



Description

JMT N And P-Channel Enhancement Mode MOSFET

Features

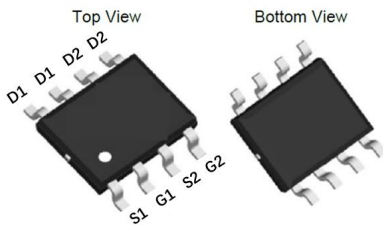
- N-Channel: 40V, 8A
 $R_{DS(ON)} < 22m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 35m\Omega @ V_{GS} = 4.5V$
- P-Channel: -40V, -6A
 $R_{DS(ON)} < 53m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 81m\Omega @ V_{GS} = -4.5V$
- Excellent Gate Charge x $R_{DS(ON)}$ Product(FOM)
- Very Low On-resistance $R_{DS(ON)}$
- Fast Switching Speed

Application

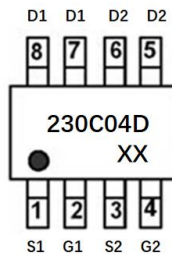
- Battery Protection
- Load Switch
- Power Management



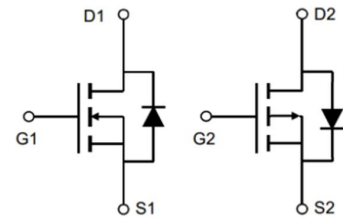
100% UIS TESTED!
100% ΔVds TESTED!



SOP-8



Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
230C04D	JMTP230C04D	TAPING	SOP-8	13inch	4000	48000

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

Symbol	Parameter	Max. N-Channel	Max. P-Channel	Units
V _{DSS}	Drain-Source Voltage	40	-40	V
V _{GSS}	Gate-Source Voltage	±20	±20	V
I _D	Continuous Drain Current	T _A = 25°C	-6	A
		T _A = 100°C	-3.9	A
I _{DM}	Pulsed Drain Current ^{note1}	32	-24	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}	13	17.6	mJ
P _D	Power Dissipation	2	3.2	W
R _{θJA}	Thermal Resistance, Junction to Ambient	62.5	39	°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	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	-	-	1.0	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 <small>note3</small>	V _{GS} =10V, I _D =8A	-	17	22	mΩ
		V _{GS} =4.5V, I _D =5A	-	25	35	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1.0MHz	-	633	-	pF
C _{oss}	Output Capacitance		-	67	-	pF
C _{rss}	Reverse Transfer Capacitance		-	58	-	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =8A, V _{GS} =10V	-	12	-	nC
Q _{gs}	Gate-Source Charge		-	3.2	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	3.1	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 20V, R _L =2.5Ω V _{GS} =10V, R _{REN} =3Ω	-	4	-	ns
t _r	Turn-on Rise Time		-	3	-	ns
t _{d(off)}	Turn-off Delay Time		-	15	-	ns
t _f	Turn-off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	8	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = 8A	-	-	1.2	V

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

2. EAS condition : T_J=25°C, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=7.2A

T_J=25°C, V_{DD}=-20V, V_G= -10V, L=0.5mH, R_g=25Ω, I_{AS}=-8.4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%



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	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -40V, 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	-1.6	-2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note3</small>	V _{GS} = -10V, I _D = -6A	-	41	53	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	58	81	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -20V, V _{GS} =0V, f=1.0MHz	-	860	-	pF
C _{oss}	Output Capacitance		-	87	-	pF
C _{rss}	Reverse Transfer Capacitance		-	70	-	pF
Q _g	Total Gate Charge	V _{DS} = -20V, I _D = -6A, V _{GS} = -10V	-	13	-	nC
Q _{gs}	Gate-Source Charge		-	3.8	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	3.1	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = -20V, R _L =2.3Ω V _{GS} =-10V, R _{REN} =6Ω	-	7.5	-	ns
t _r	Turn-on Rise Time		-	5.5	-	ns
t _{d(off)}	Turn-off Delay Time		-	19	-	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		-	-	-6	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-24	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -6A	-	-	-1.2	V



Typical Performance Characteristics-N

Figure 1: Output Characteristics

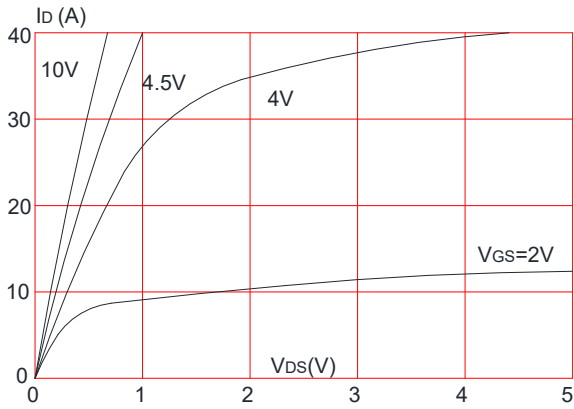


Figure 2: Typical Transfer Characteristics

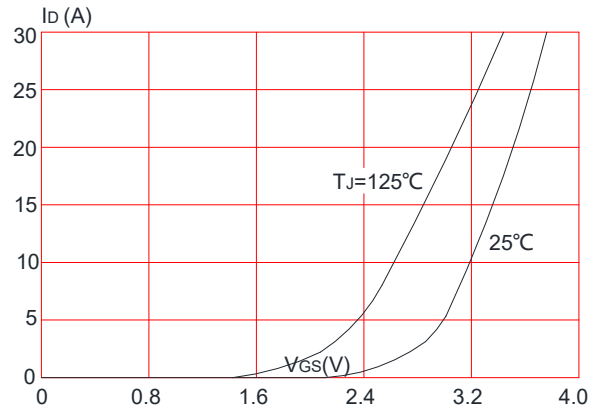


Figure 3: On-resistance vs. Drain Current

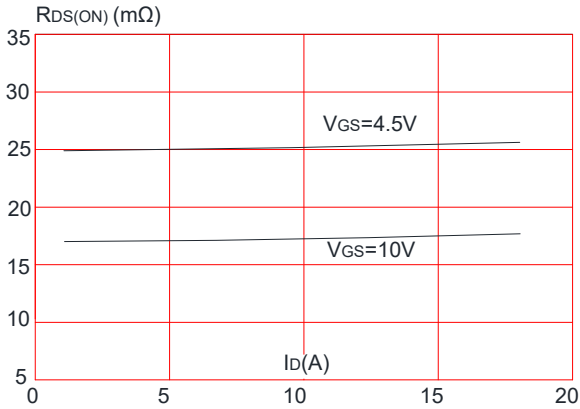


Figure 4: Body Diode Characteristics

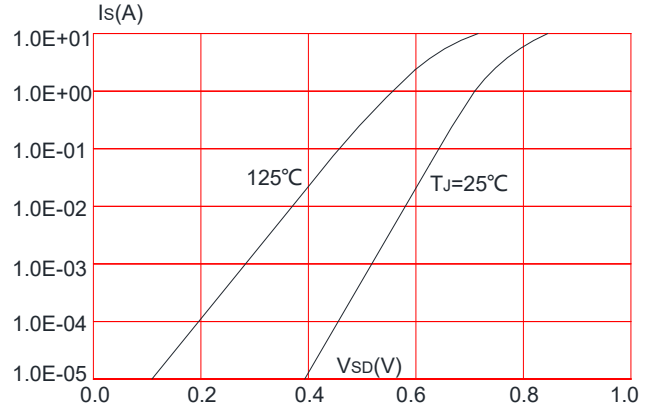


Figure 5: Gate Charge Characteristics

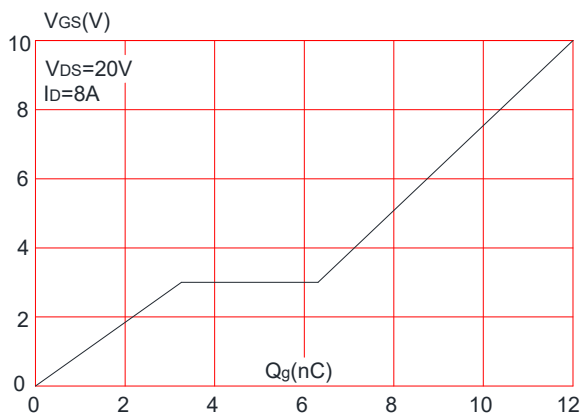


Figure 6: Capacitance Characteristics

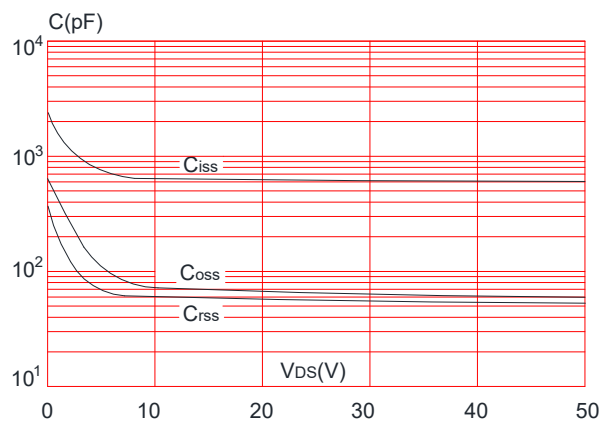




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

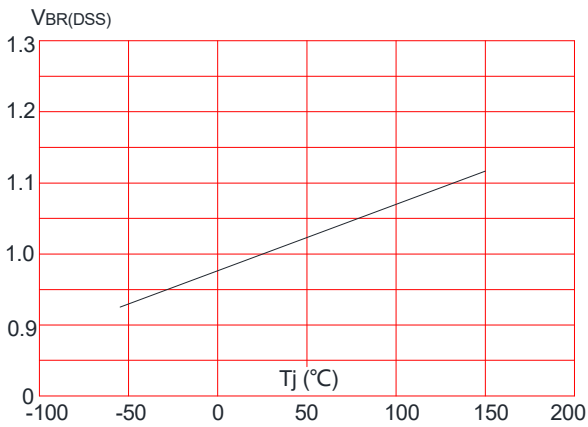


Figure 8: Normalized on Resistance vs. Junction Temperature

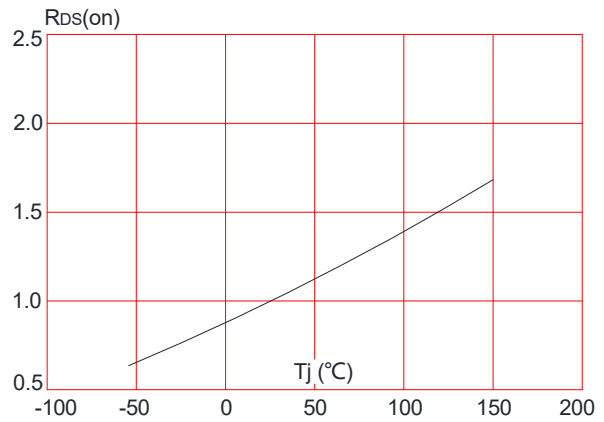


Figure 9: Maximum Safe Operating Area

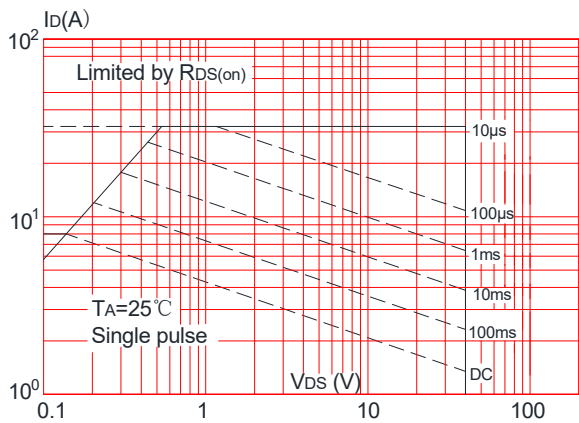


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

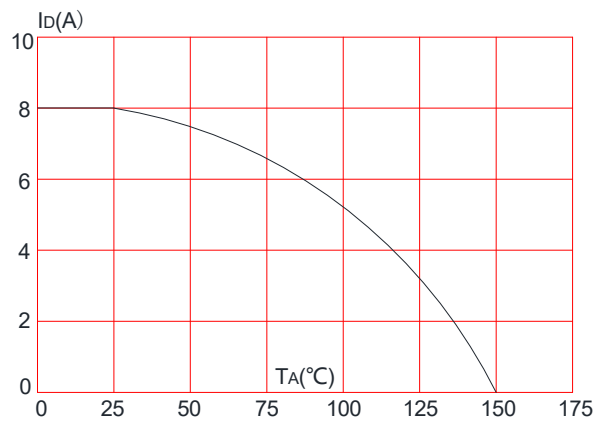
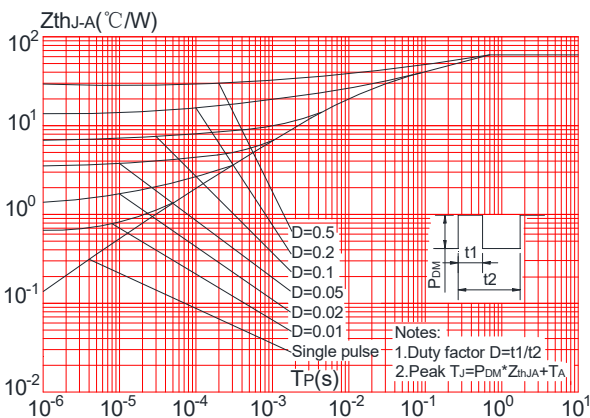


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit-N

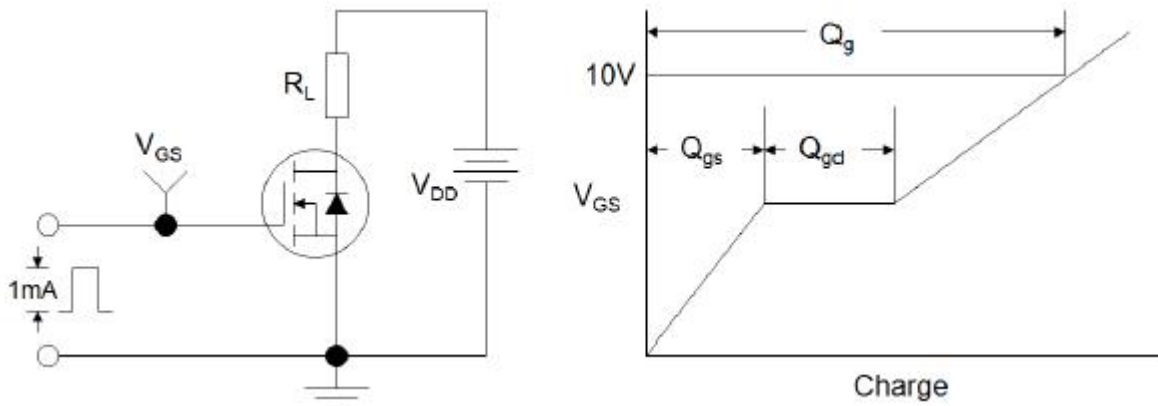


Figure1:Gate Charge Test Circuit & Waveform

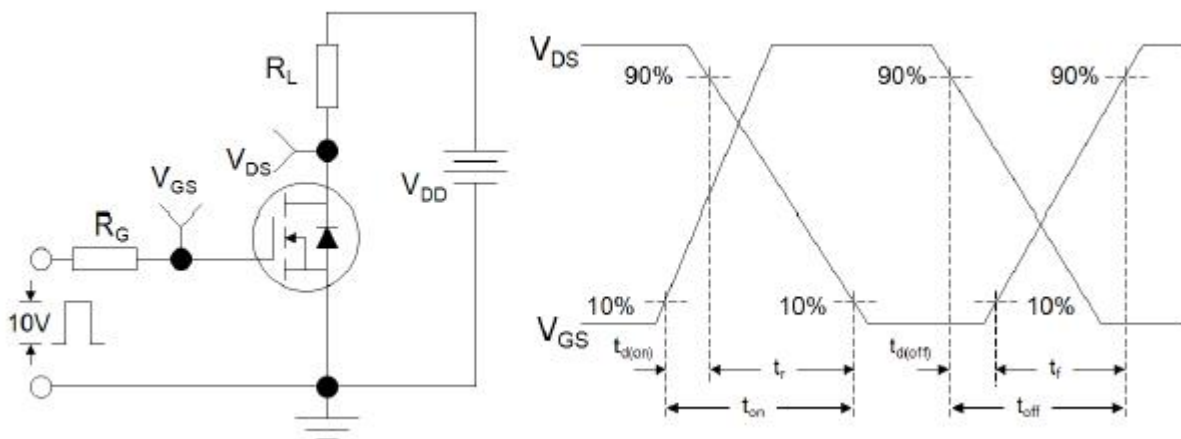


Figure 2: Resistive Switching Test Circuit & Waveforms

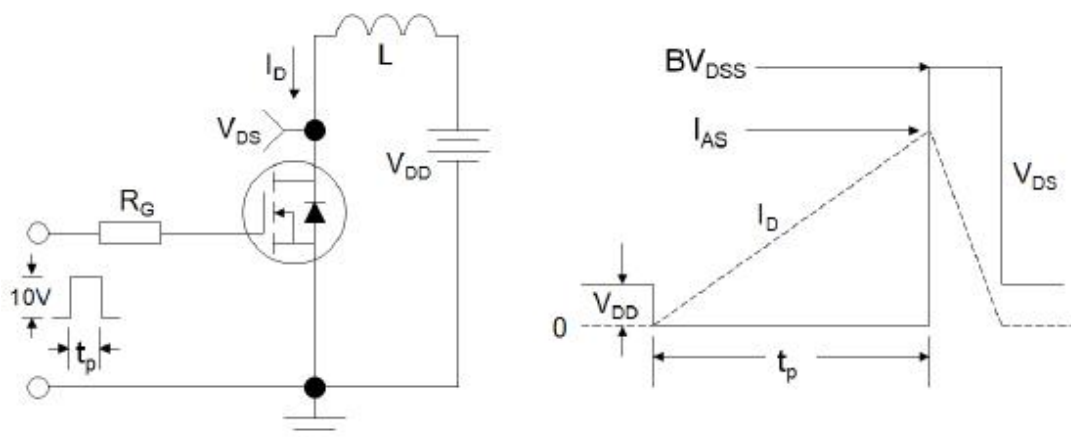


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics-P

Figure 1: Output Characteristics

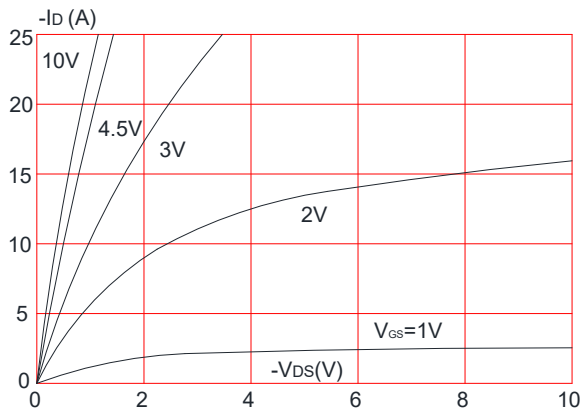


Figure 2: Typical Transfer Characteristics

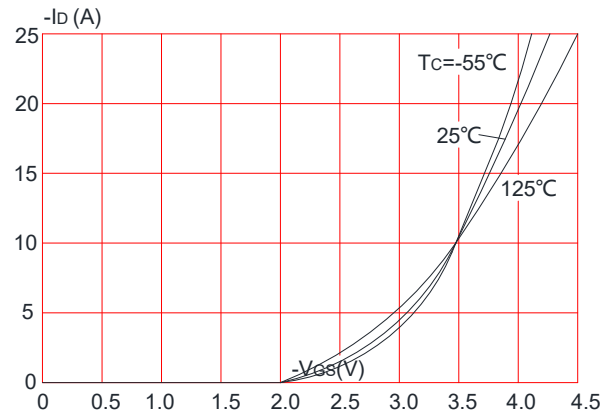


Figure 3: On-resistance vs. Drain Current

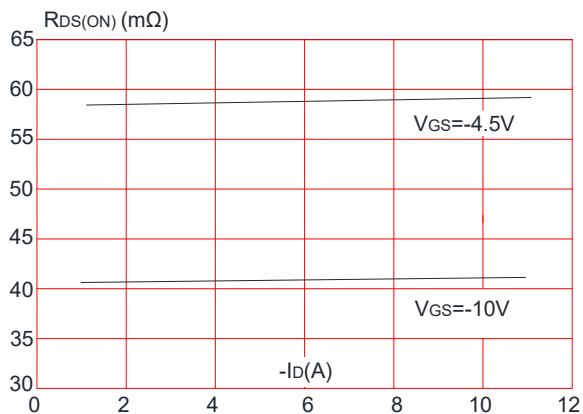


Figure 4: Body Diode Characteristics

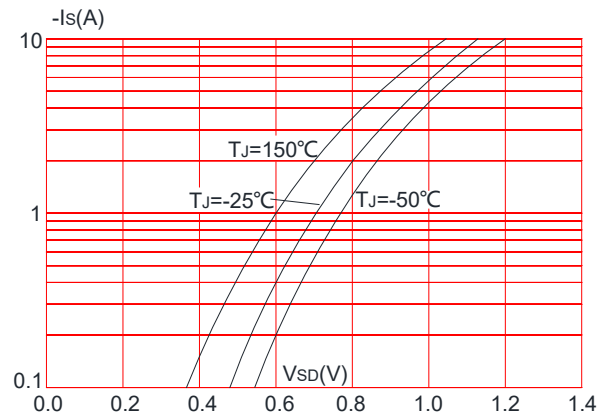


Figure 5: Gate Charge Characteristics

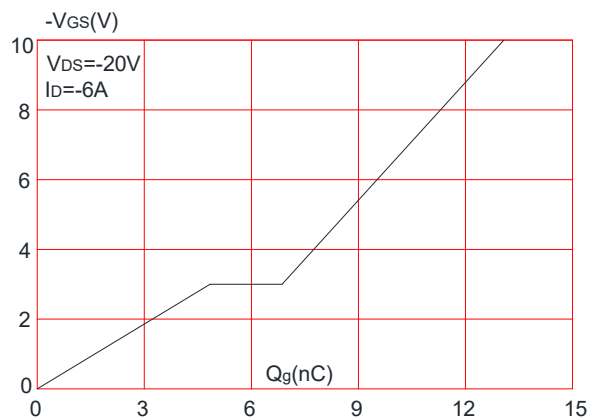


Figure 6: Capacitance Characteristics

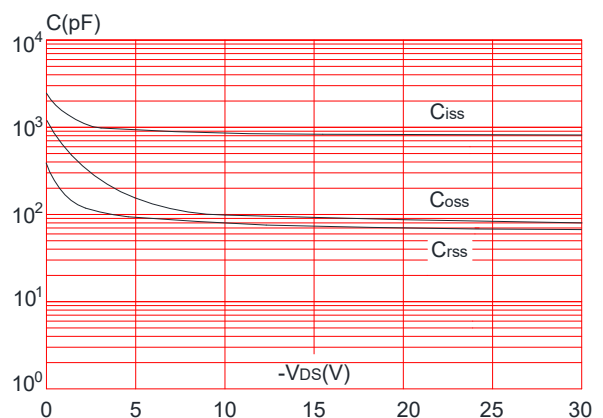




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

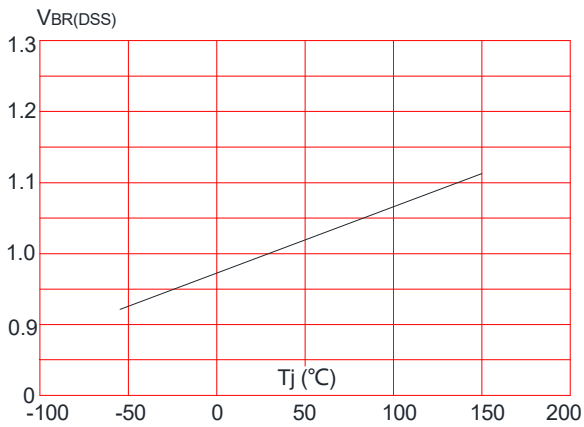


Figure 8: Normalized on Resistance vs. Junction Temperature

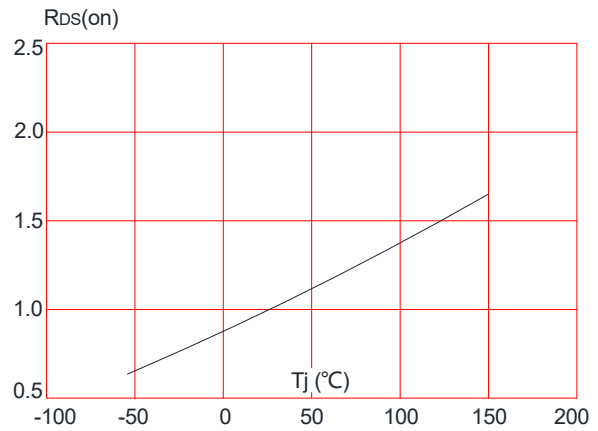


Figure 9: Maximum Safe Operating Area

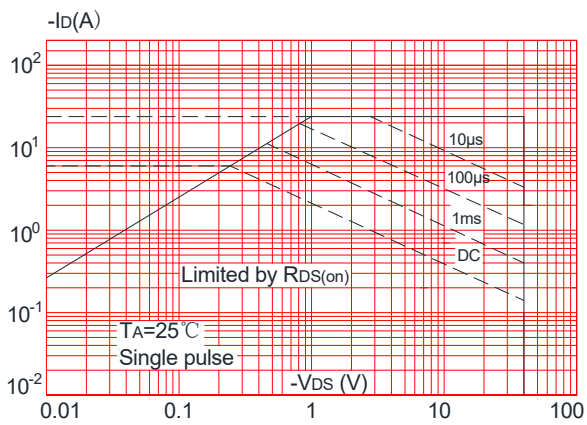


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

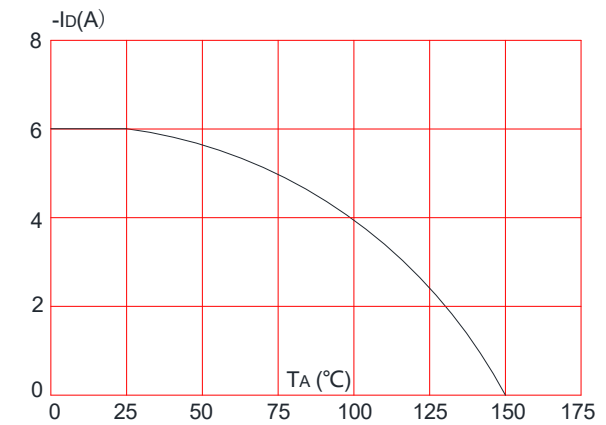
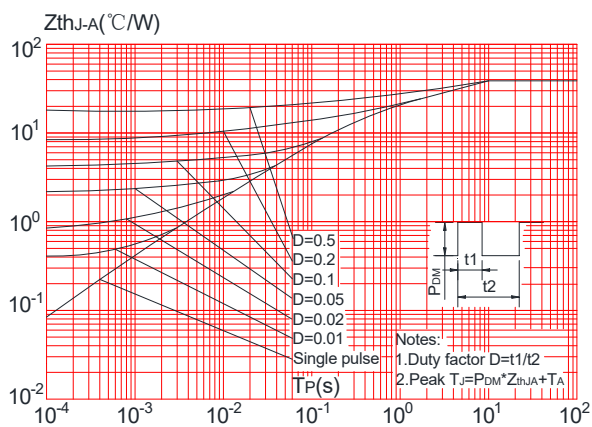
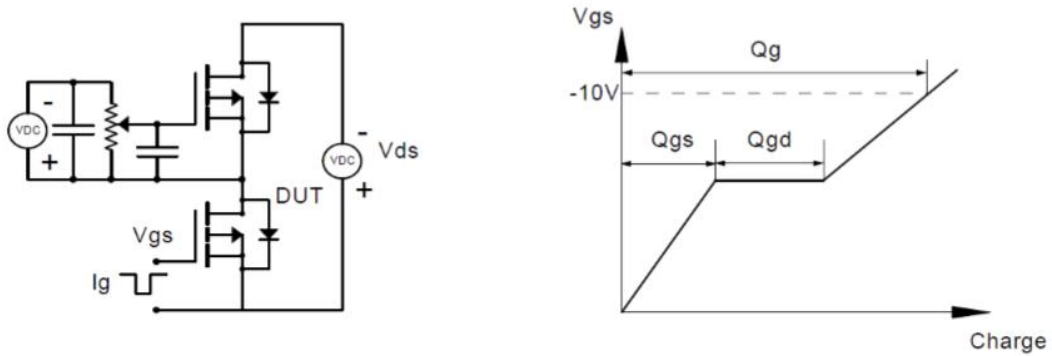


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

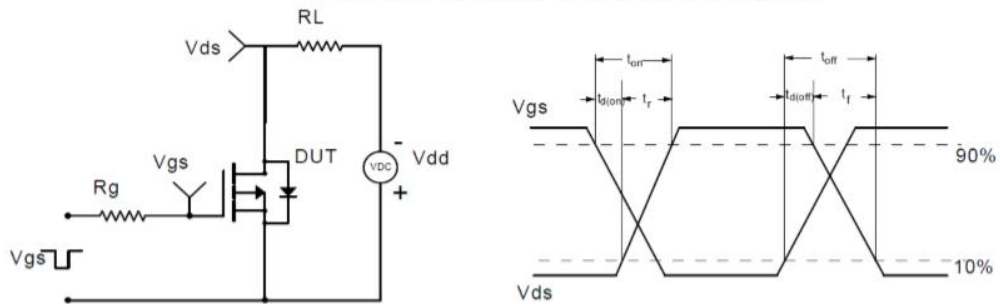


Test Circuit-P

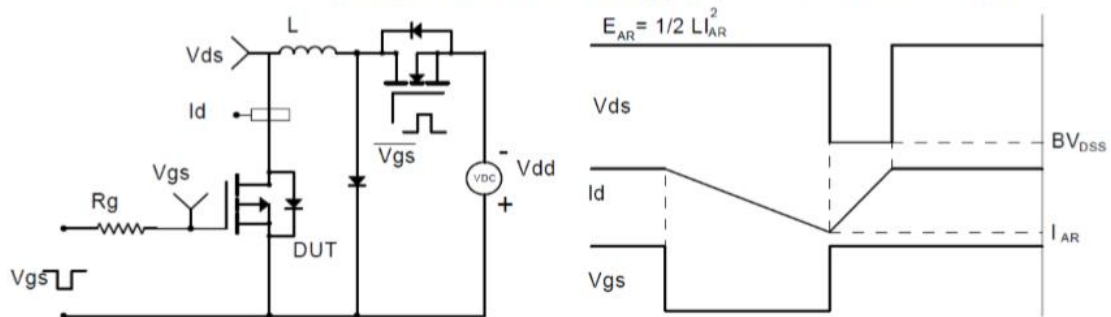
Gate Charge Test Circuit & Waveform



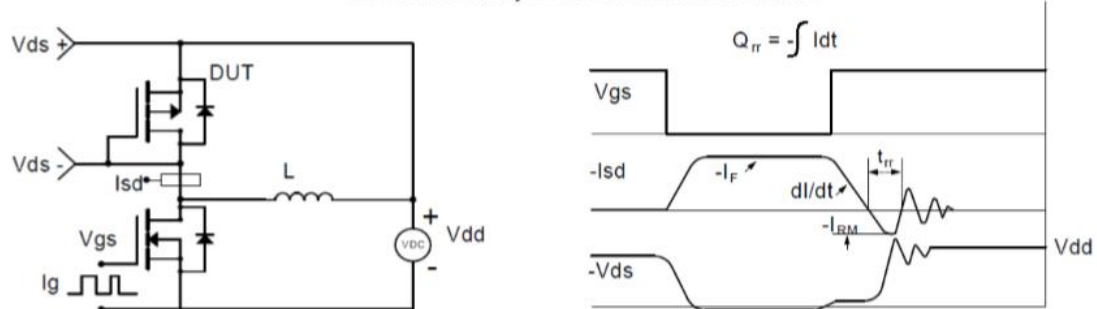
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

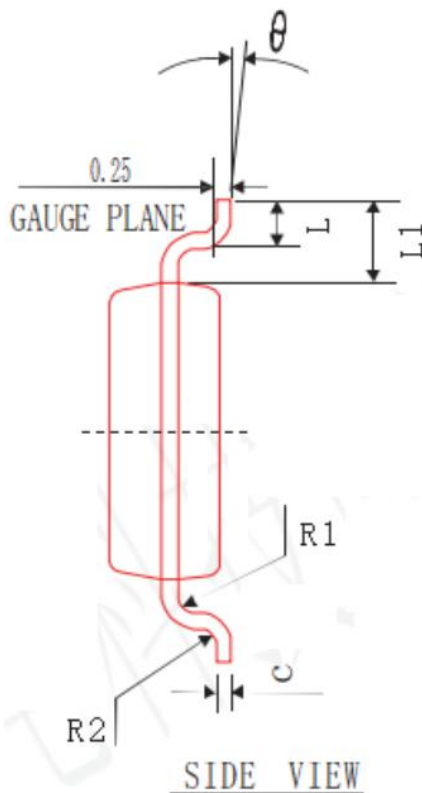
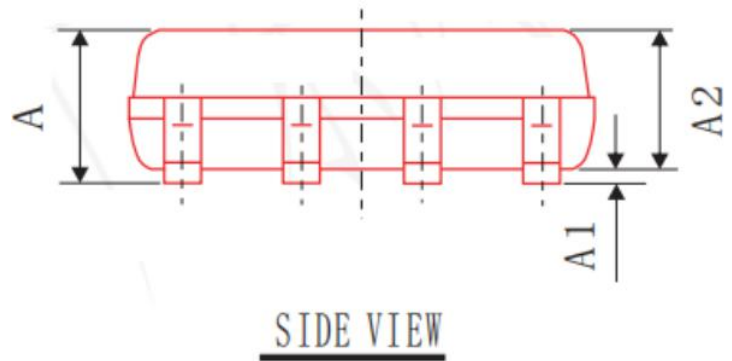
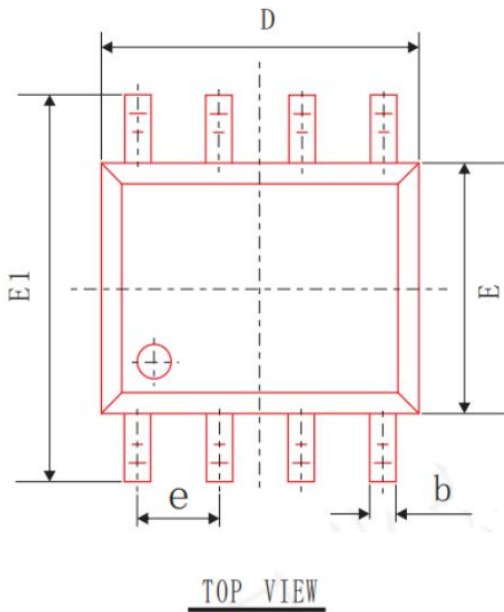


Diode Recovery Test Circuit & Waveforms





Package Mechanical Data-SOP-8




SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		



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