

Features

- CRM G2 SiC MOSFET Technology
- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Avalanche Ruggedness
- Fast Reverse Recovery

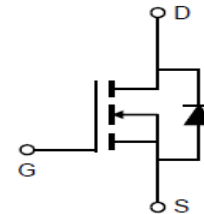
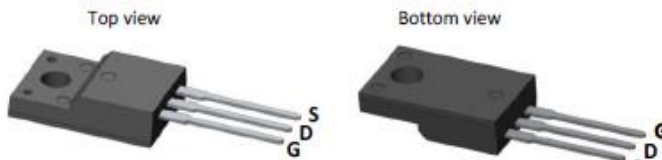
Applications

- Switching Mode Power Supply(SMPS)
- High Voltage DC/DC Converters
- On Board Charger(OBC)
- EV Charger

Product Summary

V _{DS}	650V
R _{DS(on)_typ}	60mΩ
I _D	37A

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Qty
CRXF60M065G2Z	CRXF60M065G2Z	TO-220F	Tube	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DSmax}	650	V
Continuous drain current V _{GS} =15V, T _C = 25°C V _{GS} =15V, T _C = 100°C	I _D	37 26	A
Pulsed drain current (T _C = 25°C, t _p limited by T _{jmax})	I _{D(pulse)}	93	A
Avalanche energy, single pulse (L=10mH, R _g =25Ω)	E _{AS}	720	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	29	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/+18V

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	5.1	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	62.5	

Electrical Characteristic (at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	650	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.8	-	3.6	V	$V_{DS}=V_{GS}, I_D=5mA$
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	$V_{DS}=650V, V_{GS}=0V$ $T_j=25^\circ C$
		-	10	-		$T_j=175^\circ C$
Gate-source leakage current	I_{GSS}	-	-	250	nA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	60	79	mΩ	$V_{GS}=15V, I_D=13.2A,$ $T_j=25^\circ C$
		-	78	-		$T_j=175^\circ C$
Transconductance	g_{fs}	-	12.8	-	S	$V_{DS}=20V, I_{DS}=13.2A$

Dynamic Characteristic

Internal Gate resistance	$R_{G(int)}$	-	2	-	Ω	$f=1MHz$
Input Capacitance	C_{iss}	-	1100	-	pF	$V_{GS}=0V, V_{DS}=600V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	105	-		
Reverse Transfer Capacitance	C_{rss}	-	9.1	-		
Coss Stored Energy	E_{oss}	-	19	-	uJ	
Gate Total Charge	Q_g	-	45	-	nC	$V_{GS}=-5/15V$ $V_{DS}=400V$ $I_D=13.2A$
Gate-Source charge	Q_{gs}	-	13	-		
Gate-Drain charge	Q_{gd}	-	12	-		
Turn-on delay time	$t_{d(on)}$	-	16	-	ns	$V_{DD}=400V, I_D=13.2A$ $V_{GS}=-5V/15V,$ $R_G=10\Omega, L=100\mu H$
Rise time	t_r	-	28	-		
Turn-off delay time	$t_{d(off)}$	-	29	-		
Fall time	t_f	-	39	-		
Turn-On Switching Energy	$E_{(on)}$	-	137	-	uJ	
Turn Off Switching Energy	$E_{(off)}$	-	9.1	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.5	-	V	$V_{GS}=0V, I_F=6.6A$
		-	3	-	V	$V_{GS}=0V, I_F=6.6A, T_j=175^{\circ}C$
Continuous Diode Forward Current	I_S	-	-	37	A	$V_{GS}=0V$
Diode pulse Current	$I_{S,pulse}$	-	-	93	A	pulse width t_p limited by T_{jmax}
Body Diode Reverse Recovery Time	t_{rr}	-	15	-	ns	$di/dt=1000A/us$ $I_F=13.2A$ $V_{dd}=400V$ $T_j=25^{\circ}C$
Body Diode Reverse Recovery Charge	Q_{rr}	-	57	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	6.2	-	A	
Body Diode Reverse Recovery Time	t_{rr}	-	18	-	ns	$di/dt=1000A/us$ $I_F=13.2A$ $V_{dd}=400V,$ $T_j=175^{\circ}C$
Body Diode Reverse Recovery Charge	Q_{rr}	-	67	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	6	-	A	

Typical Performance Characteristics

Fig 1. Output Characteristics ($T_j = -55^\circ\text{C}$)

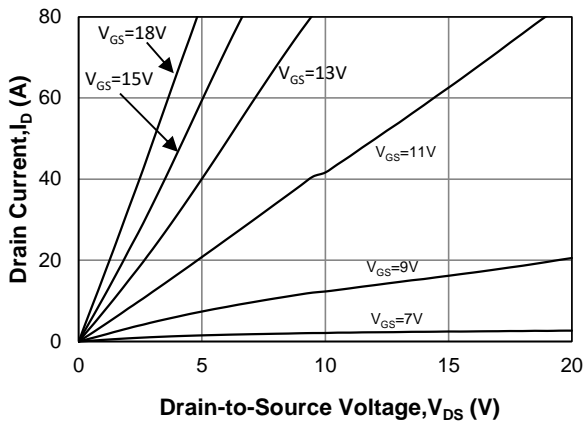


Fig 2. Output Characteristics ($T_j = 25^\circ\text{C}$)

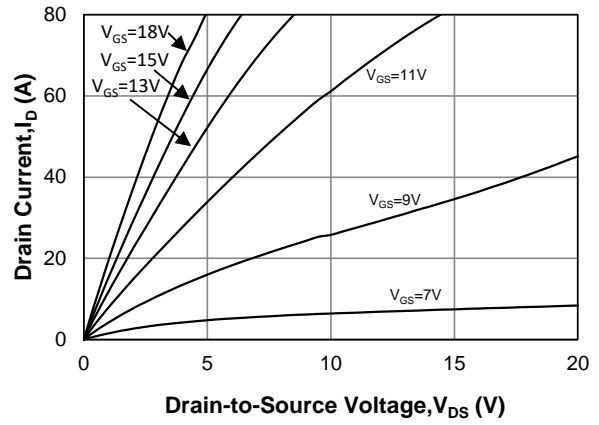


Fig 3. Output Characteristics ($T_j = 175^\circ\text{C}$)

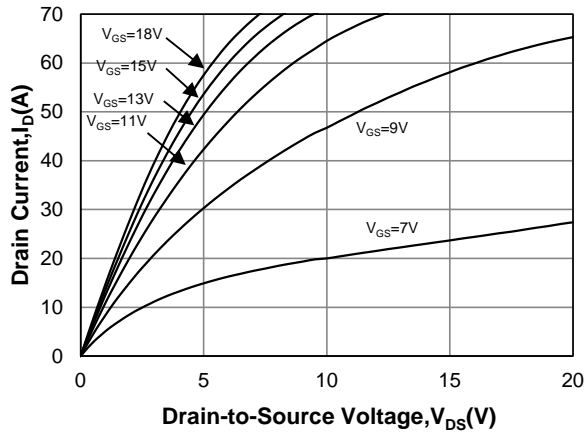


Fig 4: $R_{DS(on)}$ vs. Temperature

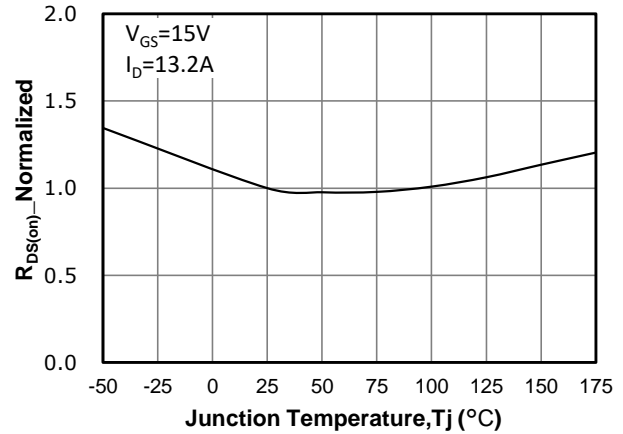


Fig 5: On-Resistance vs. Drain Current For Various Temperatures

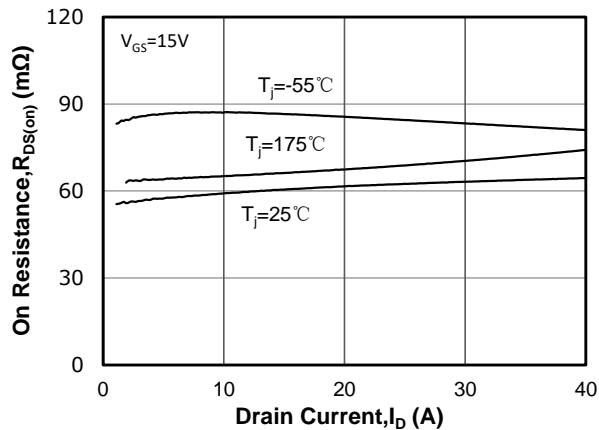


Fig 6: $R_{DS(on)}$ vs. Temperature For Various Gate Voltage

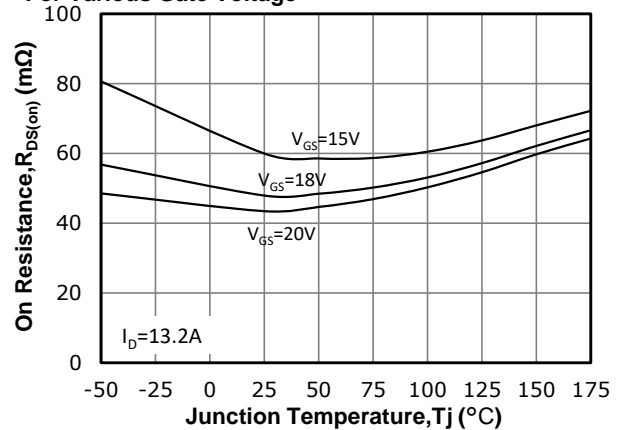


Fig 7: Transfer Characteristics

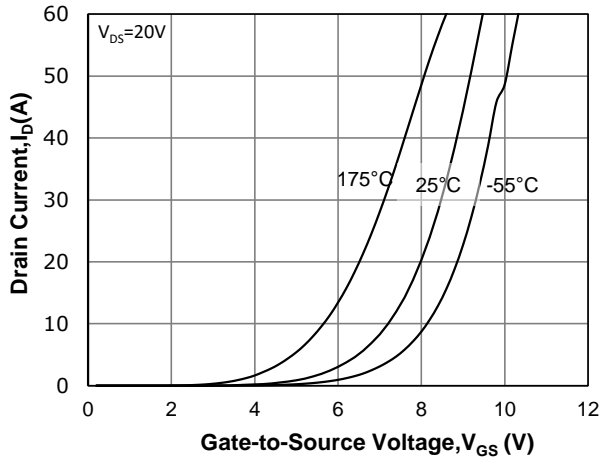


Fig 8: Body-diode Forward Characteristics For Various Temperatures

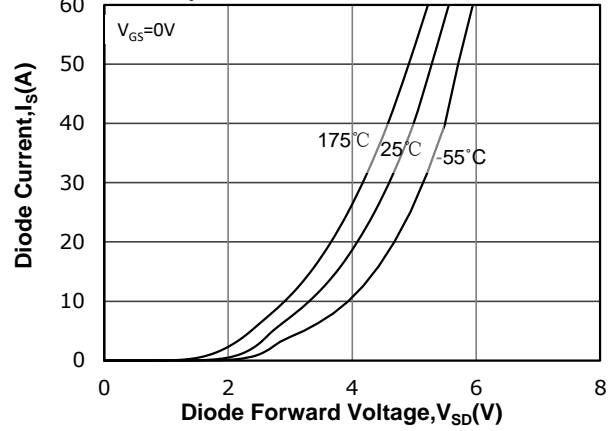


Fig 9: VGS(th) Vs Tj Characteristics

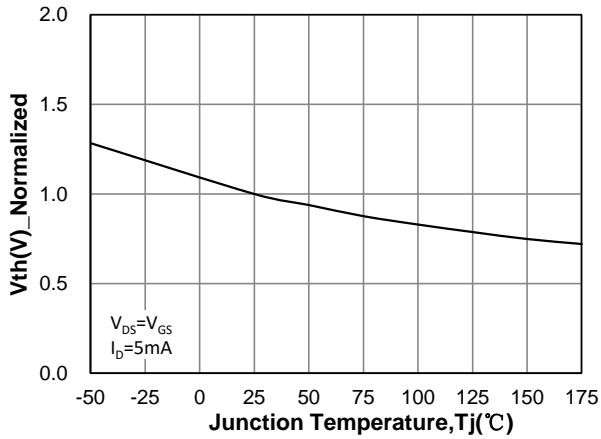


Fig 10: 3rd Quadrant Characteristic at 25°C

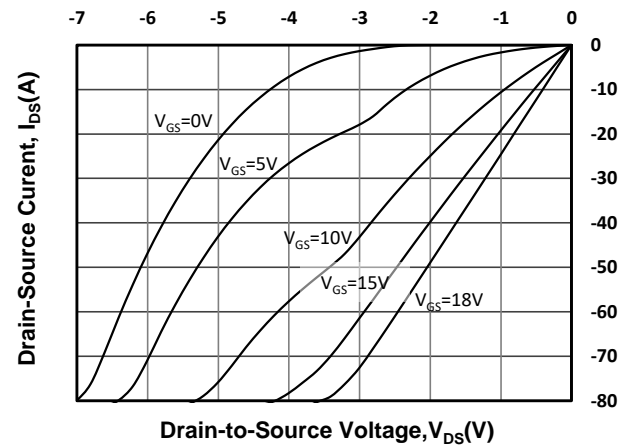


Fig 11: Gate Charge Characteristics

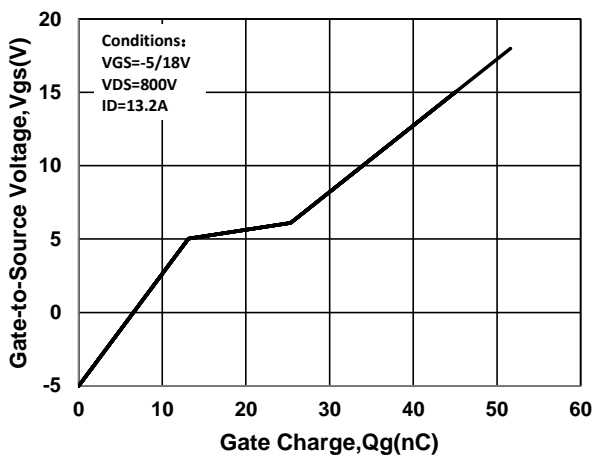


Fig 12: Capacitance Characteristics

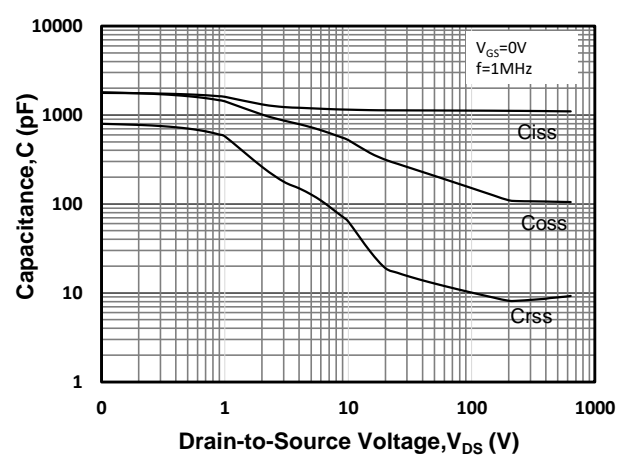


Fig 13: Continuous Drain Current vs. Case Temperature

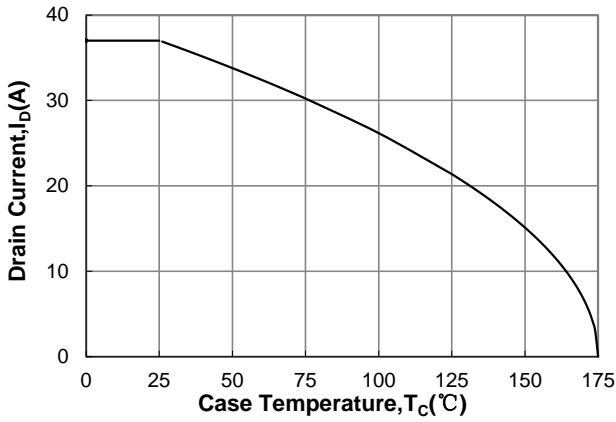


Fig 14: Maximum Power Dissipation vs. Case Temperature

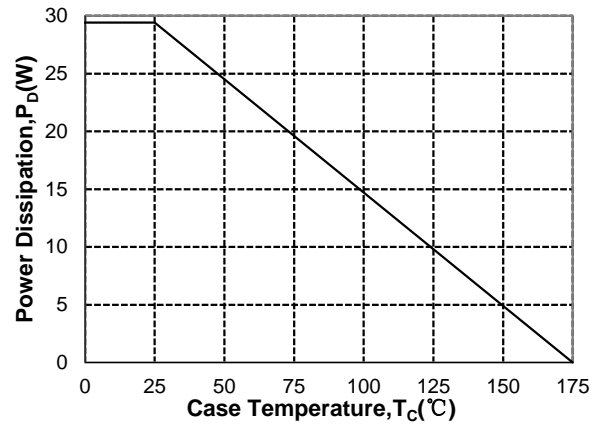


Fig 15: Safe Operating Area

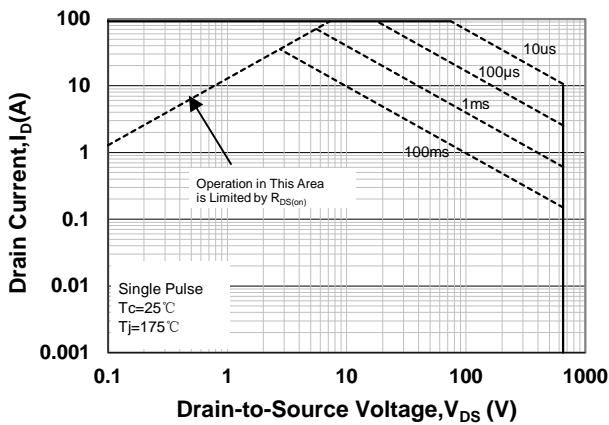


Fig 16: Output Capacitor Stored Energy

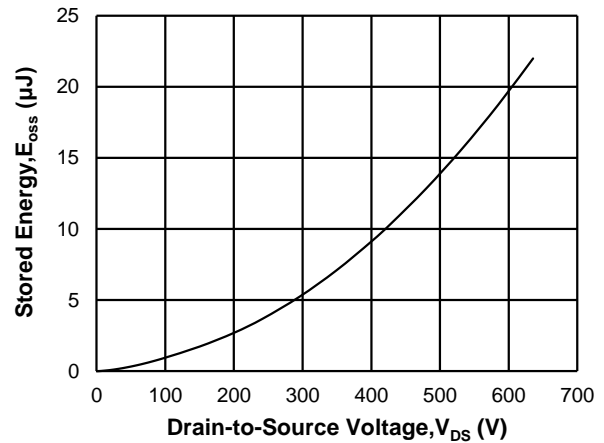
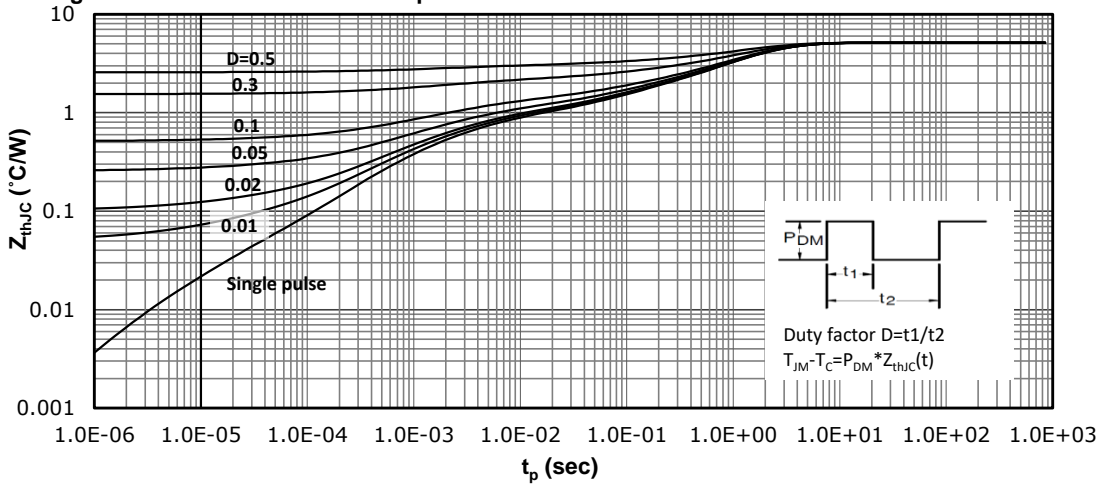
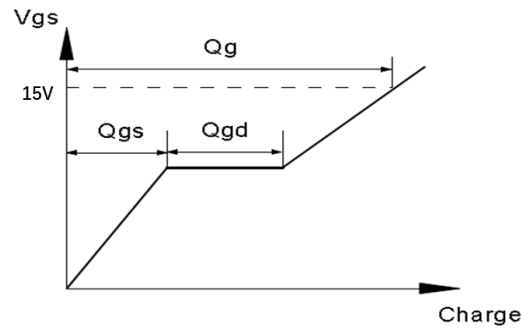
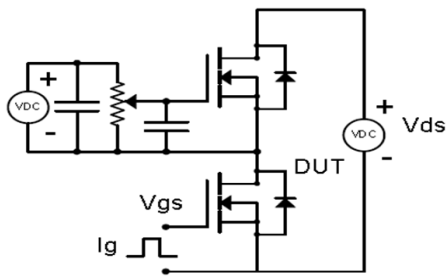


Fig 17: Max. Transient Thermal Impedance

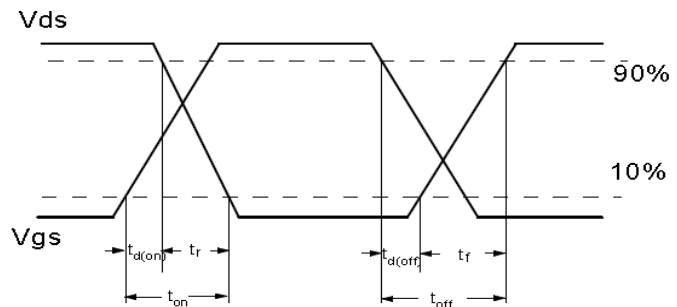
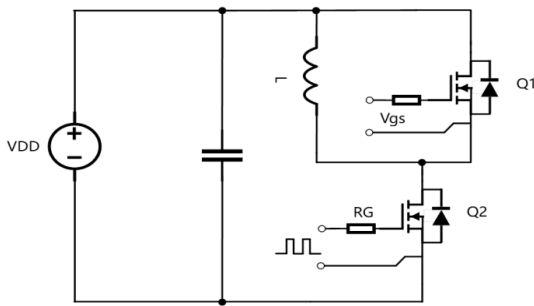


Test Circuit & Waveform

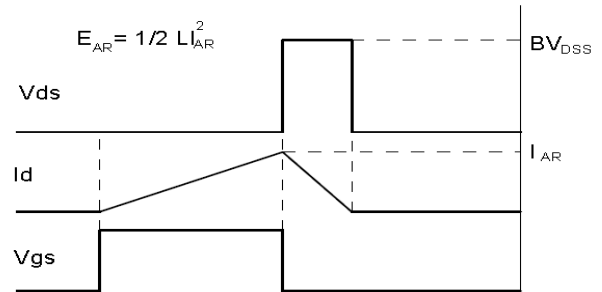
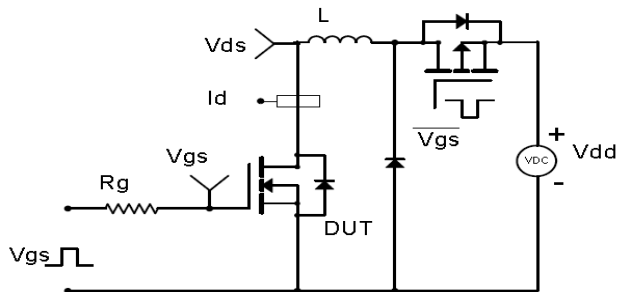
Gate Charge Test Circuit & Waveform



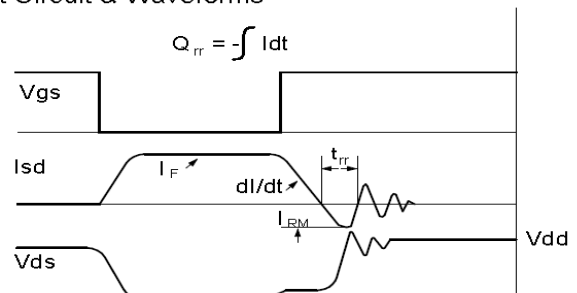
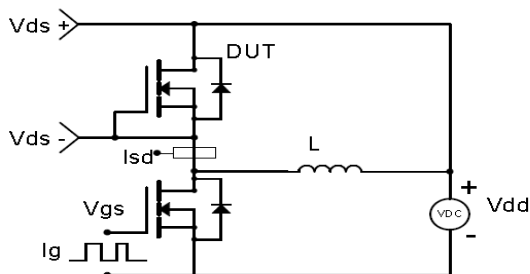
Resistive Switching Test Circuit & Waveforms



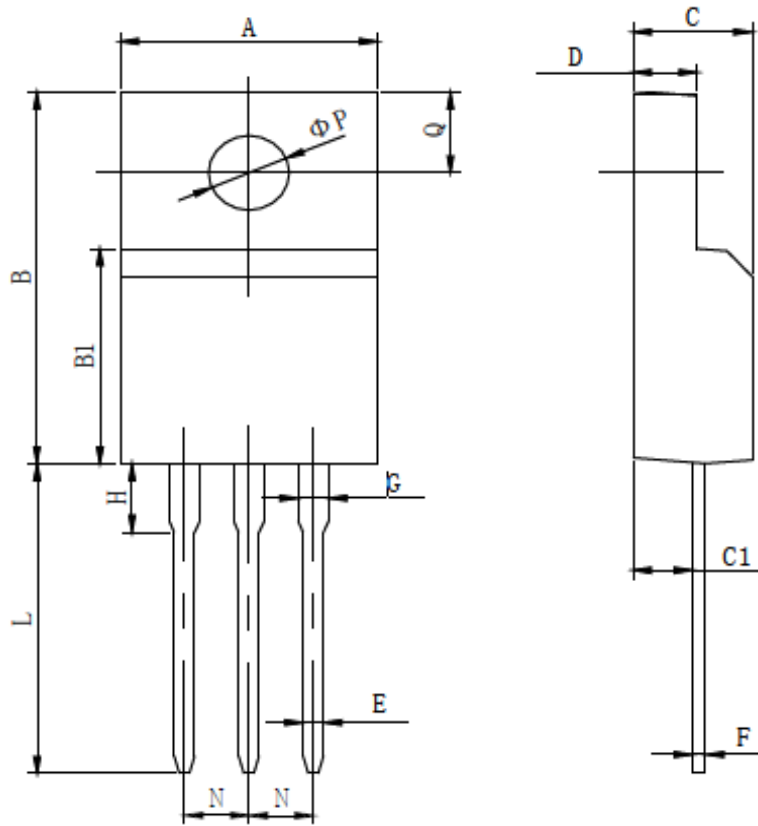
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-220F



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.60	10.40	0.378	0.409
B	15.40	16.20	0.606	0.638
B1	8.90	9.50	0.350	0.374
C	4.30	4.90	0.169	0.193
C1	2.10	3.00	0.083	0.118
D	2.40	3.00	0.094	0.118
E	0.60	1.00	0.024	0.039
F	0.30	0.60	0.012	0.024
G	1.12	1.42	0.044	0.056
H	3.40	3.80	0.134	0.150
L*	12.00	14.00	0.472	0.551
N	2.34	2.74	0.092	0.108
Q	3.15	3.55	0.124	0.140
Φp	2.90	3.30	0.114	0.130

Revision History

Revision	Date	Major changes
1.0	2024/5/14	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified 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 semiconductor 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.