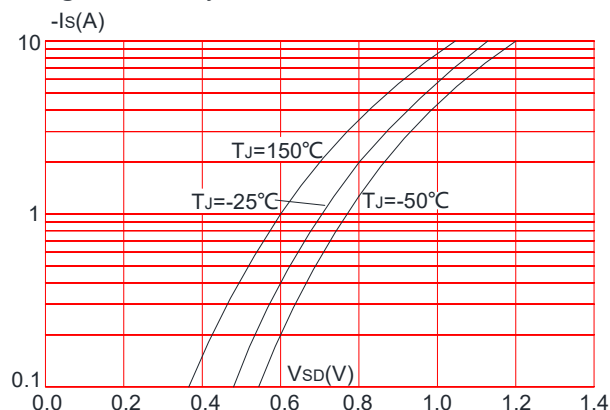


Figure 5: Gate Charge Characteristics

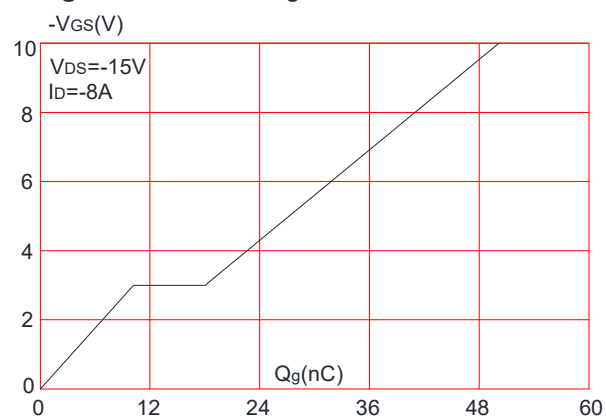


Figure 6: Capacitance Characteristics

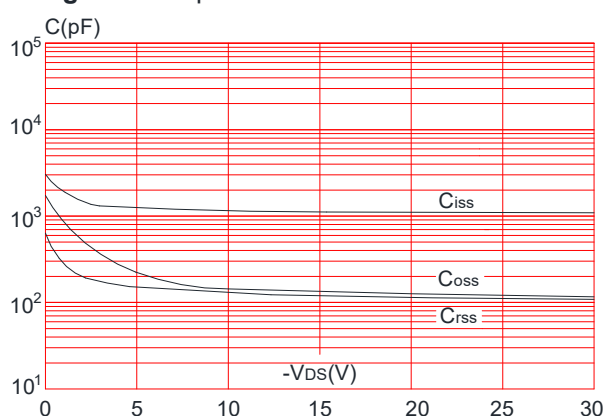


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

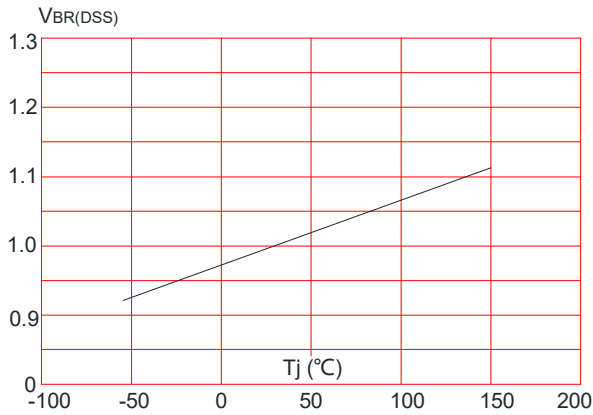


Figure 8: Normalized on Resistance vs. Junction Temperature

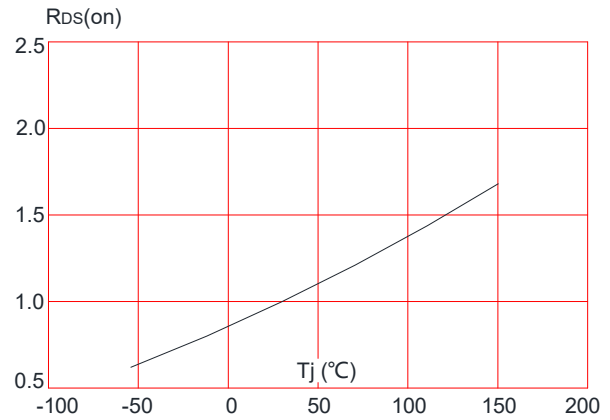


Figure 9: Maximum Safe Operating Area

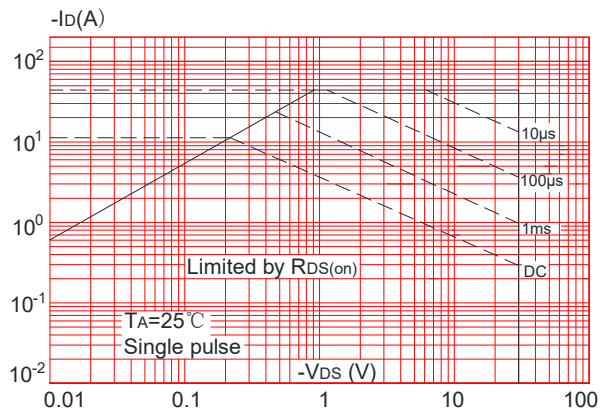


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

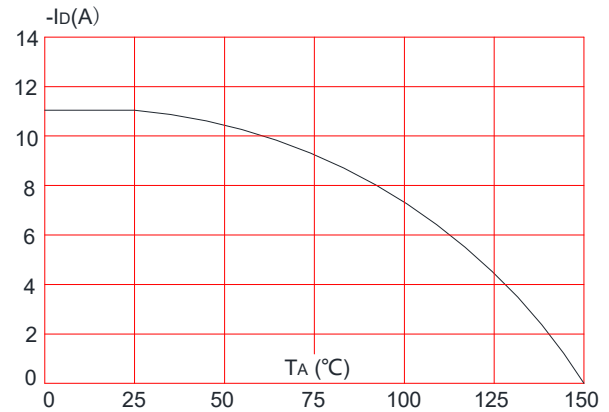
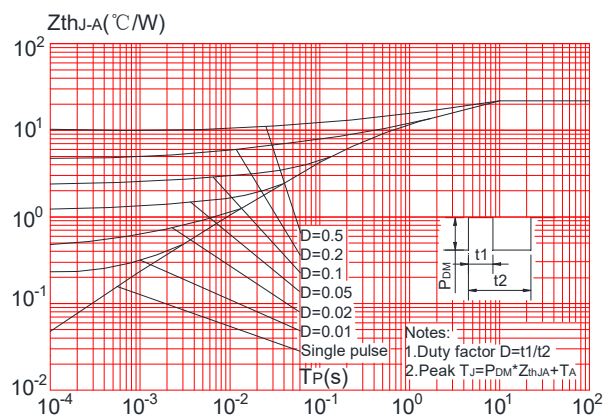
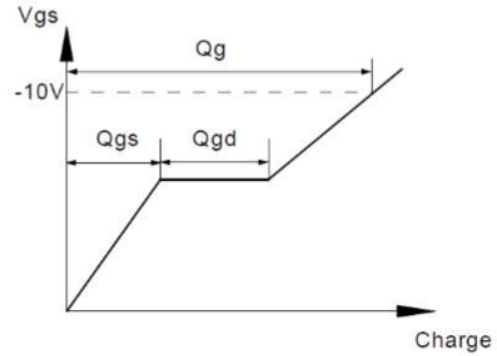
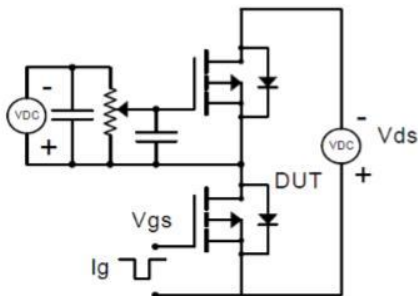


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

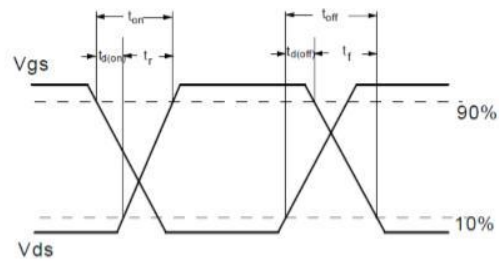
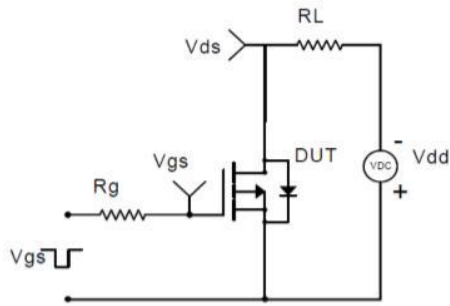


Test Circuit-P

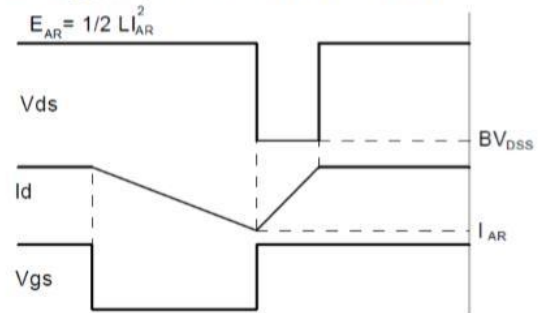
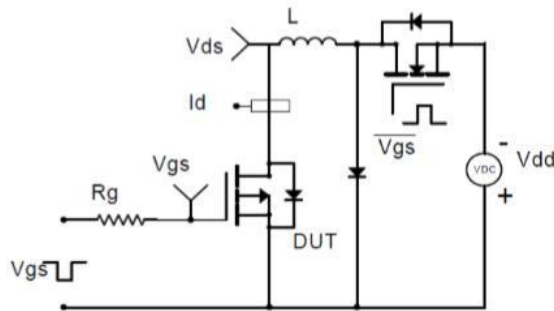
Gate Charge Test Circuit & Waveform



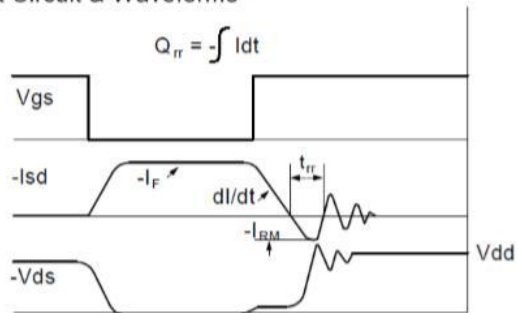
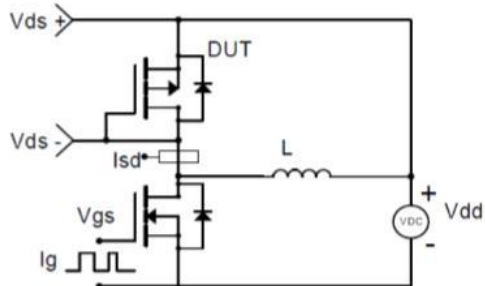
Resistive Switching Test Circuit & Waveforms



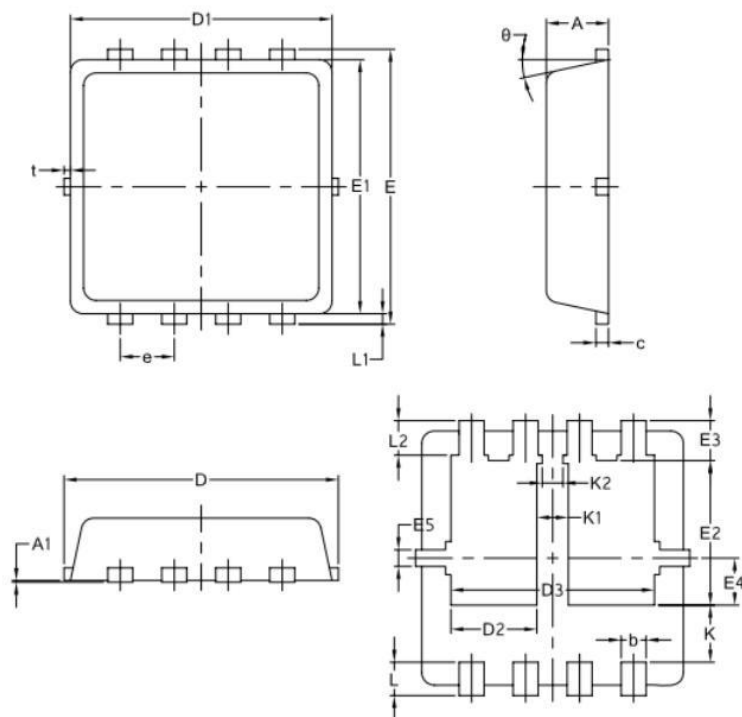
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

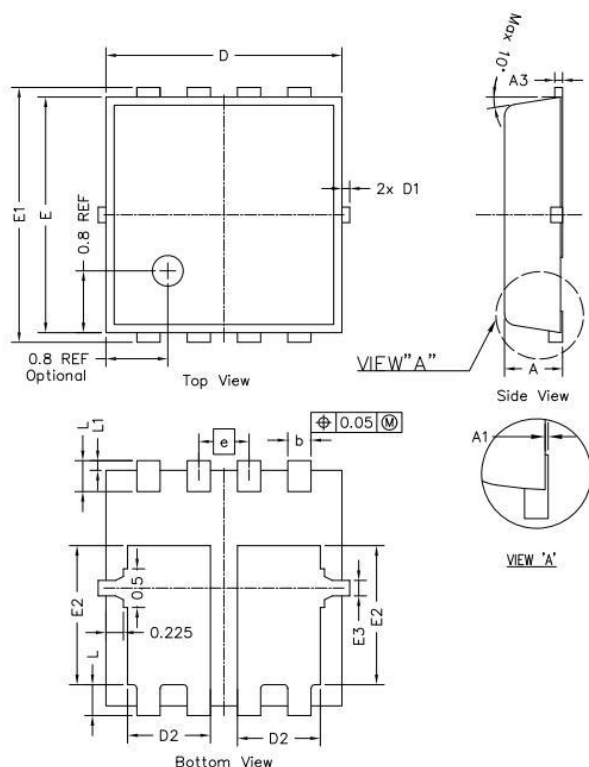


Package Mechanical Data-PDFN3x3-8L-D-Type A



SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
θ	10°	12°	14°

Package Mechanical Data-PDFN3x3-8L-D-Type B



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	----	----	0.002
A3	0.144	0.152	0.202	0.006	0.006	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65 BSC			0.026 BSC		
D	2.950	3.050	3.150	0.116	0.120	0.124
E	2.950	3.050	3.150	0.116	0.120	0.124
D1	---	---	0.125	----	----	0.005
E1	3.200	3.300	3.400	0.126	0.130	0.134
D2	0.970	1.070	1.170	0.038	0.042	0.046
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	0.150	0.200	0.250	0.006	0.008	0.010
L	0.300	0.400	0.500	0.012	0.016	0.020
L1	0.075	0.125	0.175	0.003	0.005	0.007



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