

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	1200V
$R_{DS(on)_{typ}}$	160mΩ
I_D	18A

Applications

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

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRXF160M120G1	-	TO220F	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DSmax}	1200	V
Continuous drain current $V_{GS}=20V, T_C = 25^\circ C$ $V_{GS}=20V, T_C = 100^\circ C$	I_D	18 12	A
Pulsed drain current ($T_C = 25^\circ C, t_p$ limited by T_{jmax})	$I_{D(pulse)}$	45	A
Avalanche energy, single pulse ($L=20mH, R_g=25\Omega$)	E_{AS}	278	mJ
Gate-Source voltage	V_{GSmax}	-10/+25	V
Gate-Source voltage	V_{GSop}	-5/+20	V
Power dissipation ($T_C=25^\circ C, T_J=175^\circ C$)	P_D	44	W
Operating junction and storage temperature	T_j, T_{stg}	-55...175	°C

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	3.4	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	62.5	

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

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

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	1200	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2	2.5	4	V	$V_{DS}=V_{GS}, I_D=2.5mA$
			1.7		V	$V_{DS}=V_{GS}, I_D=2.5mA, T_j=175\text{ °C}$
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	$V_{DS}=1200V, V_{GS}=0V, T_j=25\text{ °C}$
		-	10	-		$T_j=175\text{ °C}$
Gate-source leakage current	I_{GSS}	-	-	250	nA	$V_{GS}=20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	160	200	mΩ	$V_{GS}=20V, I_D=10A, T_j=25\text{ °C}$
		-	305	-		$T_j=175\text{ °C}$
Transconductance	g_{fs}	-	7.5	-	S	$V_{DS}=20V, I_{DS}=10A$

Dynamic Characteristic

Internal Gate resistance	$R_{G(int)}$	-	3.4	-	Ω	$f=1MHz$
Input Capacitance	C_{iss}	-	704	-	pF	$V_{GS}=0V, V_{DS}=100V, f=1MHz$
Output Capacitance	C_{oss}	-	41	-		
Reverse Transfer Capacitance	C_{rss}	-	7	-		
Coss Stored Energy	E_{oss}	-	22	-	uJ	$V_{DS}=1000V$
Gate Total Charge	Q_g	-	44	-	nC	$V_{GS}=-5/15V, V_{DS}=800V, I_D=10A$
Gate-Source charge	Q_{gs}	-	11	-		
Gate-Drain charge	Q_{gd}	-	19	-		
Turn-on delay time	$t_{d(on)}$	-	8.5	-	ns	$V_{GS}=-5V/20V, R_G=2.5\Omega, V_{DD}=800V, I_D=10A$
Rise time	t_r	-	17	-		
Turn-off delay time	$t_{d(off)}$	-	19	-		
Fall time	t_f	-	10	-		
Turn-On Switching Energy	$E_{(on)}$	-	141	-	uJ	
Turn Off Switching Energy	$E_{(off)}$	-	7.3	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.5	-	V	$V_{GS}=0V, I_F=5A$
		-	3.1	-	V	$V_{GS}=0V, I_F=5A, T_j=175^\circ C$
Body Diode Reverse Recovery Time	t_{rr}	-	17	-	ns	$di/dt=100A/us$ $I_F=10A$ $V_{dd}=800V$
Body Diode Reverse Recovery Charge	Q_{rr}	-	41	-	nC	
Body Diode Peak Reverse Recovery Current	I_{rrm}	-	4.2	-	A	

Typical Performance Characteristics

Fig 1. Output Characteristics (T_j=-55°C)

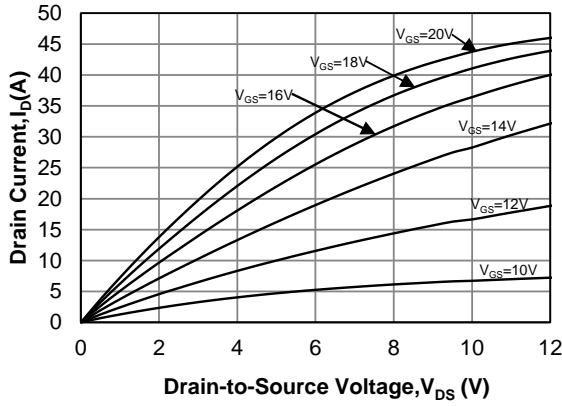


Fig 2. Output Characteristics (T_j=25°C)

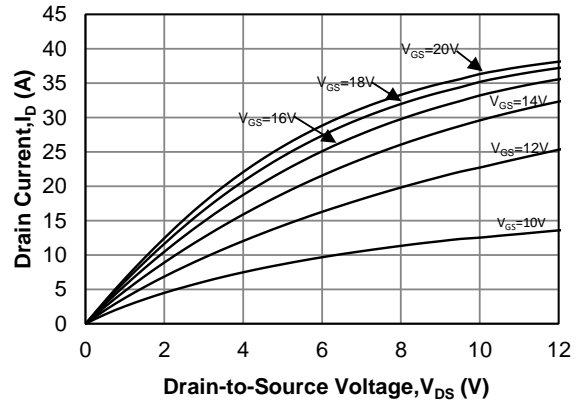


Fig 3. Output Characteristics (T_j=175°C)

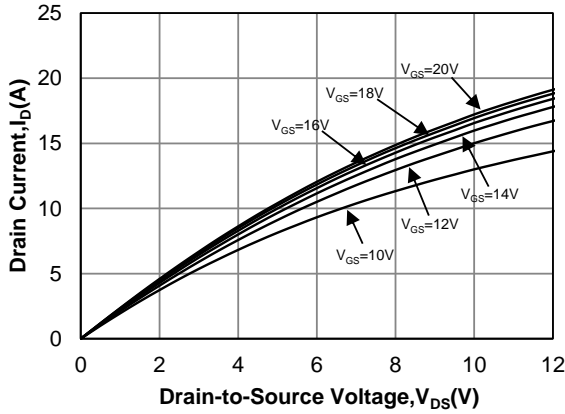


Fig 4: R_{ds(on)} vs. Temperature

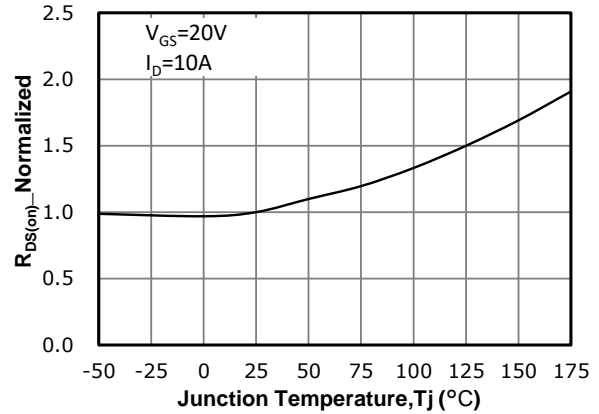


Fig 5: On-Resistance vs. Drain Current For Various Temperatures

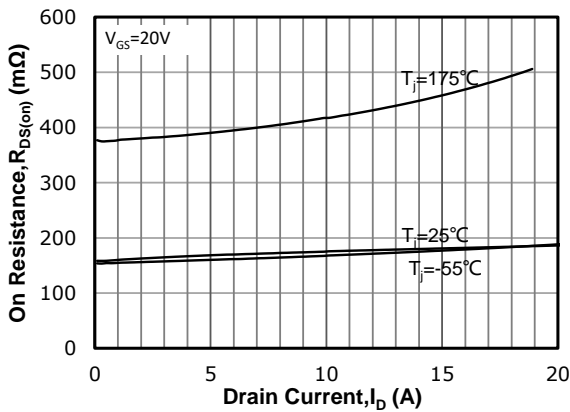


Fig 6: R_{ds(on)} vs. Temperature For Various Gate Voltage

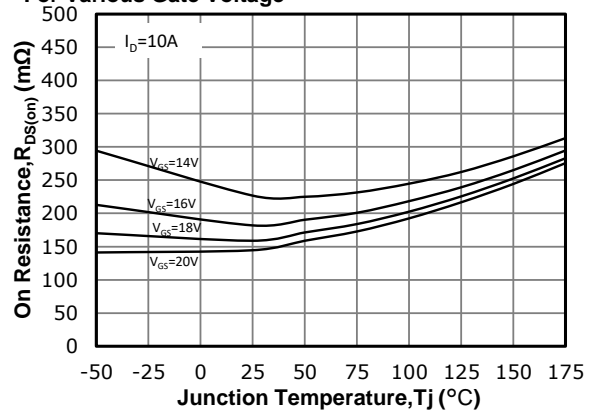


Fig 7: Transfer Characteristics

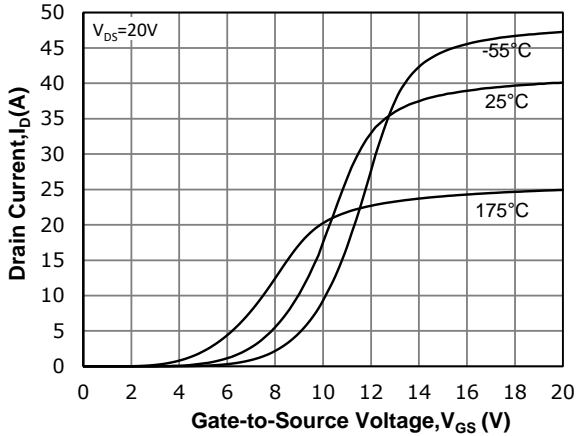


Fig 8: Body-diode Forward Characteristics For Various Temperatures

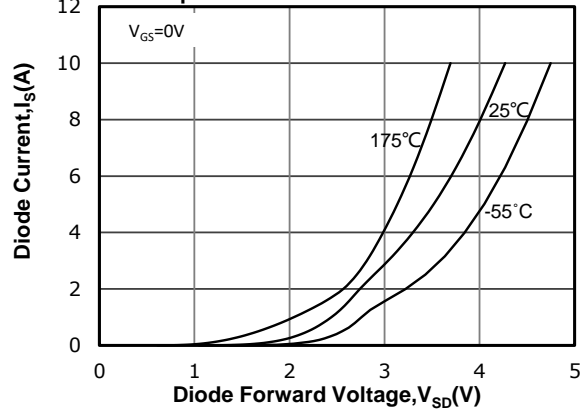


Fig 9: VGS(th) Vs Tj Characteristics

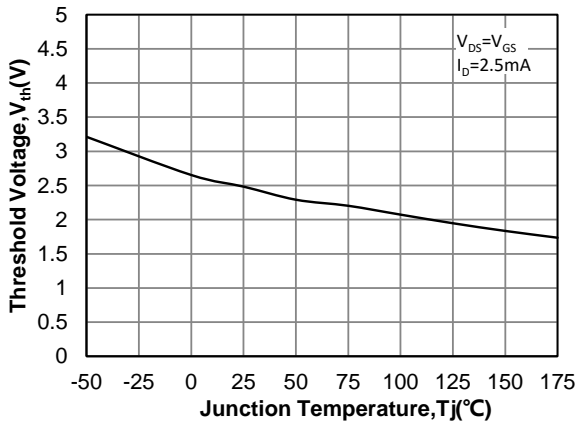


Fig 10: 3rd Quadrant Characteristic at 25°C

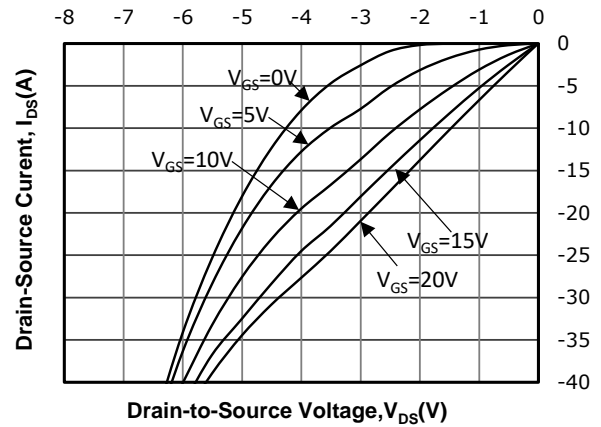


Fig 11: Gate Charge Characteristics

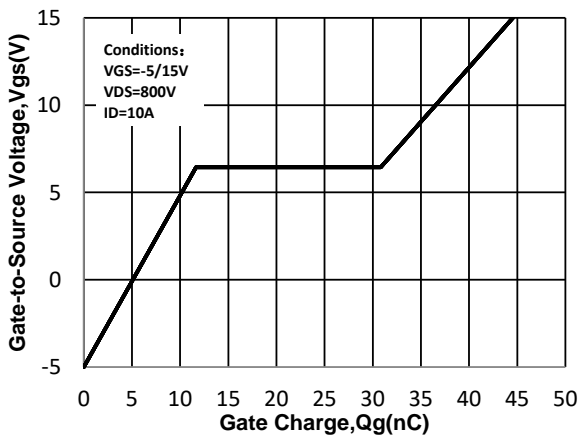


Fig 12: Capacitance Characteristics

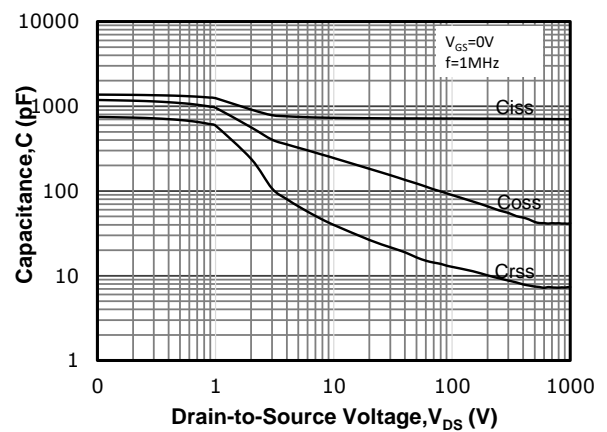


Fig 13: Continuous Drain Current vs. Case Temperature

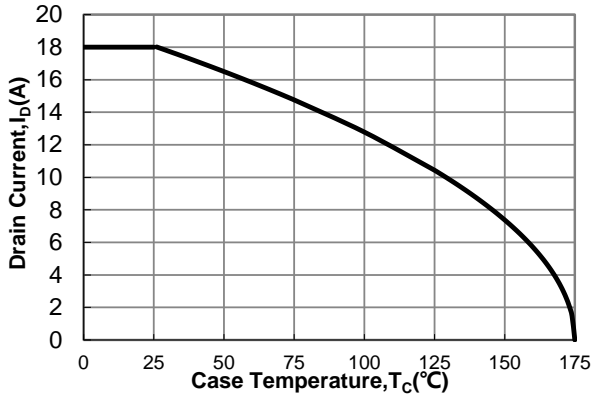


Fig 14: Maximum Power Dissipation vs. Case Temperature

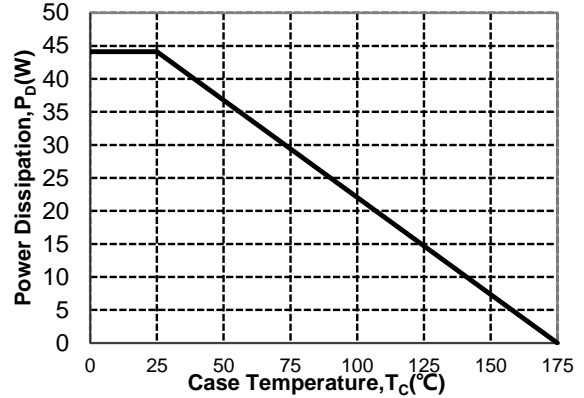


Fig 15: Safe Operating Area

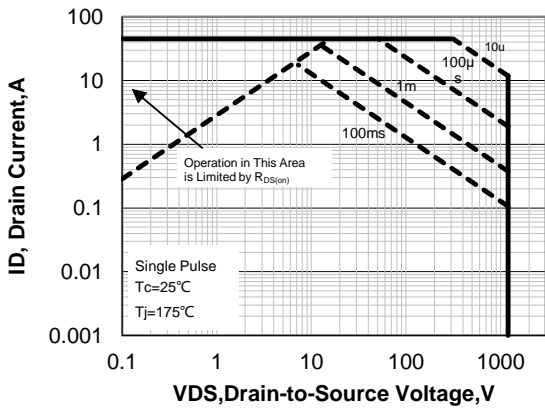


Fig 16: Output Capacitor Stored Energy

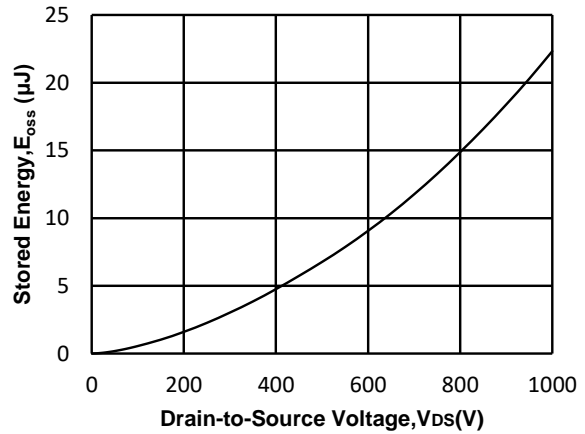
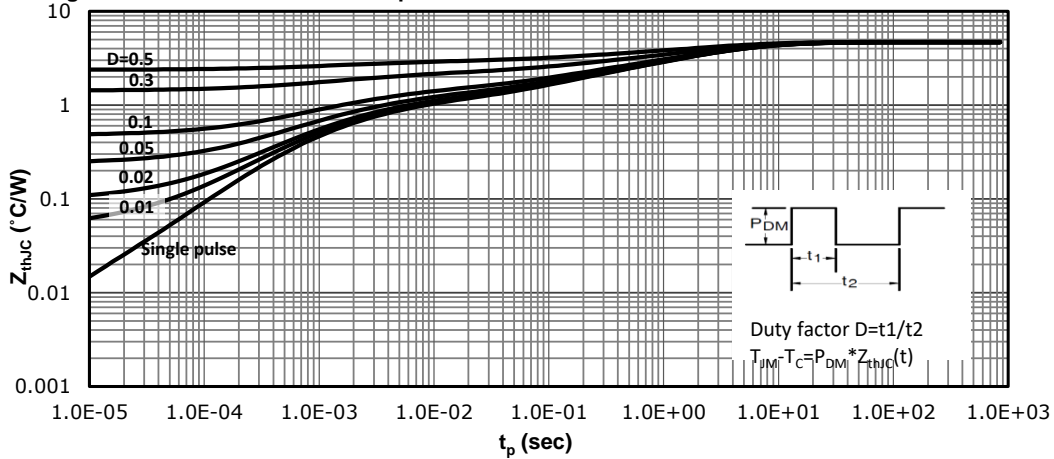
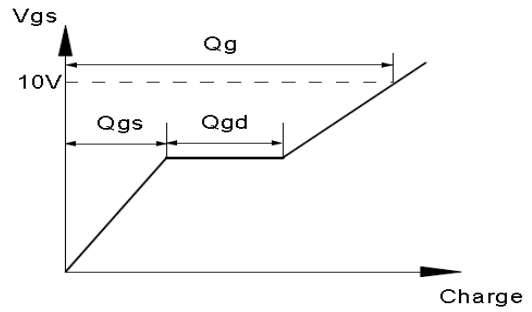
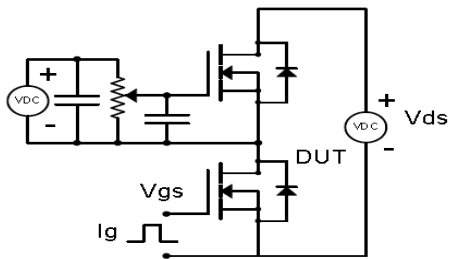


Fig 17: Max. Transient Thermal Impedance

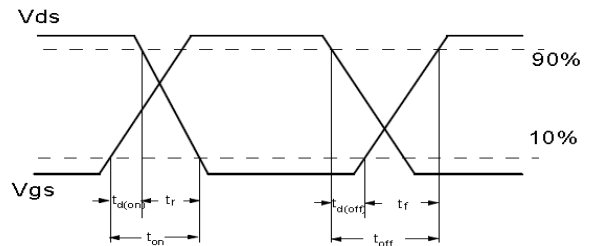
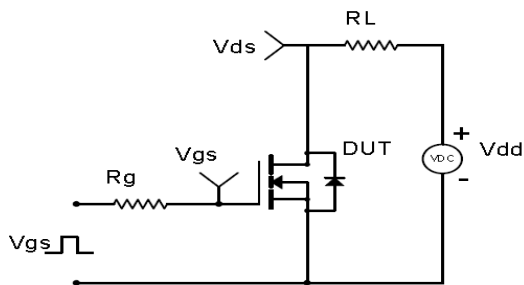


Test Circuit & Waveform

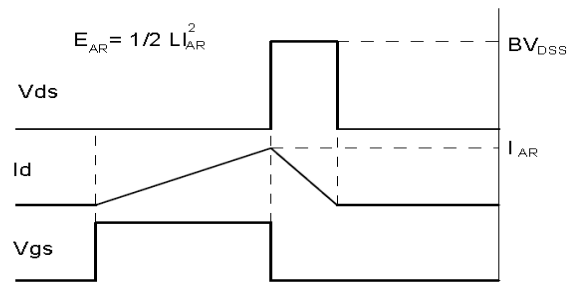
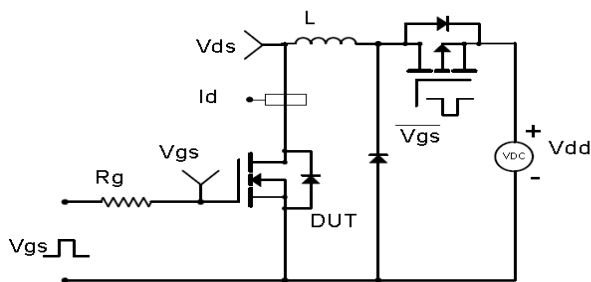
Gate Charge Test Circuit & Waveform



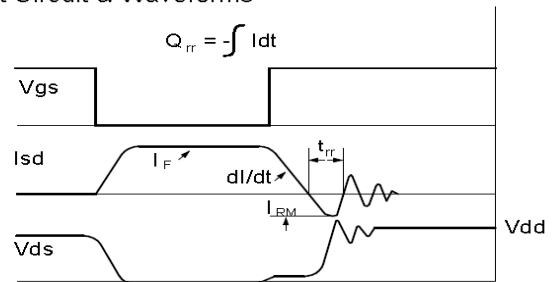
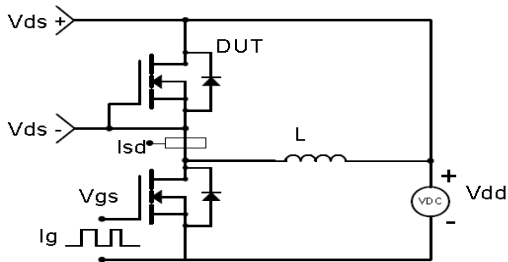
Resistive Switching Test Circuit & Waveforms



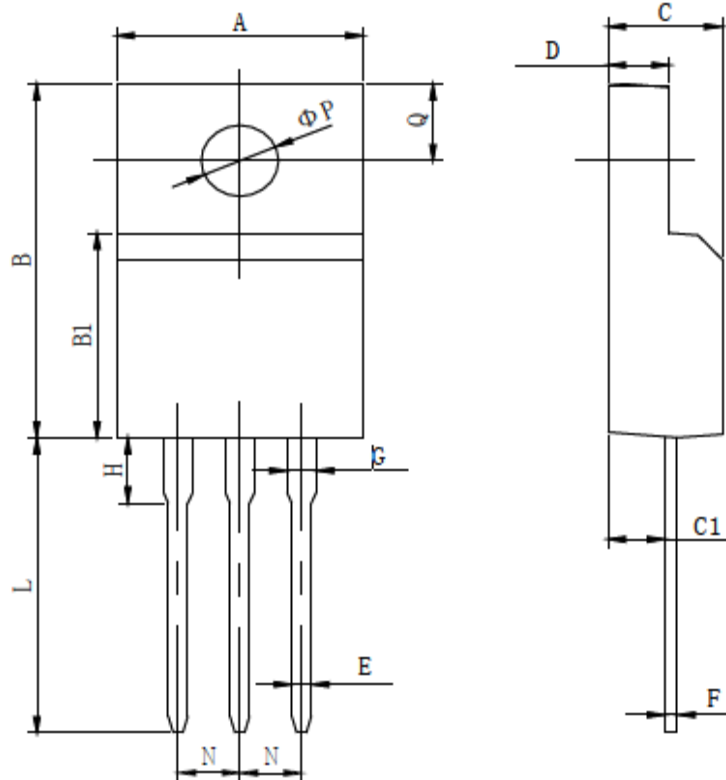
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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	2022/1/7	Release of first 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(CQ) reserves the right to improve product design, function and reliability without notice.