CRXSP160M120G2Q

SiC MOSFET 1200V, 160mΩ, 17A

Features

- Qualified according to AEC Q101
- CRM G2 SIC MOSFET Technology
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness
- Fast Reverse Recovery

Product Summary

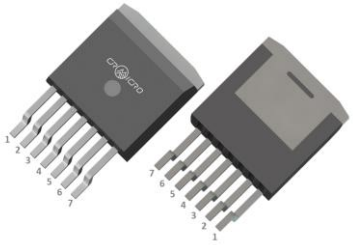
VDS	1200V
$R_{DS(on)\_typ}$	160mΩ
I_D	17A

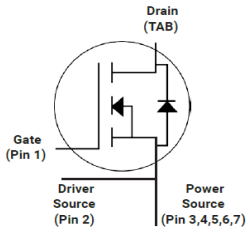
Applications

- Solar Inverters
- High Voltage DC/DC Converters
- On Board Charger(OBC)
- EV Charger

100% Avalanche Tested

RoHS HF





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Qty
CRXSP160M120G2Q	X160M120G2Q	TO-263-7	Reel	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DSmax}	1200	V
Continuous drain current V_{GS}=15V, T_C = 25°C V_{GS}=15V, T_C = 100°C	I_D	 17 12	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D(pulse)}$	43	A
Avalanche energy, single pulse (L=10mH, Rg=25Ω)	E_{AS}	210	mJ
Gate-Source voltage (dynamic)[a1]	V_{GSmax}	-10/+22	V
Gate-Source voltage (static)[a2]	V_{GSop}	-5/+18	V
Power dissipation (T_C=25°C,T_J=175°C)	P_D	92	W
Operating Junction and Storage Temperature	T_j,T_{stg}	-55…175	°C

a1: When using MOSFET Body Diode V_{GSmax} = -5V/+22V

a2: MOSFET can also safely operate at 0/+18 V

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	1.63	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	40	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	1200	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	1.8	-	3.6	V	V_{DS}=V_{GS},I_D=2.5mA
Zero gate voltage drain current	I_{DSS}	- -	1 10	100 -	μA	V_{DS}=1200V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	250	nA	V_{GS}=20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	160 304	208 -	mΩ	V_{GS}=15V, I_D=8.5A, T_j=25°C T_j=175°C
Transconductance	g_{fs}	-	6.6	-	S	V_{DS}=20V,I_{DS}=8.5A
Dynamic Characteristic						
Internal Gate resistance	$R_{G(int)}$	-	3.2	-	Ω	f=1MHz
Input Capacitance	C_{iss}	-	659	-	pF	V_{GS}=0V, V_{DS}=1000V, f=1MHz
Output Capacitance	C_{oss}	-	29.5	-		
Reverse Transfer Capacitance	C_{rss}	-	3.6	-		
Coss Stored Energy	E_{oss}	-	16.5	-	uJ	
Gate Total Charge	Q_g	-	36	-	nC	VGS=-5/15V VDS=800V ID=8.5A
Gate-Source charge	Q_{gs}	-	7.5	-		
Gate-Drain charge	Q_{gd}	-	15	-		
Turn-on delay time	$t_{d(on)}$	-	24	-	ns	VDD=800V,ID=8.5A VGS=-5V/15V, RG=10Ω，L=100uH
Rise time	t_r	-	15.8	-		
Turn-off delay time	$t_{d(off)}$	-	18.6	-		
Fall time	t_f	-	10	-		
Turn-On Switching Energy	$E_{(on)}$	-	174	-	uJ	
Turn Off Switching Energy	$E_{(off)}$	-	8.9	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	2.9	-	V	V_{GS}=0V,I_F=3.0A
		-	2.7	-	V	V_{GS}=0V,I_F=3.0A, T_j=175℃
Continuous Diode Forward Current	I_S	-	-	17	A	V_{GS}=0V
Diode pulse Current	$I_{S,pulse}$	-	-	43	A	pulse width t_P limited by Tjmax
Body Diode Reverse Recovery Time	t_{rr}	-	36	-	ns	di/dt=1000A/us IF=8.5A Vdd=800V Tj=25℃
Body Diode Reverse Recovery Charge	Q_{rr}	-	89	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	4.9	-	A	
Body Diode Reverse Recovery Time	t_{rr}	-	47	-	ns	di/dt=1000A/us IF=8.5A Vdd=800V Tj=175℃
Body Diode Reverse Recovery Charge	Q_{rr}	-	230	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	8.7	-	A	

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=-55℃)

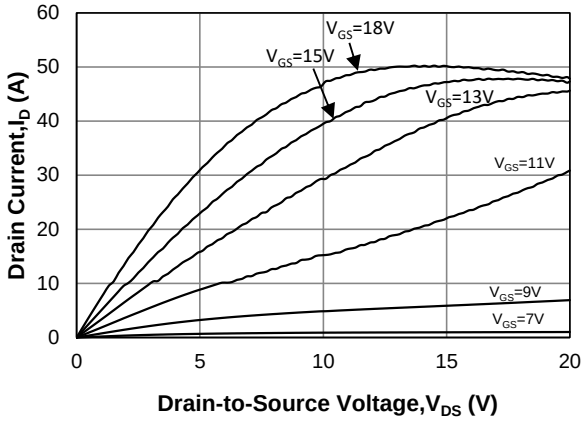


Fig 2. Output Characteristics (Tj=25℃)

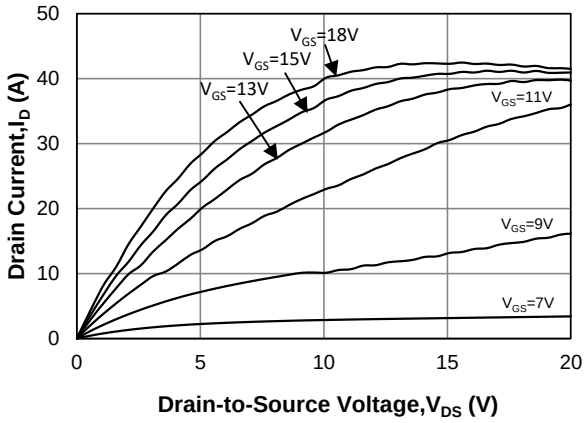


Fig 3. Output Characteristics (Tj=175℃)

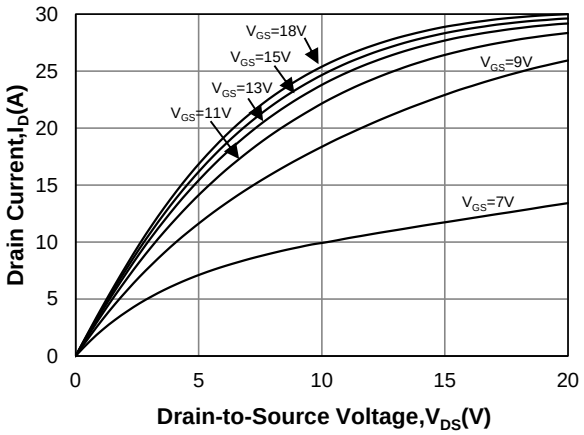


Fig 4: Rds(on) vs. Temperature

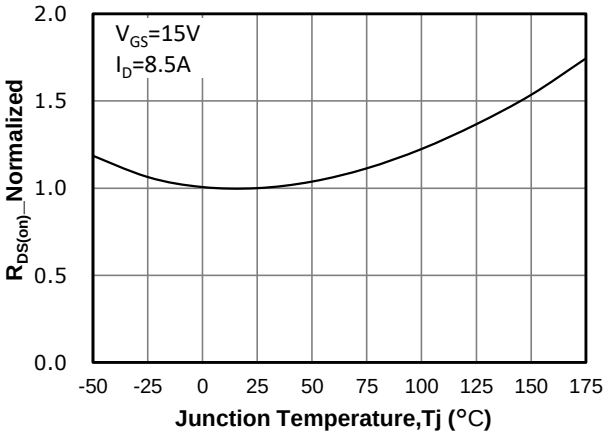


Fig 5: On-Resistance vs. Drain Current For Various Temperatures

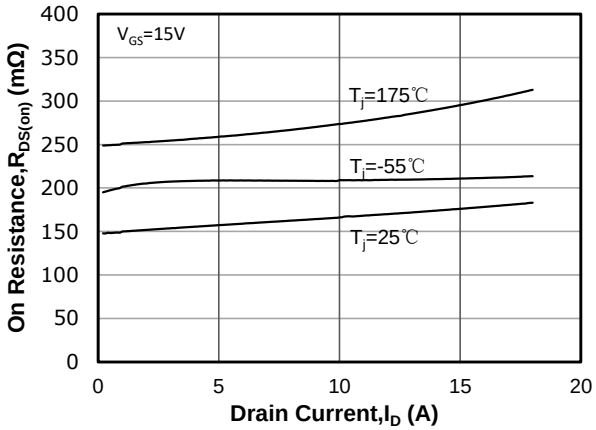


Fig 6: Rds(on) vs. Temperature For Various Gate Voltage

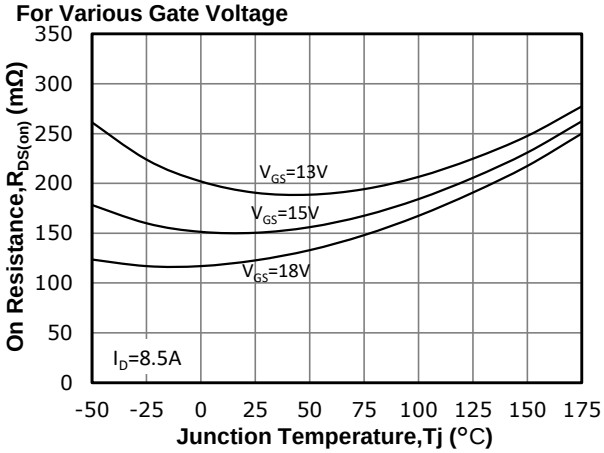


Fig 7: Transfer Characteristics

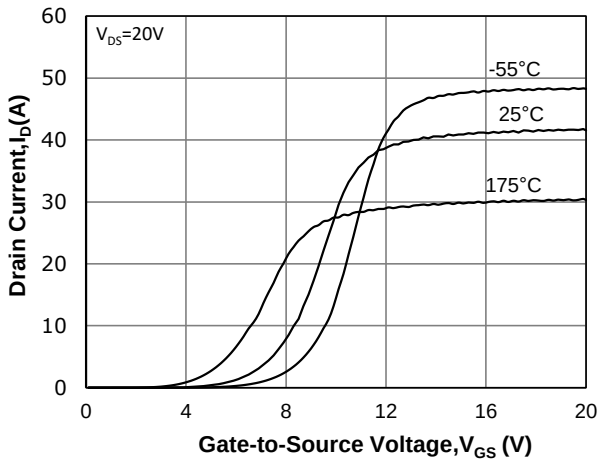


Fig 8: Body-diode Forward Characteristics For Various Temperatures

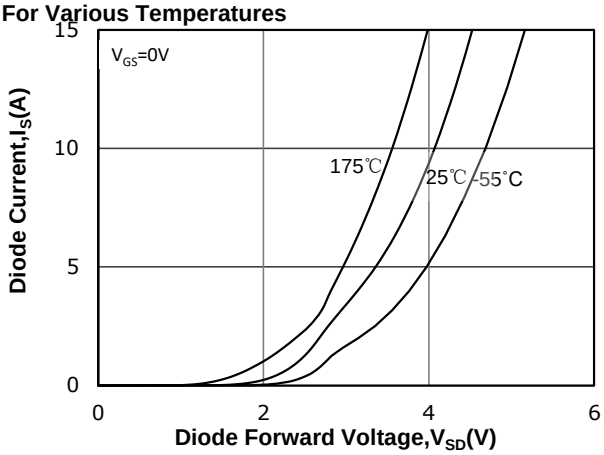


Fig 9: VGS(th) Vs Tj Characteristics

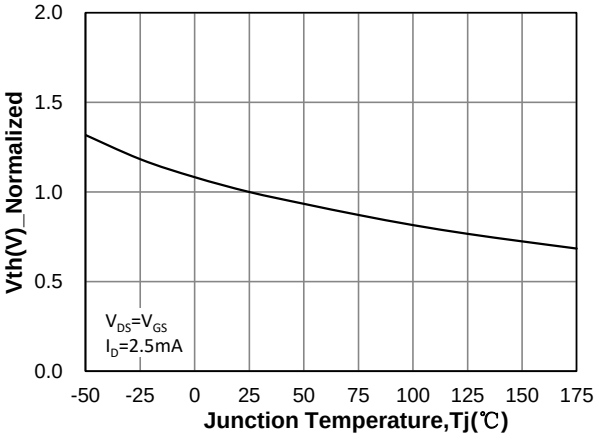


Fig 10: 3rd Quadrant Characteristic at 25℃

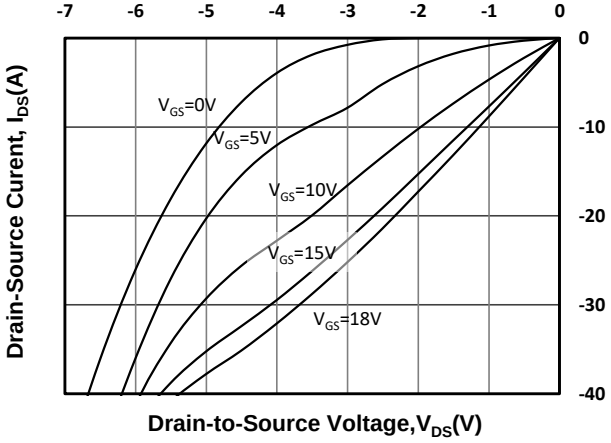


Fig 11：Gtate Charge Characteristics

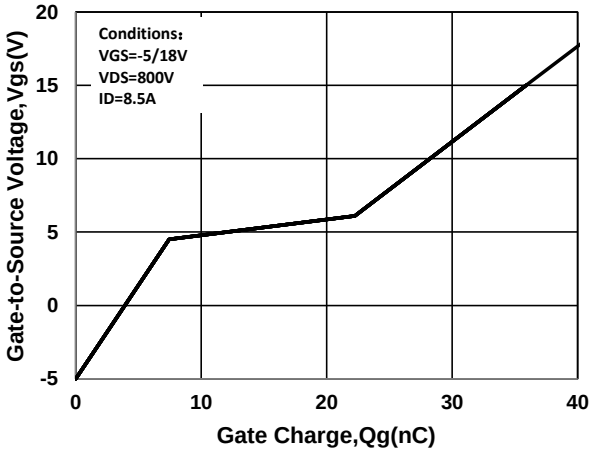


Fig 12: Capacitance Characteristics

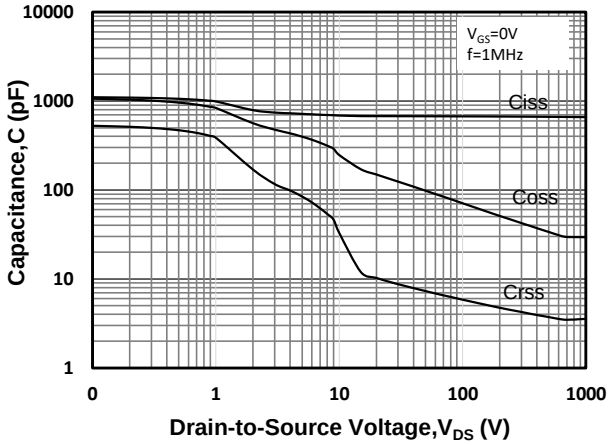


Fig 13: Continuous Drain Current vs. Case Temperature

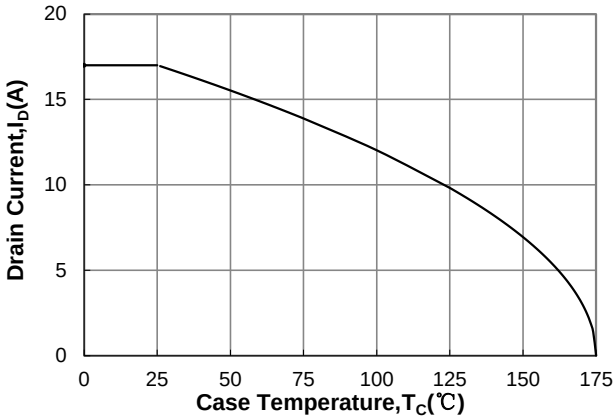


Fig 14: Maximum Power Dissipation vs. Case Temperature

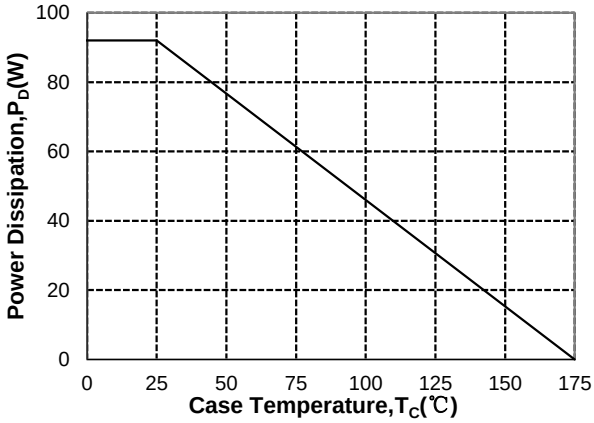


Fig 15: Safe Operating Area

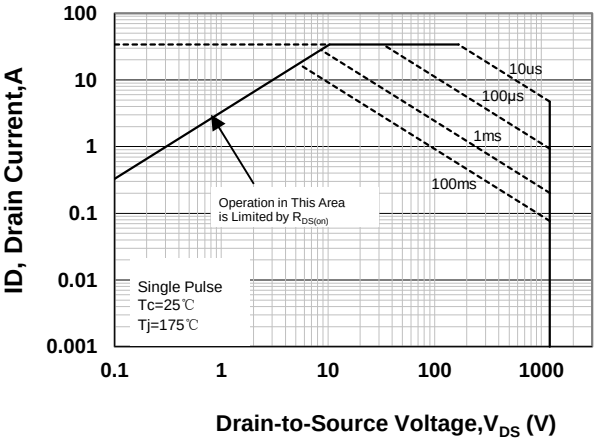


Fig 16:Output Capacitor Stored Energy

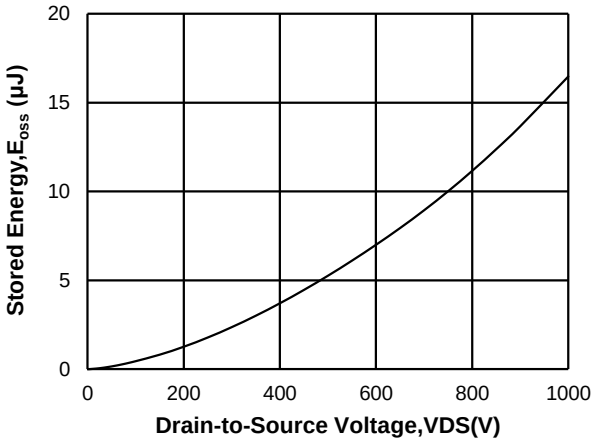
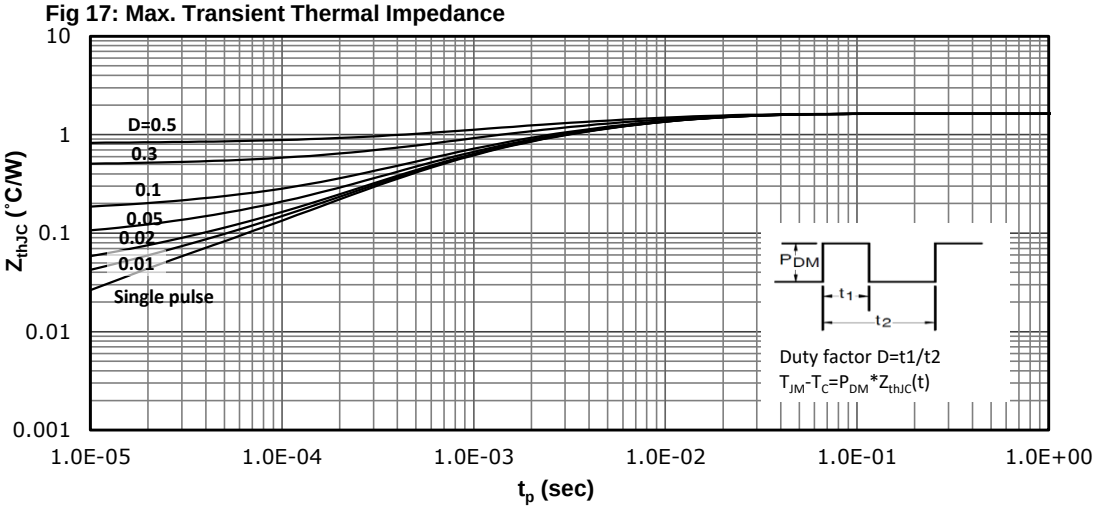
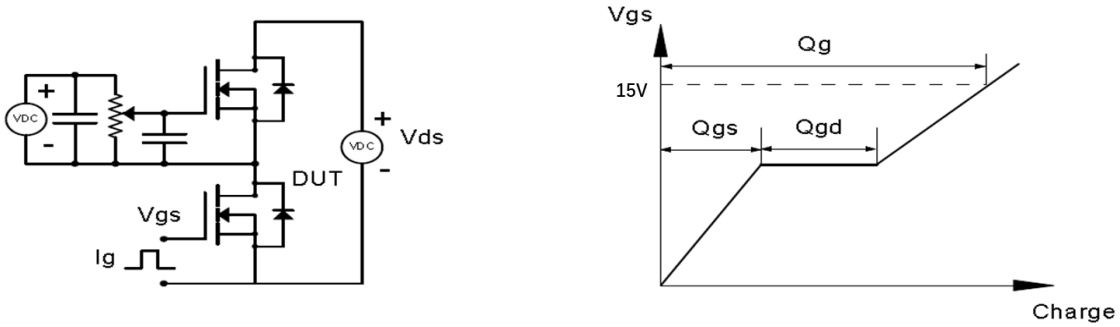


Fig 17: Max. Transient Thermal Impedance

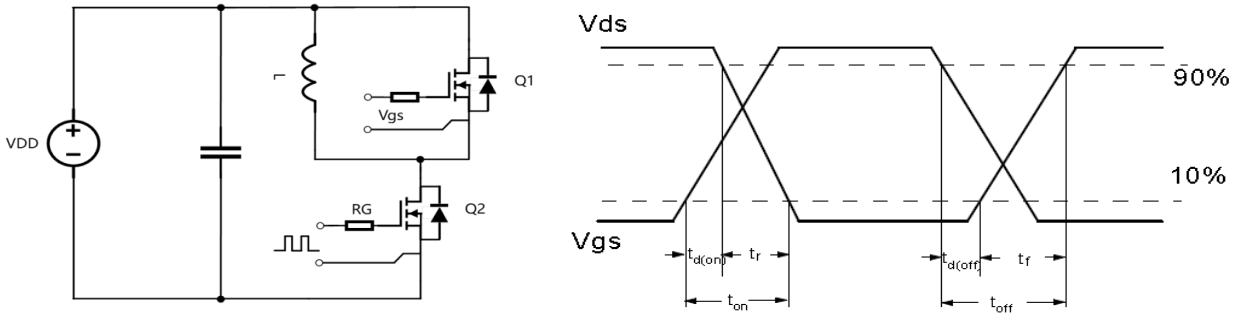


Test Circuit & Waveform

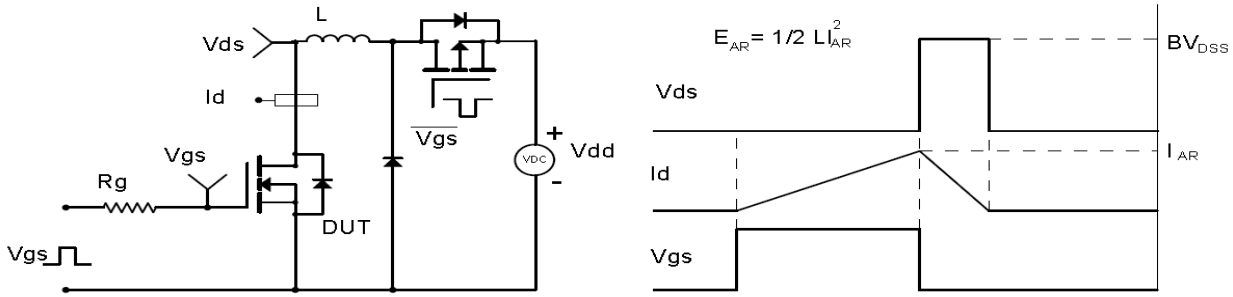
Gate Charge Test Circuit & Waveform



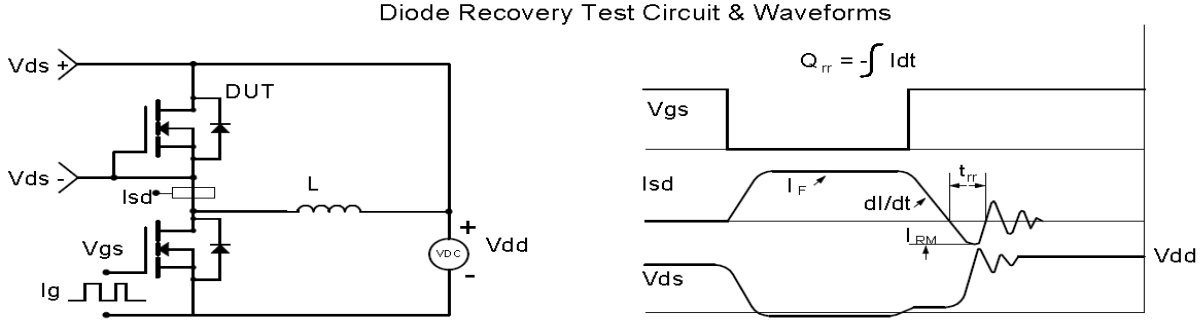
Resistive Switching Test Circuit & Waveforms



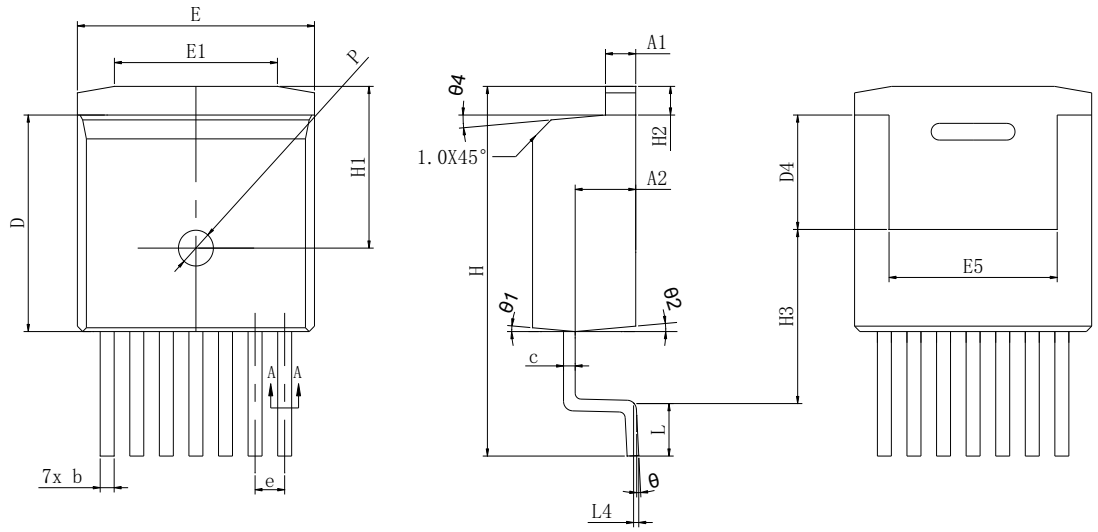
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-263US-7



Items	Values(mm)	
	MIN	MAX
A	4.2	4.6
A1	1.1	1.4
A2	2.4	2.8
A3	0	0.3
b	0.5	0.8
c	0.4	0.7
D	8.8	9.3
D4	4.5	5.05
e	1.27BSC	
E	9.8	10.4
E1	6.5	7.5
E5	6.72	7.72
H	14.8	16.2
H1	6.38	7.18
H2	0.9	1.5
H3	6.8	7.8
L	1.8	2.6
L4	0.25	
P	1.3	1.7
θ	0°	10°
θ1	2°	9°
θ2	2°	9°
θ4	2°	9°

Revision History

Revison	Date	Major changes
1.0	2024/5/31	Release of formal version

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