



## Description

### JMT N And P-Channel Enhancement Mode MOSFET

#### Features

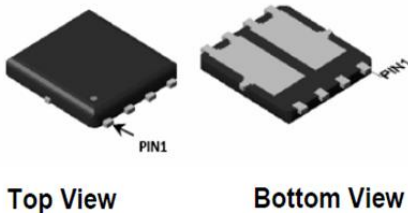
- N-Channel: 30V, 11A  
 $R_{DS(ON)} < 17m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 28m\Omega @ V_{GS} = 4.5V$
- P-Channel: -30V, -11A  
 $R_{DS(ON)} < 21m\Omega @ V_{GS} = -10V$   
 $R_{DS(ON)} < 32m\Omega @ V_{GS} = -4.5V$
- Excellent Gate Charge x  $R_{DS(ON)}$  Product(FOM)
- Very Low On-resistance  $R_{DS(ON)}$
- Fast Switching Speed

#### Application

- Battery Protection
- Load Switch
- Power Management



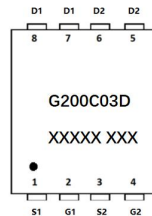
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



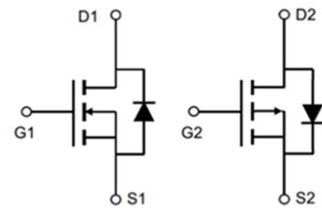
Top View

Bottom View

PDFN5x6-8L-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)
G200C03D	JMTG200C03D	TAPING	PDFN5x6-8L-D	13inch	2500	25000

## Absolute Maximum Ratings (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Parameter	Max. N-Channel	Max. P-Channel	Units
V <sub>DSS</sub>	Drain-Source Voltage	30	-30	V
V <sub>GSS</sub>	Gate-Source Voltage	±20	±20	V
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> = 25°C	-11	A
		T <sub>C</sub> = 100°C	-7.2	A
I <sub>DM</sub>	Pulsed Drain Current <sup>note1</sup>	44	-44	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy <sup>note2</sup>	9	30	mJ
P <sub>D</sub>	Power Dissipation	T <sub>C</sub> = 25°C	21	W
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	7.8	6.0	°C/W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to +150		°C



## N-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note2</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	-	13	17	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	-	20	28	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	490	-	pF
C <sub>oss</sub>	Output Capacitance		-	79	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	61	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =5.8A, V <sub>GS</sub> =10V	-	10	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.7	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	2	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V, R <sub>REN</sub> =3Ω	-	6	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	16	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	15	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	6	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	11	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	44	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =11A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =5A,	-	7	-	ns
Qrr	Body Diode Reverse Recovery	di/dt=100A/μs	-	2	-	nC

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

2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=6A

T<sub>J</sub>=25°C, V<sub>DD</sub>= -15V, V<sub>G</sub>= -10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>= -11A

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



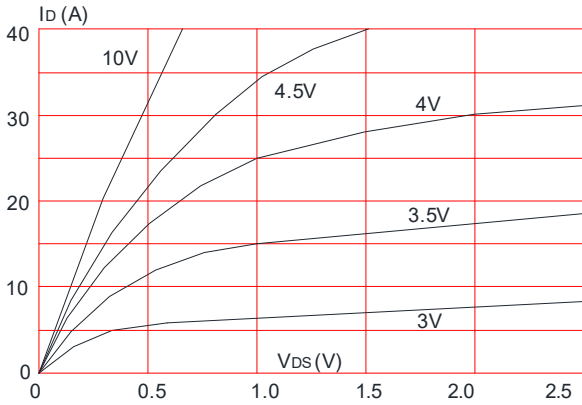
## P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	-30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V,	-	-	-1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.5	-2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A	-	16	21	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A	-	23	32	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V, V <sub>GS</sub> =0V, f=1.0MHz	-	1432	-	pF
C <sub>oss</sub>	Output Capacitance		-	186	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	147	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -15V, I <sub>D</sub> = -9.1A, V <sub>GS</sub> = -10V	-	28	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	6	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -15V, I <sub>D</sub> = -6A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> =2.5Ω	-	9	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	36	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	34	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	43	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-11	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-44	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -11A	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-11A,	-	14	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=-100A/μs	-	6	-	nC

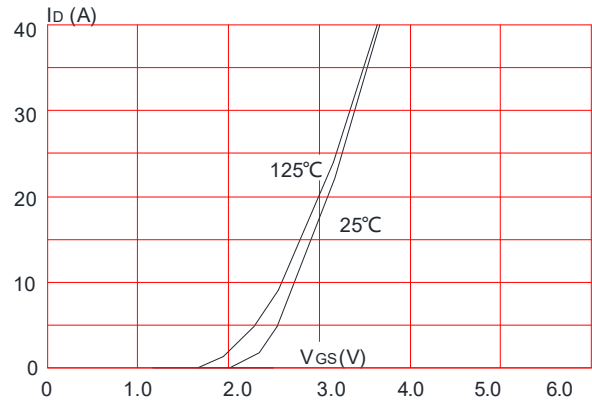


## Typical Performance Characteristics-N

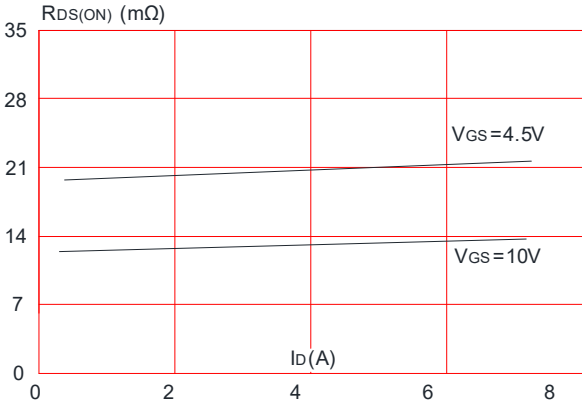
**Figure 1: Output Characteristics**



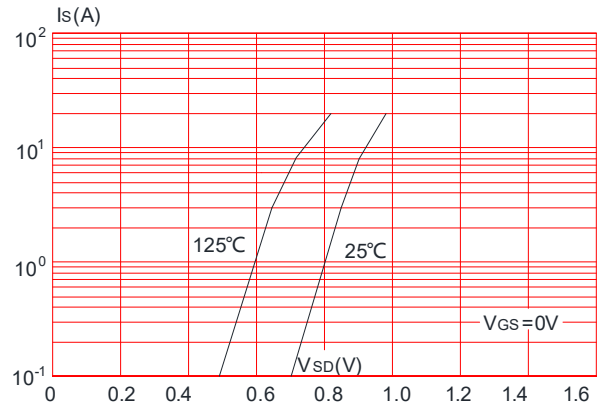
**Figure 2: Typical Transfer Characteristics**



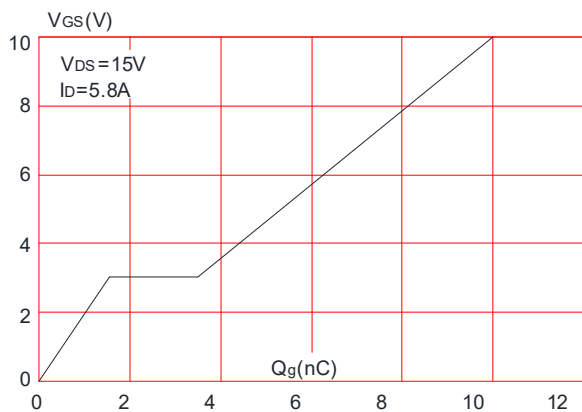
**Figure 3: On-resistance vs. Drain Current**



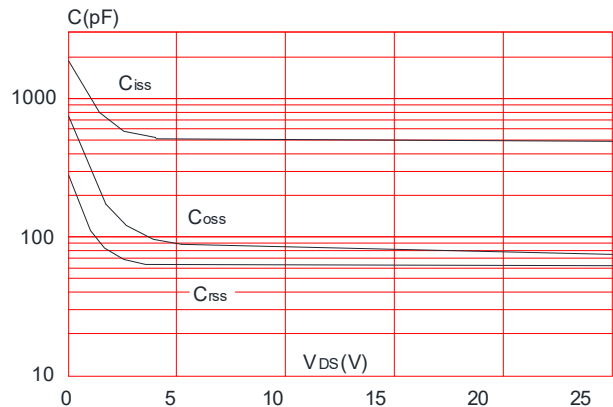
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

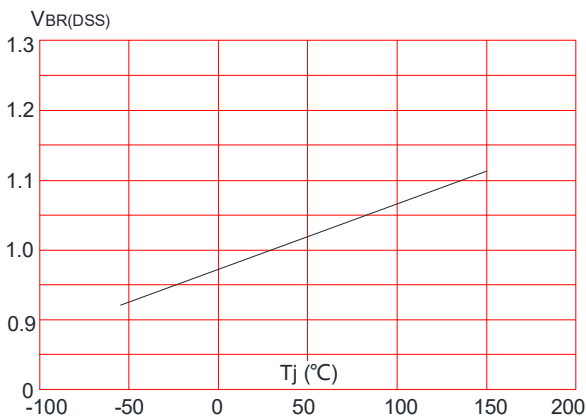


**Figure 6: Capacitance Characteristics**

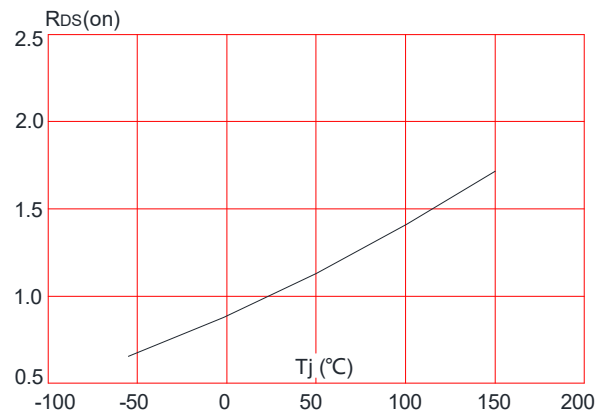




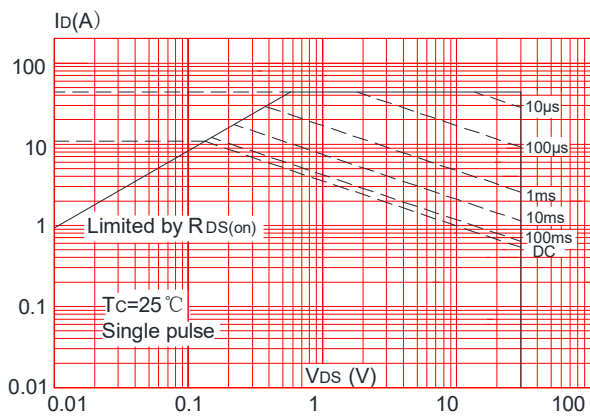
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



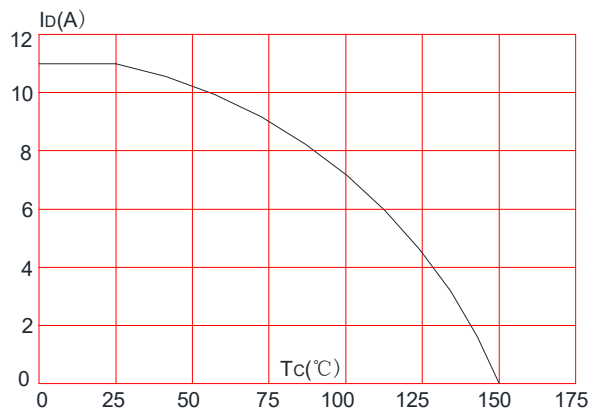
**Figure 8:** Normalized on Resistance vs. Junction Temperature



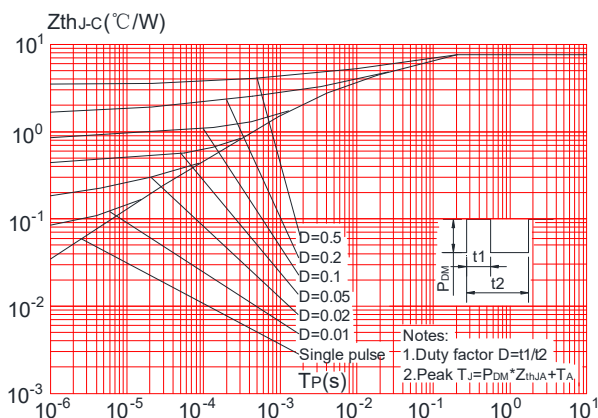
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



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



## Test Circuit-N

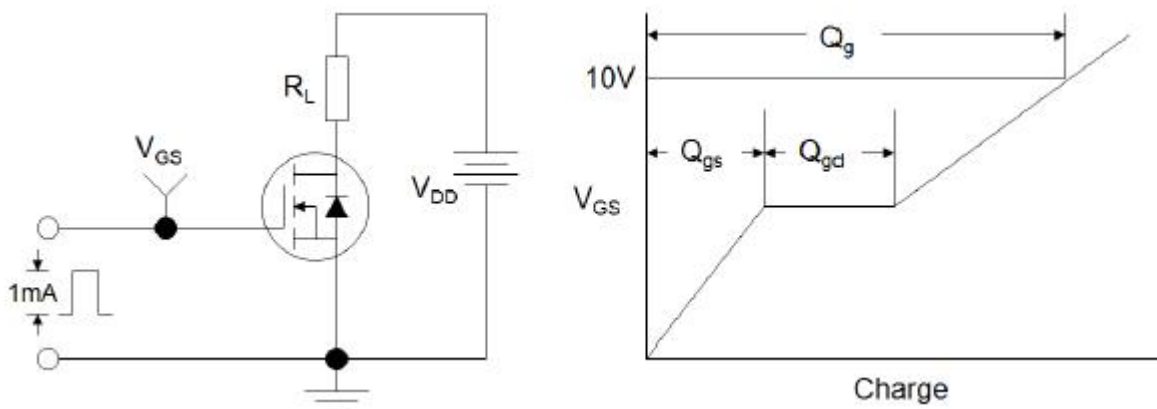


Figure1:Gate Charge Test Circuit & Waveform

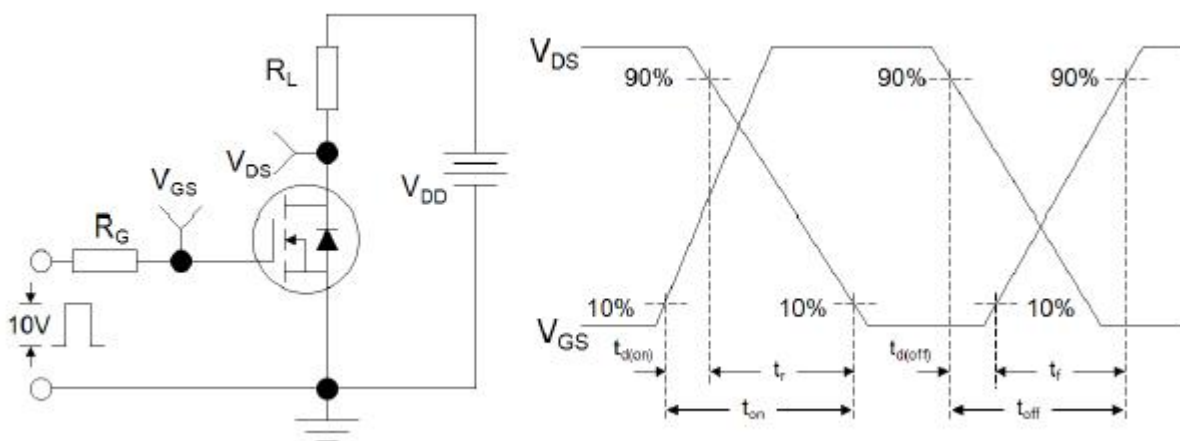


Figure 2: Resistive Switching Test Circuit & Waveforms

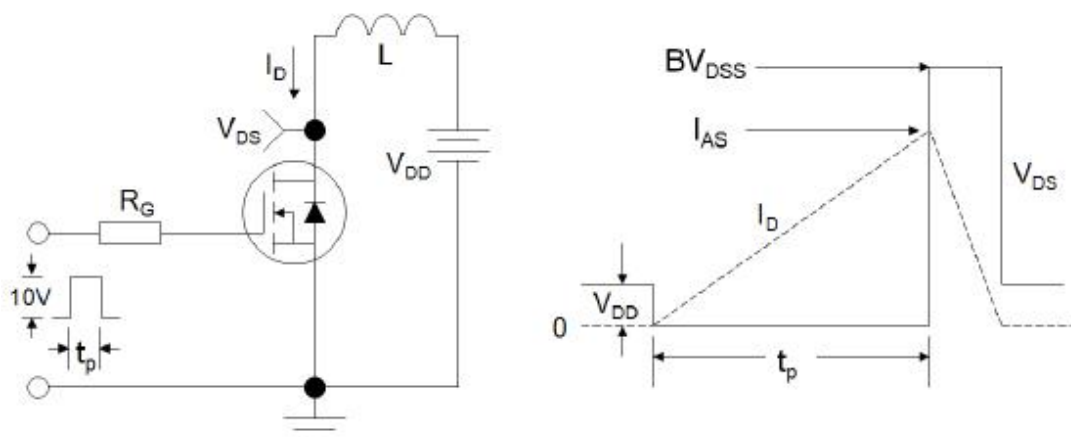
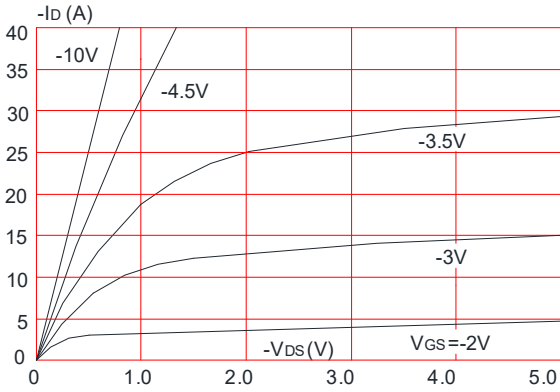


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

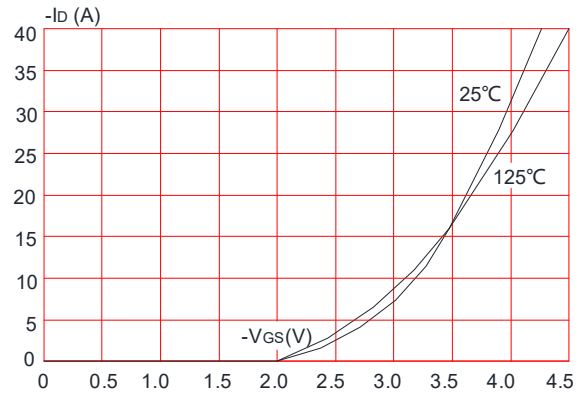


## Typical Performance Characteristics-P

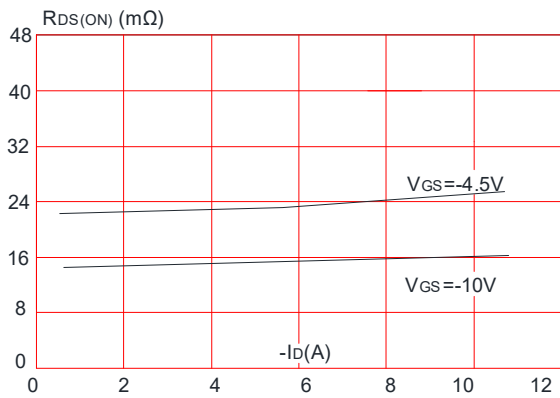
**Figure 1:** Output Characteristics



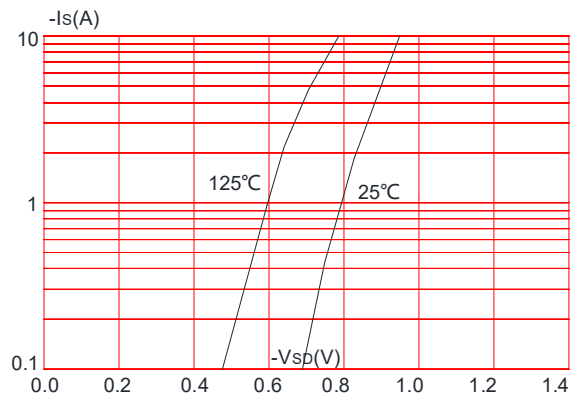
**Figure 2:** Typical Transfer Characteristics



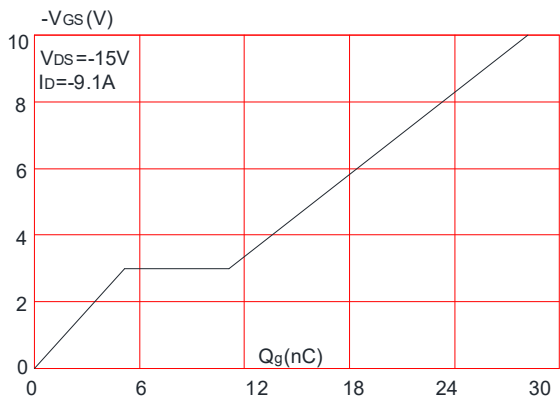
**Figure 3:** On-resistance vs. Drain Current



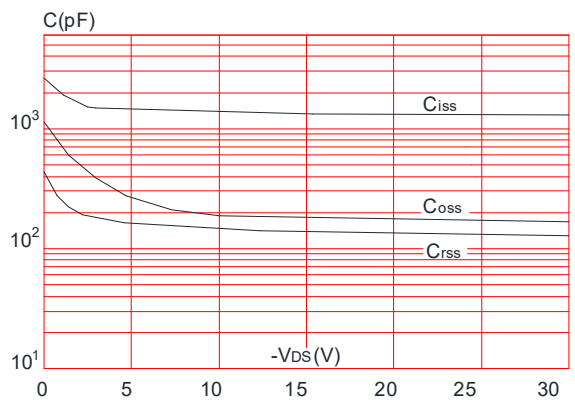
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

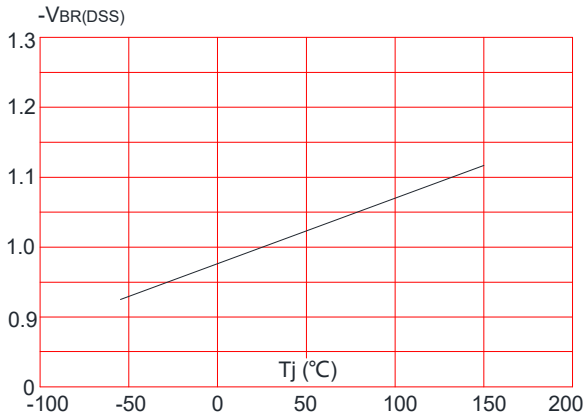


**Figure 6:** Capacitance Characteristics

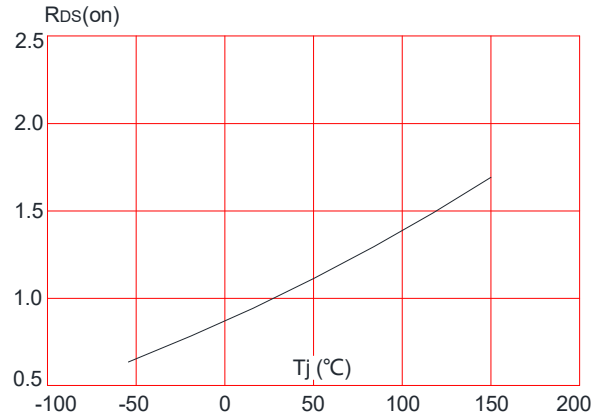




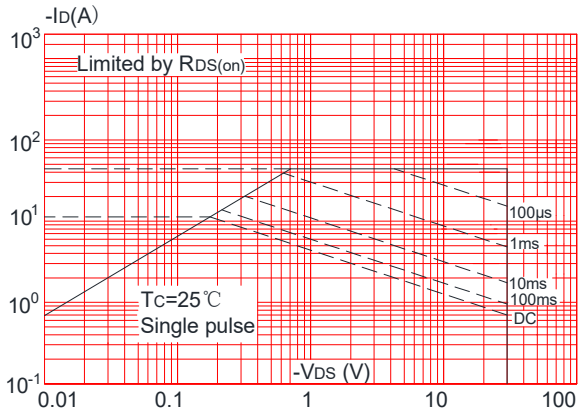
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



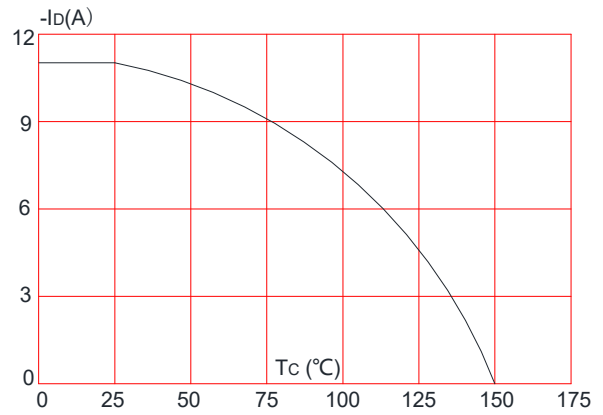
**Figure 8:** Normalized on Resistance vs. Junction Temperature



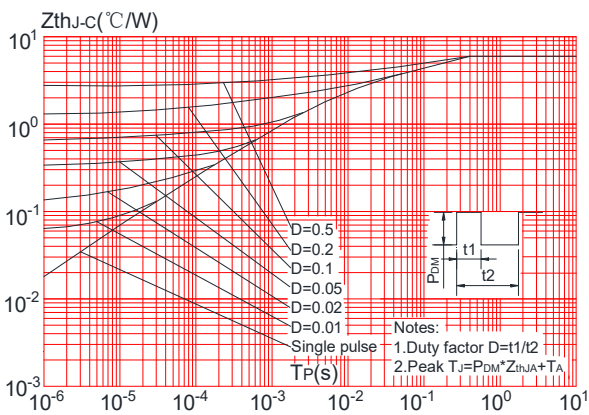
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



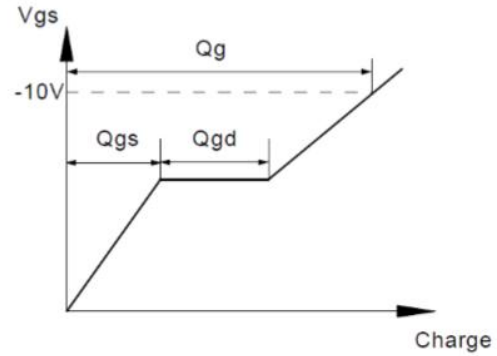
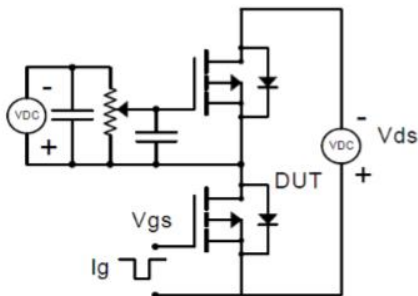
**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



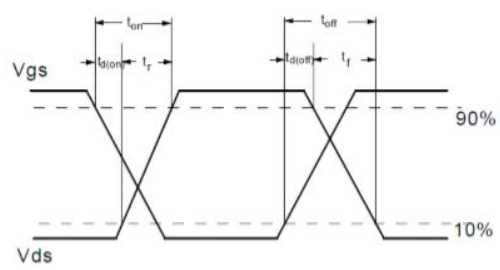
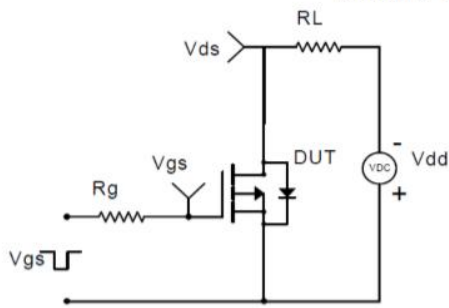


## Test Circuit-P

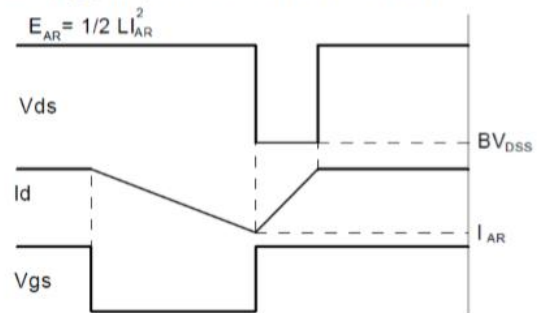
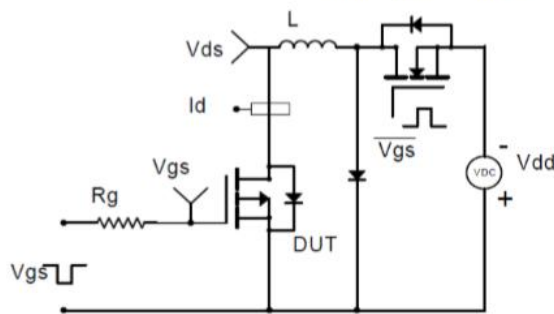
### Gate Charge Test Circuit & Waveform



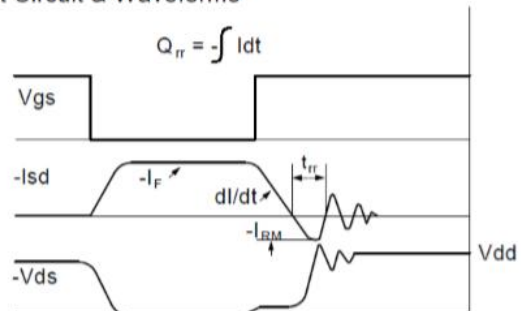
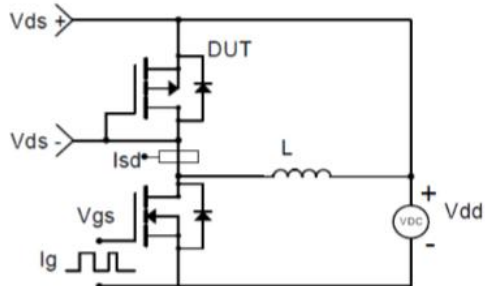
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

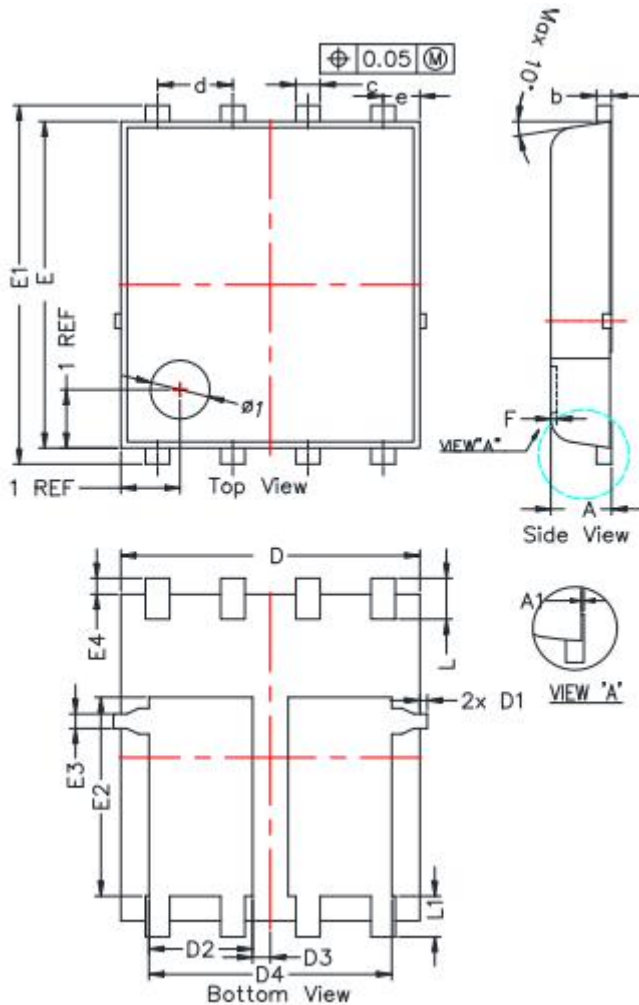


### Diode Recovery Test Circuit & Waveforms





## Package Mechanical Data-PDFN5x6-8L-D



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
* A	0.900	1.000	1.100	0.035	0.039	0.043
A1	0.000	---	0.050	0.000	----	0.002
b	0.246	0.254	0.312	0.010	0.010	0.012
* c	0.310	0.410	0.510	0.012	0.016	0.020
d	1.27 BSC			0.050 BSC		
* D	4.950	5.050	5.150	0.195	0.199	0.203
*D1	---	---	0.125	---	---	0.005
*D2	1.650	1.750	1.850	0.065	0.069	0.073
D3	0.200	0.300	0.400	0.008	0.012	0.016
D4	4.000	4.100	4.200	0.157	0.161	0.165
e	0.62 BSC			0.024 BSC		
* E	5.500	5.600	5.700	0.217	0.220	0.224
* E1	6.050	6.150	6.250	0.238	0.242	0.246
E2	3.310	3.410	3.510	0.130	0.134	0.138
E3	0.150	0.250	0.350	0.006	0.010	0.014
* E4	0.175	0.275	0.375	0.007	0.011	0.015
F	-	-	0.100	-	-	0.004
* L	0.500	0.600	0.700	0.02	0.02	0.03
L1	0.600	0.700	0.800	0.02	0.03	0.03

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