CRXQF25M065G1

SiC MOSFET 650V, 25mΩ, 97A

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Fast Reverse Recovery
- Halogen Free, RoHS Compliant

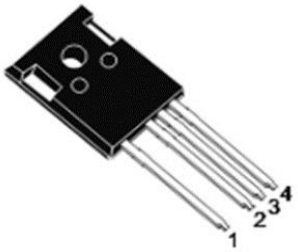
Product Summary

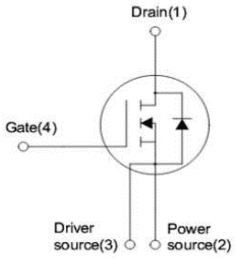
VDS	650V
$R_{DS(on)\_typ}$	25mΩ
I_D	97A

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- On Board Charger

100% Avalanche Tested





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRXQF25M065G1	-	TO-247-4L	Tube	N/A	N/A	25pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DSmax}	650	V
Continuous drain current V_{GS}=20V，T_C = 25°C V_{GS}=20V，T_C = 100°C	I_D	 97 69	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D(pulse)}$	243	A
Avalanche energy, single pulse (L=10mH, Rg=25Ω)	E_{AS}	2000	mJ
Gate-Source voltage (dynamic)	V_{GSmax}	-10/+25	V
Gate-Source voltage (static)	V_{GSop}	-5/+20	V
Power dissipation (T_C=25°C,T_J=175°C)	P_D	429	W
Operating junction temperature	T_j	-55…175	°C
Storage temperature	T_{stg}	-55…150	°C

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.35	°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	$V_{(BR)DSS}$	650	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	-	4	V	V_{DS}=V_{GS},I_D=15mA
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	VDS=650V,VGS=0V T_j=25°C
		-	10	-		T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	250	nA	V_{GS}=20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	25	-	mΩ	VGS=18V, ID=33.5A
		-	20	28	mΩ	V_{GS}=20V, ID=33.5A, T_j=25°C
		-	29	-		T_j=175°C
Transconductance	g_{fs}	-	20	-	S	V_{DS}=20V,I_{DS}=33.5A
Dynamic Characteristic						
Internal Gate resistance	$R_{G(int)}$	-	1.1	-	Ω	f=1MHz
Input Capacitance	C_{iss}	-	3277	-	pF	V_{GS}=0V, V_{DS}=650V, f=1MHz
Output Capacitance	C_{oss}	-	356	-		
Reverse Transfer Capacitance	C_{rss}	-	32	-		
Coss Stored Energy	E_{oss}	-	79	-	uJ	VDS=650V
Gate Total Charge	Q_g	-	173	-	nC	VGS=-5/20V VDS=400V ID=33.5A
Gate-Source charge	Q_{gs}	-	42	-		
Gate-Drain charge	Q_{gd}	-	39	-		
Turn-on delay time	$t_{d(on)}$	-	32	-	ns	VDD=400V,ID=33.5A VGS=-5V/20V, RG=10Ω，L=100uH
Rise time	t_r	-	43	-		
Turn-off delay time	$t_{d(off)}$	-	83	-		
Fall time	t_f	-	22	-		
Turn-On Switching Energy	$E_{(on)}$	-	477	-	uJ	
Turn Off Switching Energy	$E_{(off)}$	-	114	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.2	-	V	V_{GS}=0V,I_F=16.8A
		-	2.6	-	V	V_{GS}=0V,I_F=16.8A, T_j=175℃
Body Diode Reverse Recovery Time	t_{rr}	-	52	-	ns	di/dt=1000A/us IF=33.5A Vdd=400V
Body Diode Reverse Recovery Charge	Q_{rr}	-	240	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	11	-	A	

Typical Performance Characteristics

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

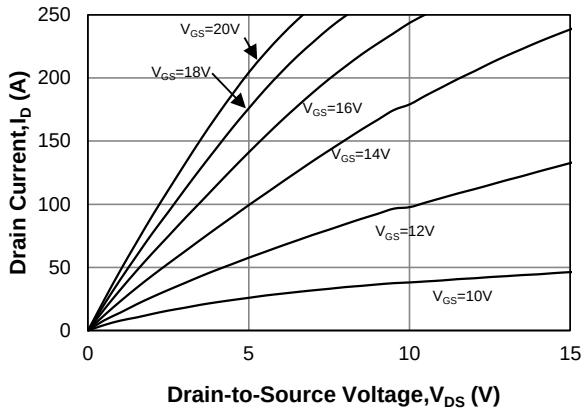


Fig 2. Output Characteristics (Tj=25℃)

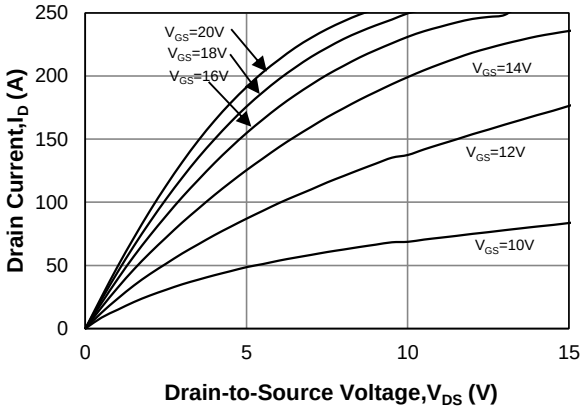


Fig 3. Output Characteristics (Tj=175℃)

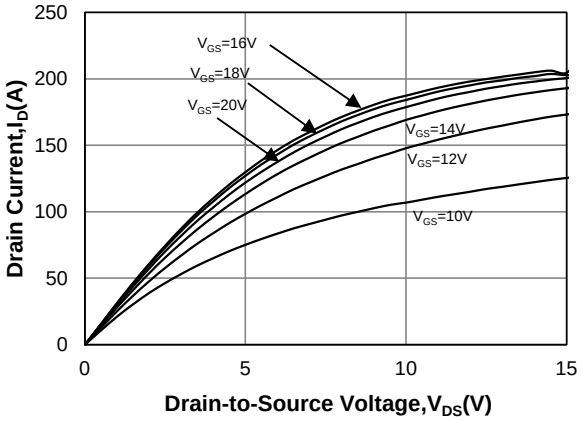


Fig 4: Rds(on) vs. Temperature

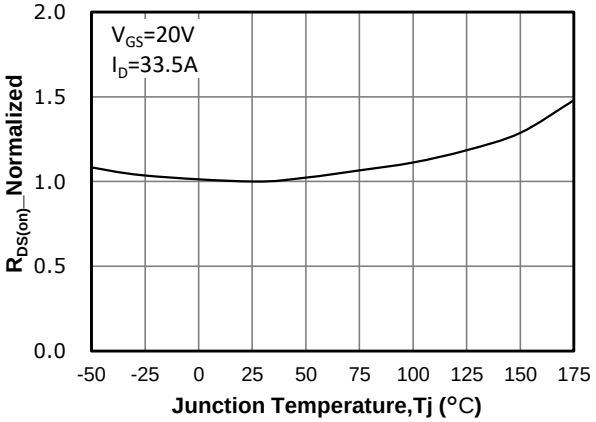


Fig 5: On-Resistance vs. Drain Current For Various Temperatures

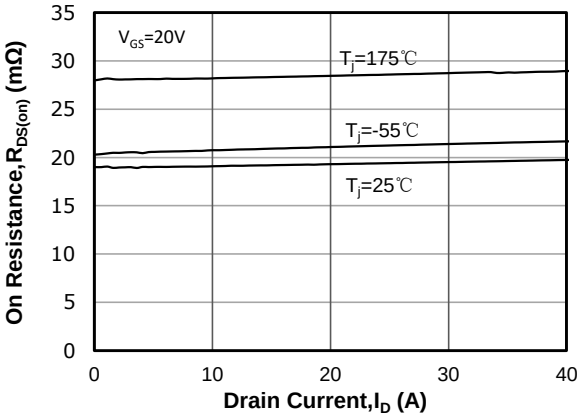


Fig 6: Rds(on) vs. Temperature For Various Gate Voltage

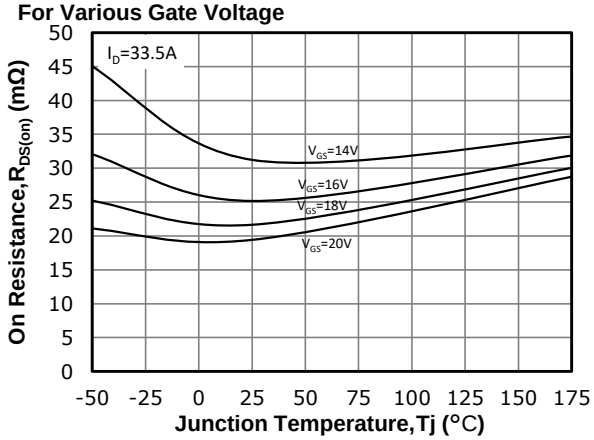


Fig 7: Transfer Characteristics

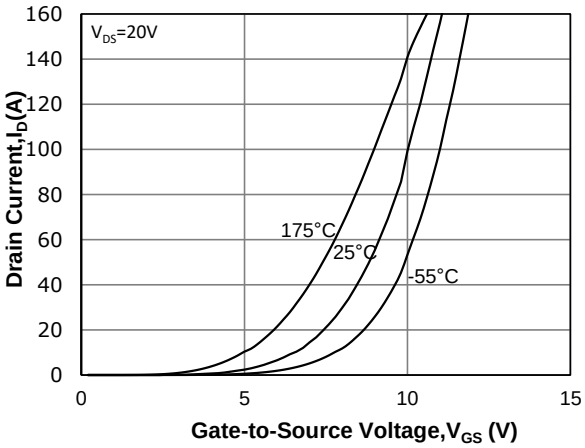


Fig 8: Body-diode Forward Characteristics For Various Temperatures

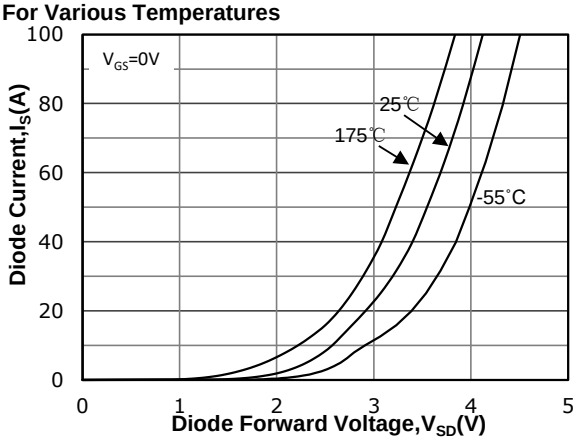


Fig 9: VGS(th) Vs Tj Characteristics

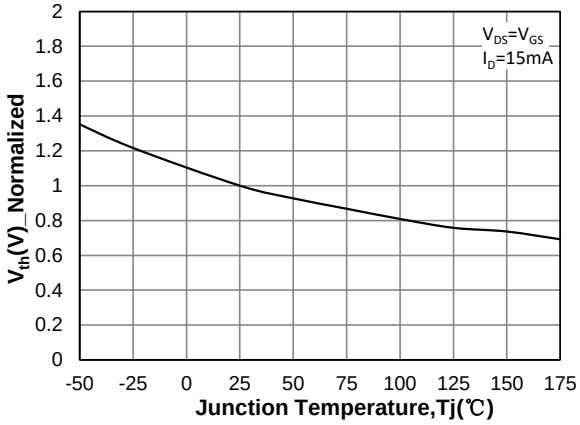


Fig 10: 3rd Quadrant Characteristic at 25℃

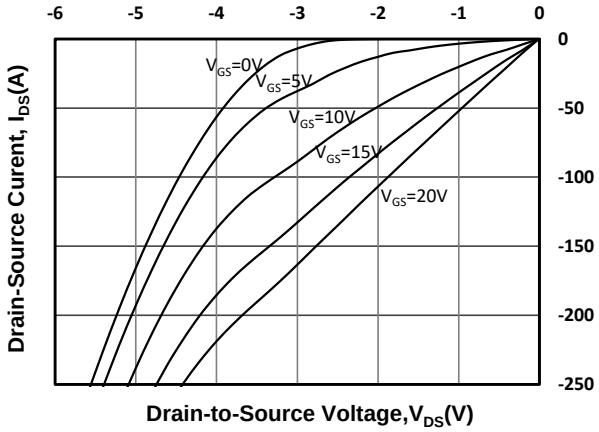


Fig 11：Gtate Charge Characteristics

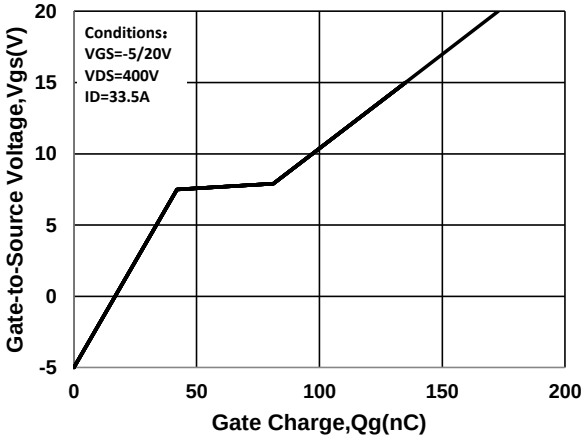


Fig 12: Capacitance Characteristics

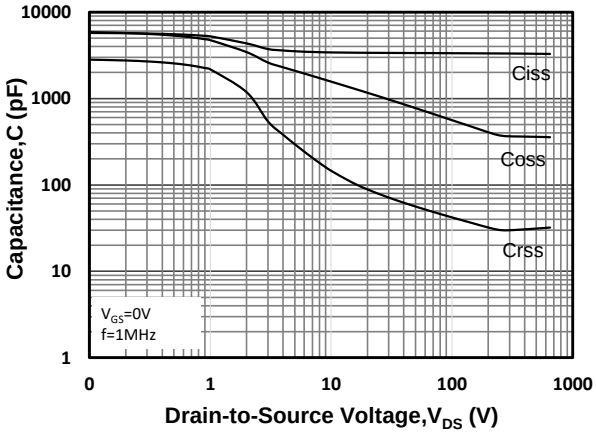


Fig 13: Continuous Drain Current vs. Case Temperature

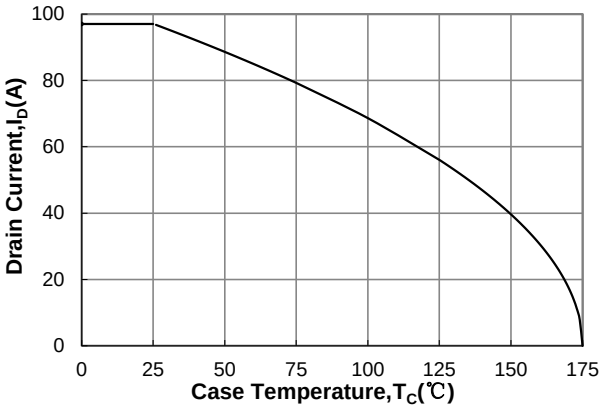


Fig 14: Maximum Power Dissipation vs. Case Temperature

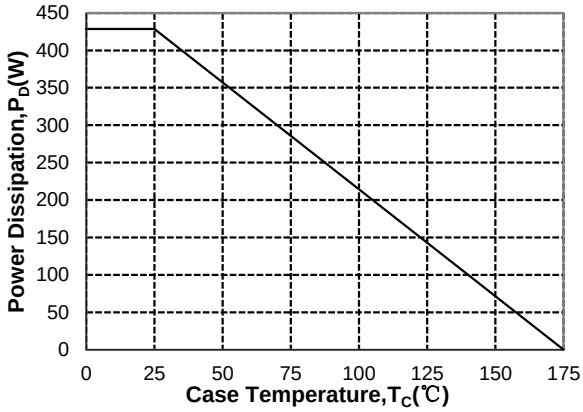


Fig 15: Safe Operating Area

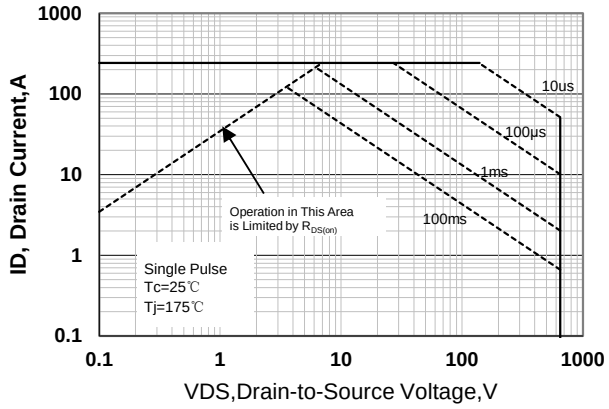


Fig 16:Output Capacitor Stored Energy

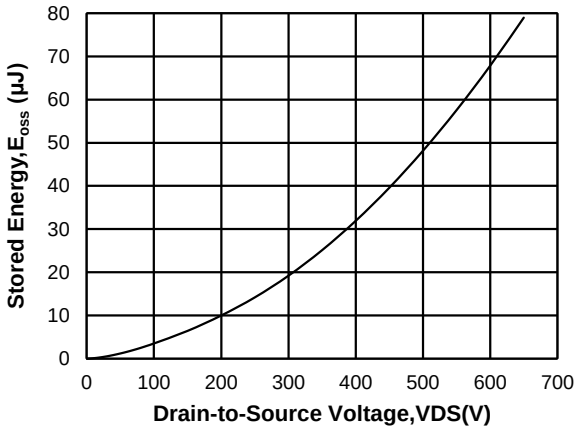
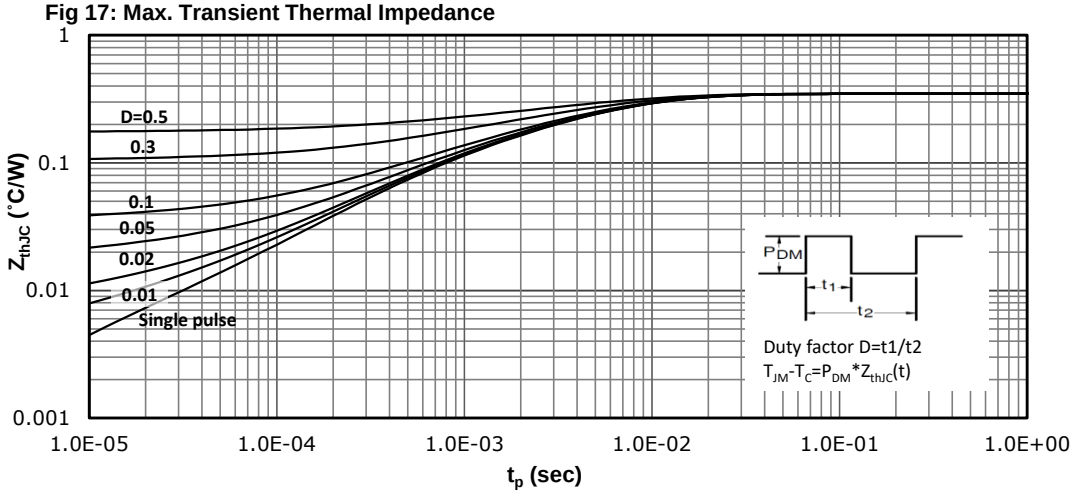
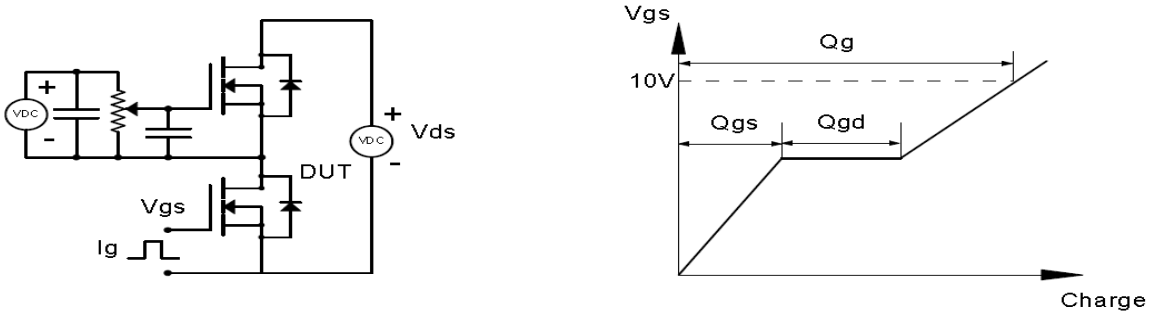


Fig 17: Max. Transient Thermal Impedance

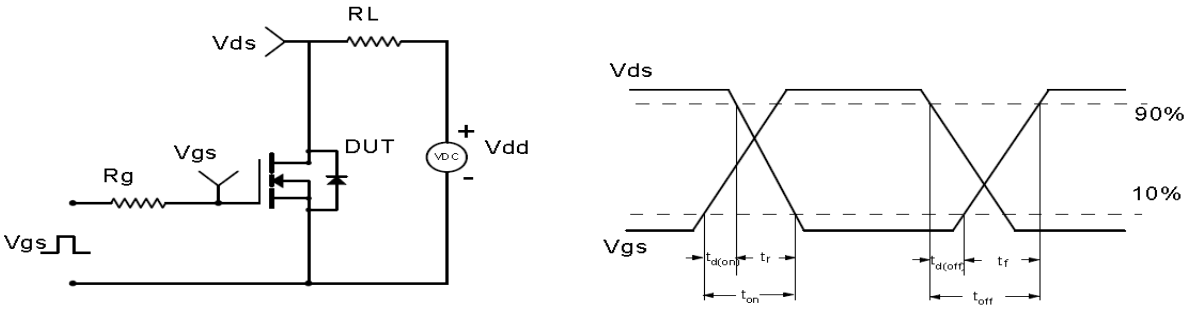


Test Circuit & Waveform

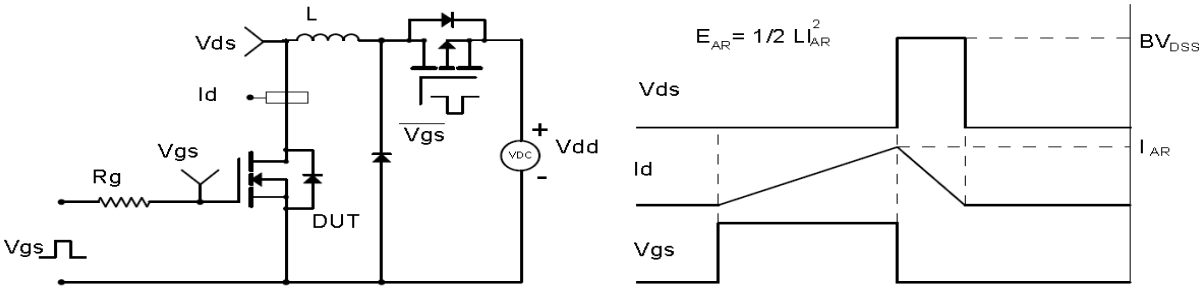
Gate Charge Test Circuit & Waveform



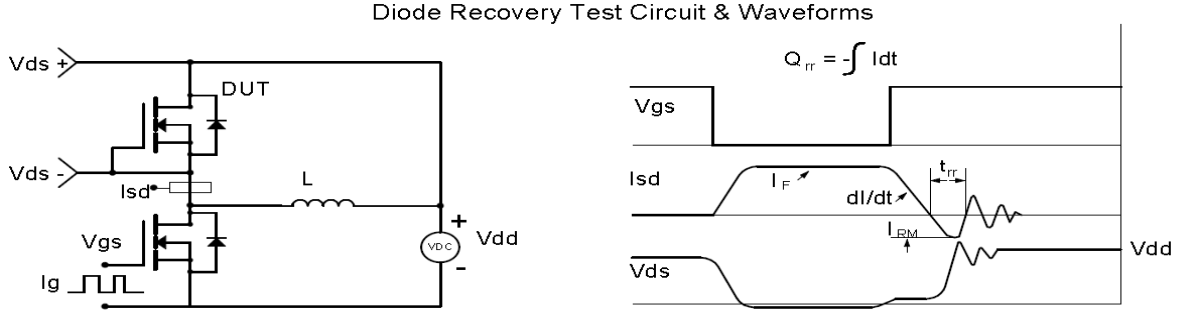
Resistive Switching Test Circuit & Waveforms



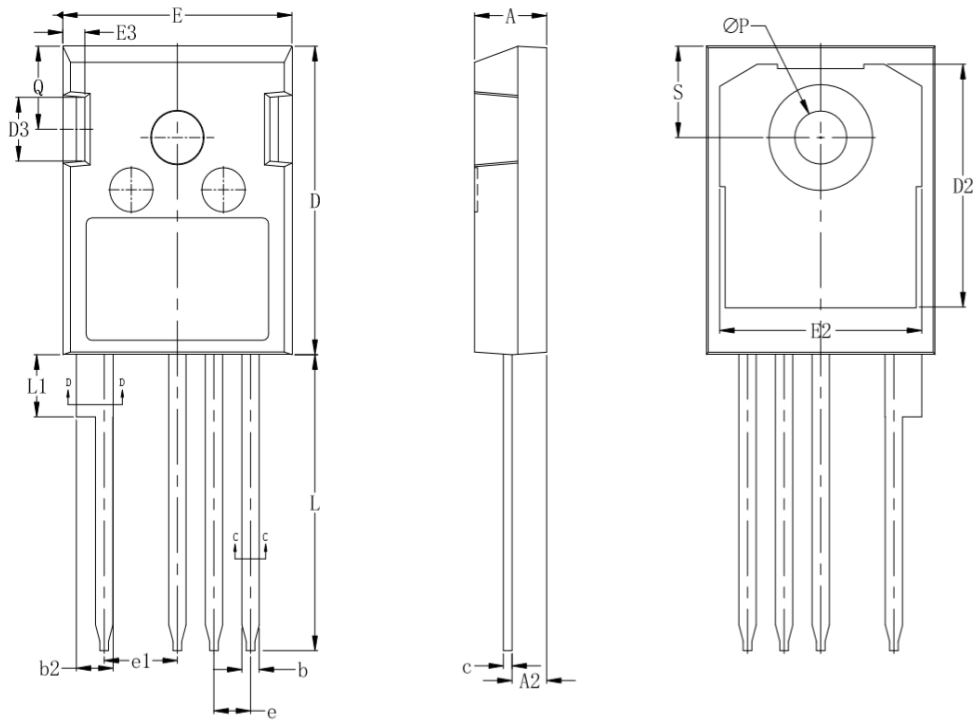
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-247-4L



Items	Values(mm)	
	MIN	MAX
A	4.8	5.2
A2	2.2	2.6
b	1.05	1.4
b2	2.4	2.75
c	0.5	0.75
D	20	21.5
D2	15.5	17.2
D3	4	5
E	15.5	16.1
E2	13	15
E3	1	2
e	2.54 BSC.	
e1	5.08 BSC.	
L	19	21
L1	4	4.45
ΦP	3.5	3.7
Q	5.4	5.9
S	5.9	6.4

Revision History

Revison	Date	Major changes
1.0	2023/2/9	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semicondutor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

CRM reserves the right to improve product design, function and reliability without notice.