Features

- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Product Summary

V_{DS}	100V
$R_{DS(on),typ}$	4.4mΩ
I_D	140A

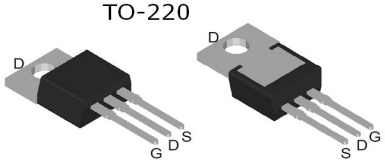
100% DVDS Tested
100% Avalanche Tested

Applications

- Motor control and drive
- Battery management System

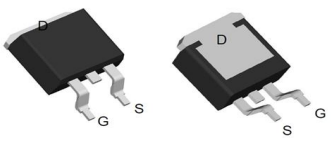
RoHS HF

TO-220

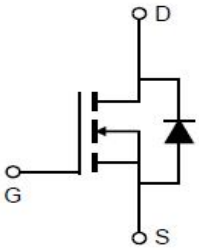


CRST049N10N3

TO-263



CRSS049N10N3



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRST049N10N3	CRST049N10N3	TO-220	Tube	N/A	N/A	50pcs
CRSS049N10N3	CRSS049N10N3	TO-263	Tape	N/A	N/A	800pcs /1000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 100°C (Silicon limit)	I_D	 140 89	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	560	A
Avalanche energy, single pulse (I_D = 48.5A, Rg=25Ω)[1]	E_{AS}	588	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	174	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

※. Notes:
1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =48.5A, Vds = 50V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.7	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

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

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250uA
		100	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=100V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$		4.4	5.2	mΩ	VGS=10V, ID=50A
Transconductance	g_{fs}	-	91	-	S	V_{DS}=5V, I_D=50A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	4890	-	pF	VGS=0V, VDS=50V, f=1MHz
Output Capacitance	C_{oss}	-	632	-		
Reverse Transfer Capacitance	C_{rss}	-	22	-		
Gate Total Charge	Q_G	-	73	-	nC	VGS=10V, VDS=50V, ID=50A, f=1MHz
Gate-Source charge	Q_{gs}	-	32	-		
Gate-Drain charge	Q_{gd}	-	11	-		
Turn-on delay time	$t_{d(on)}$	-	19	-	ns	Vds=50V Id=50A Rg=3Ω Vgs=10V
Rise time	t_r	-	37	-		
Turn-off delay time	$t_{d(off)}$	-	47	-		
Fall time	t_f	-	23	-		
Gate resistance	R_G	-	2	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode continous forward current	Is	-	-	140	A	Tc = 25°C
Diode pulse current	Is pulse	-	-	560	A	Tc = 25°C
Body Diode Forward Voltage	V_{SD}	-	0.9	1.4	V	V_{GS}=0V, I_{SD}=50A
Body Diode Reverse Recovery Time	t_{rr}	-	62	-	ns	I_F=50A,dI/dt=100A/ μ s
Body Diode Reverse Recovery Charge	Q_{rr}	-	130	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

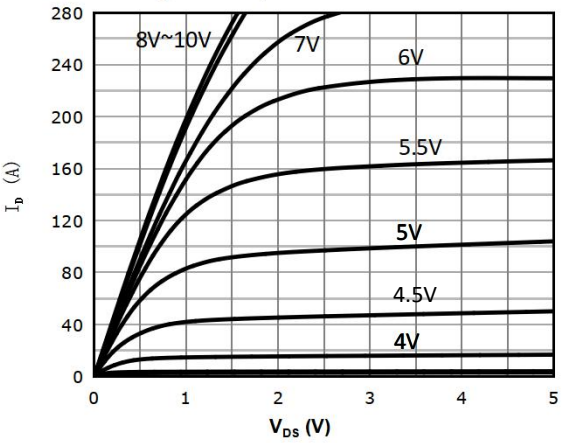


Fig 2: Transfer Characteristics

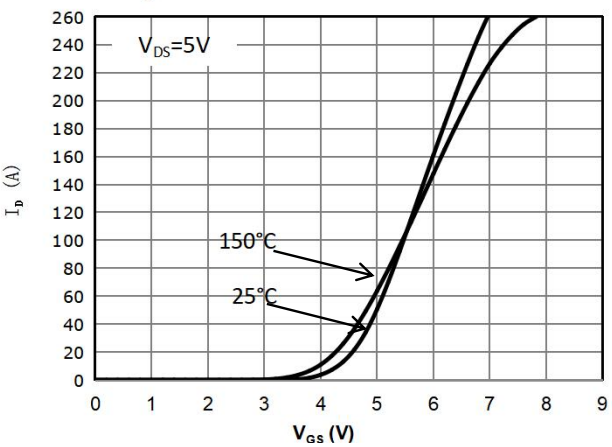


Fig 3: Rds(on) vs Drain Current and Gate Voltage

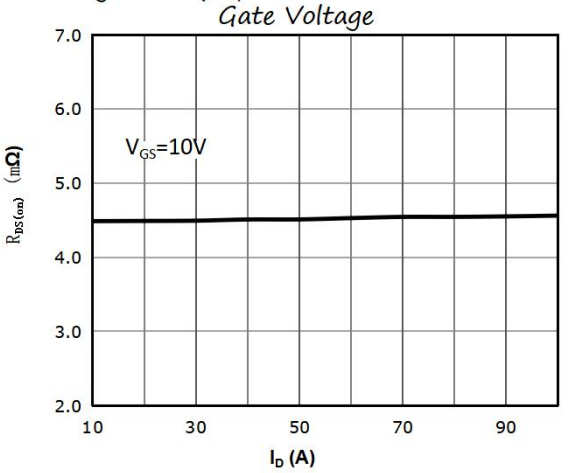


Fig 4: Rds(on) vs Gate Voltage

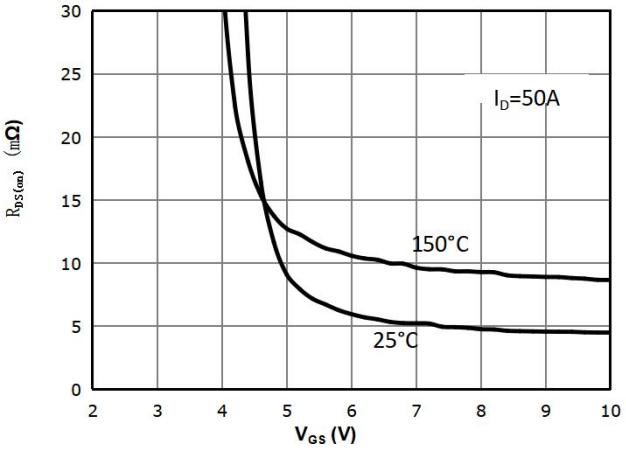


Fig 5: Rds(on) vs. Temperature

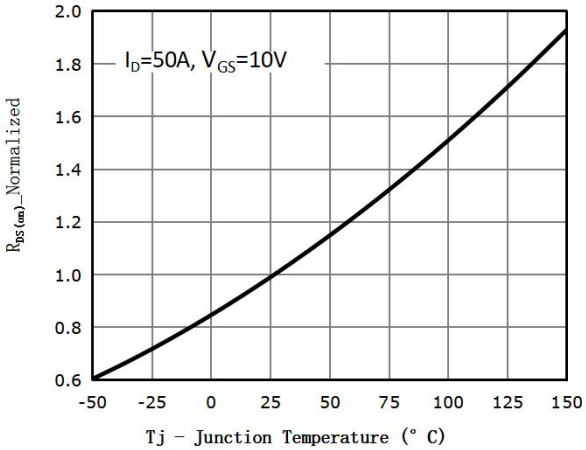


Fig 6: Vgs(th) vs. Temperature

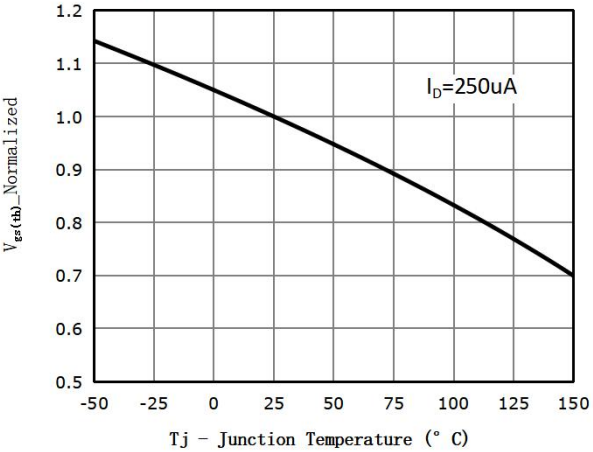


Fig 7: BVdss vs. Temperature

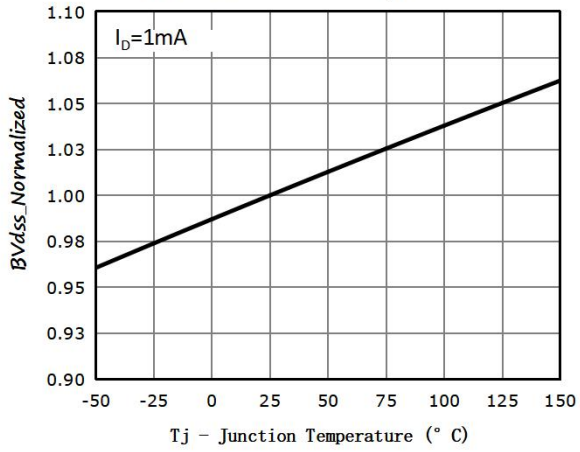


Fig 8: Capacitance Characteristics

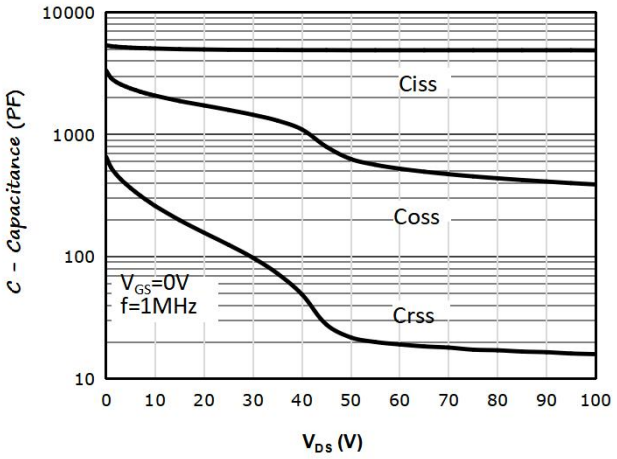


Fig 9: Gate Charge Characteristics

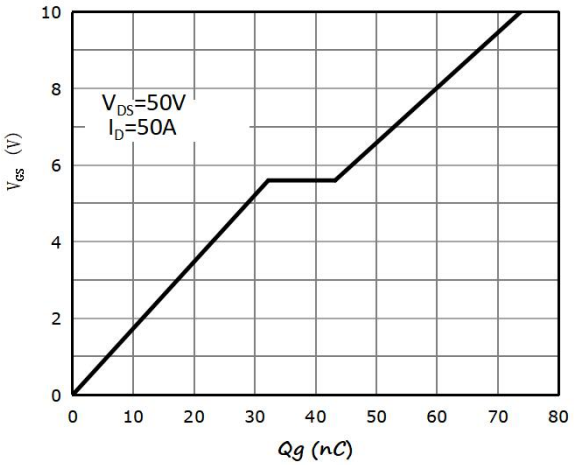


Fig 10: Body-diode Forward Characteristics

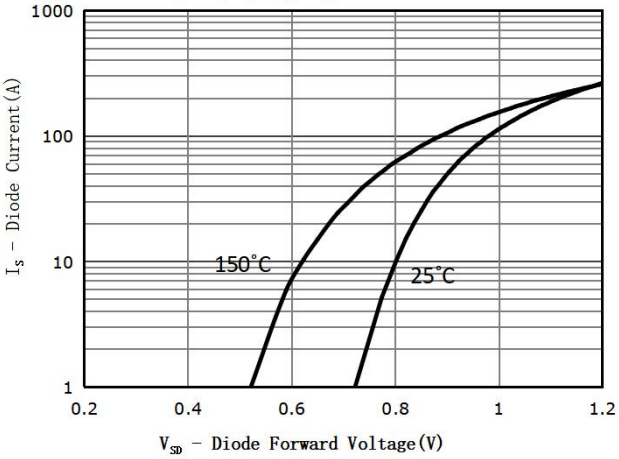


Fig 11: Power Dissipation

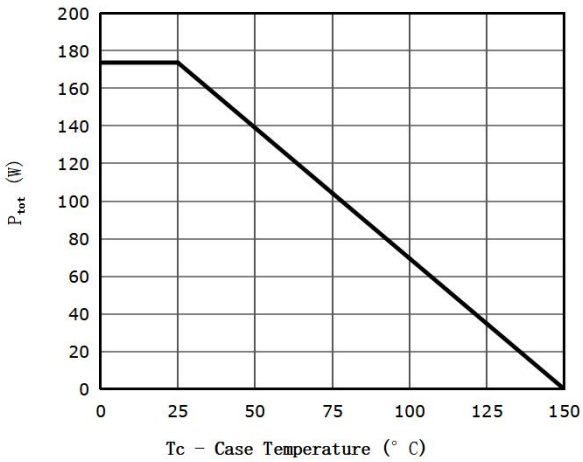


Fig 12: Drain Current Derating

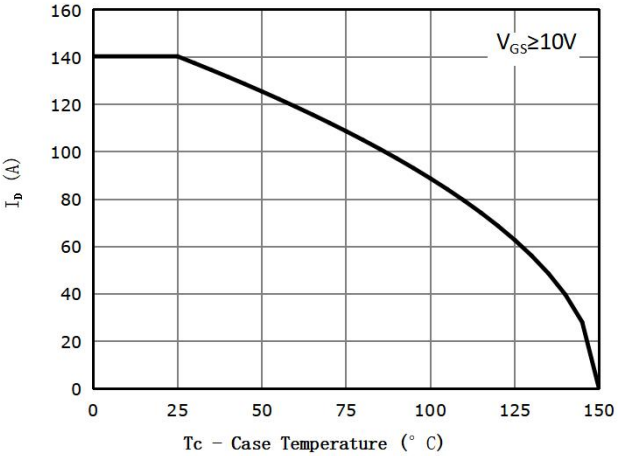


Fig 13: Safe Operating Area

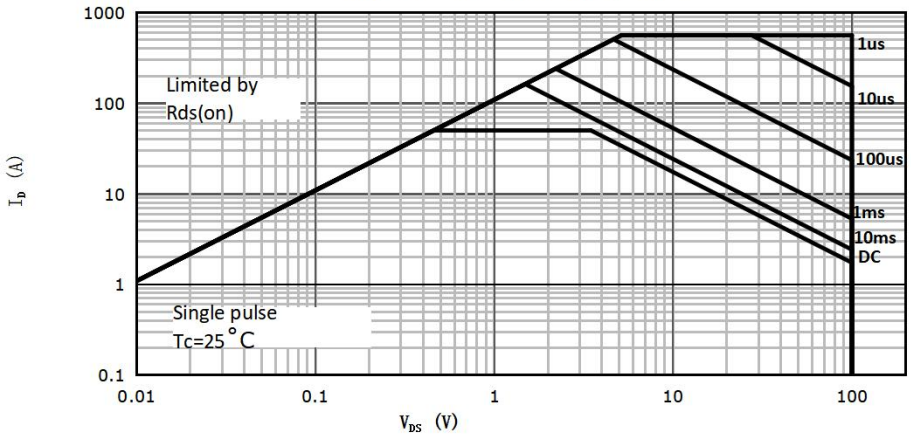
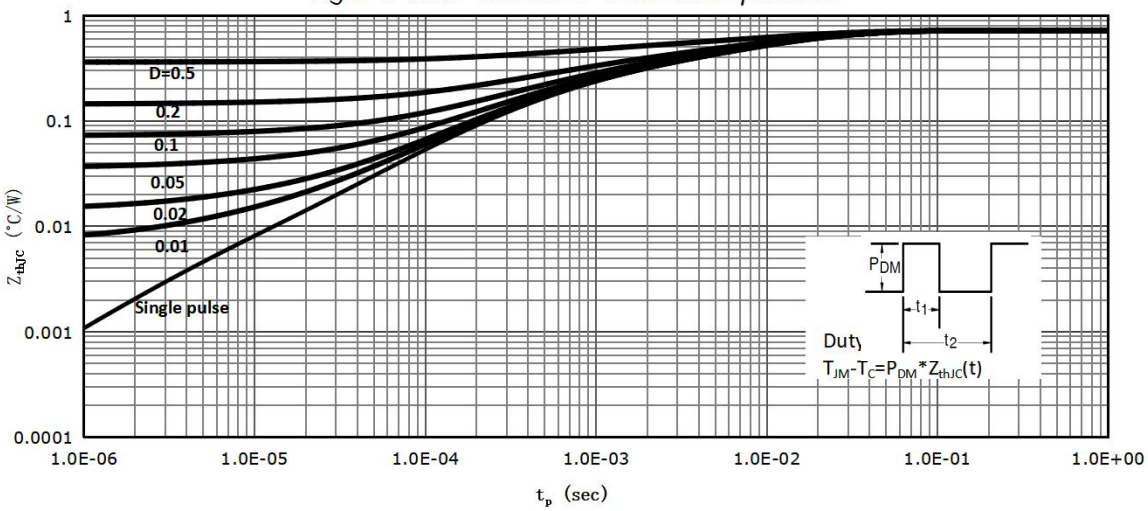
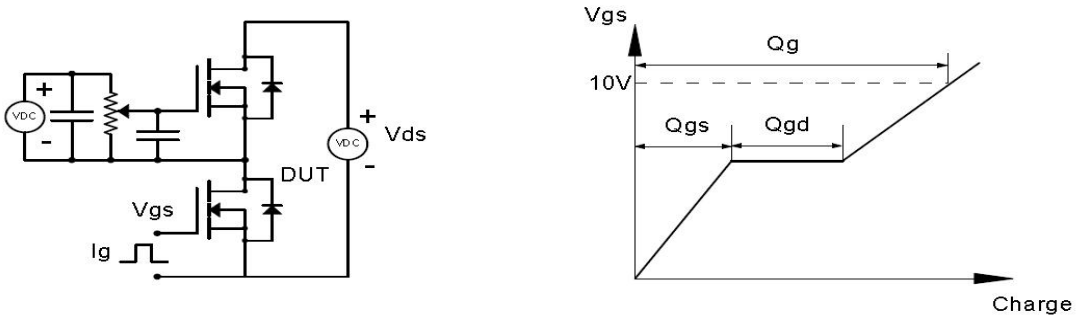


Fig 14: Max. Transient Thermal Impedance

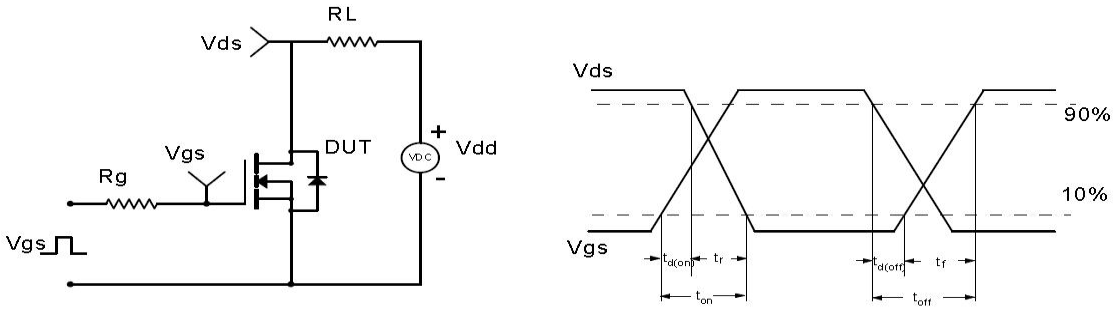


Test Circuit & Waveform

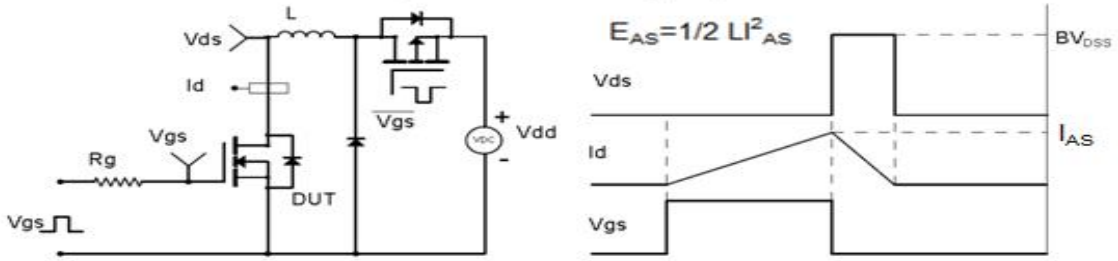
Gate Charge Test Circuit & Waveform



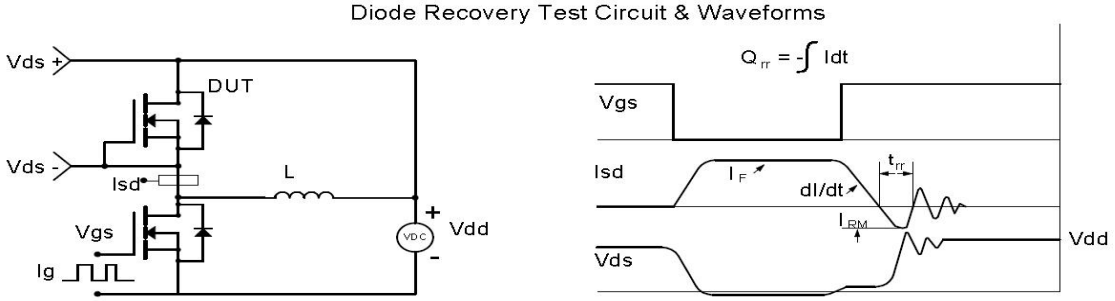
Resistive Switching Test Circuit & Waveforms



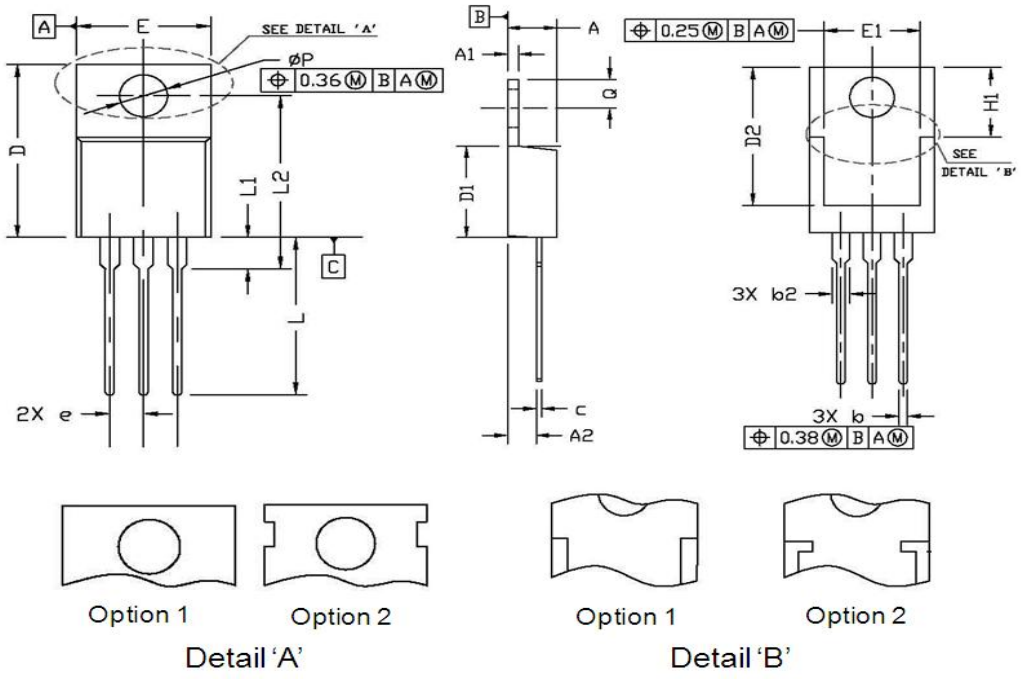
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

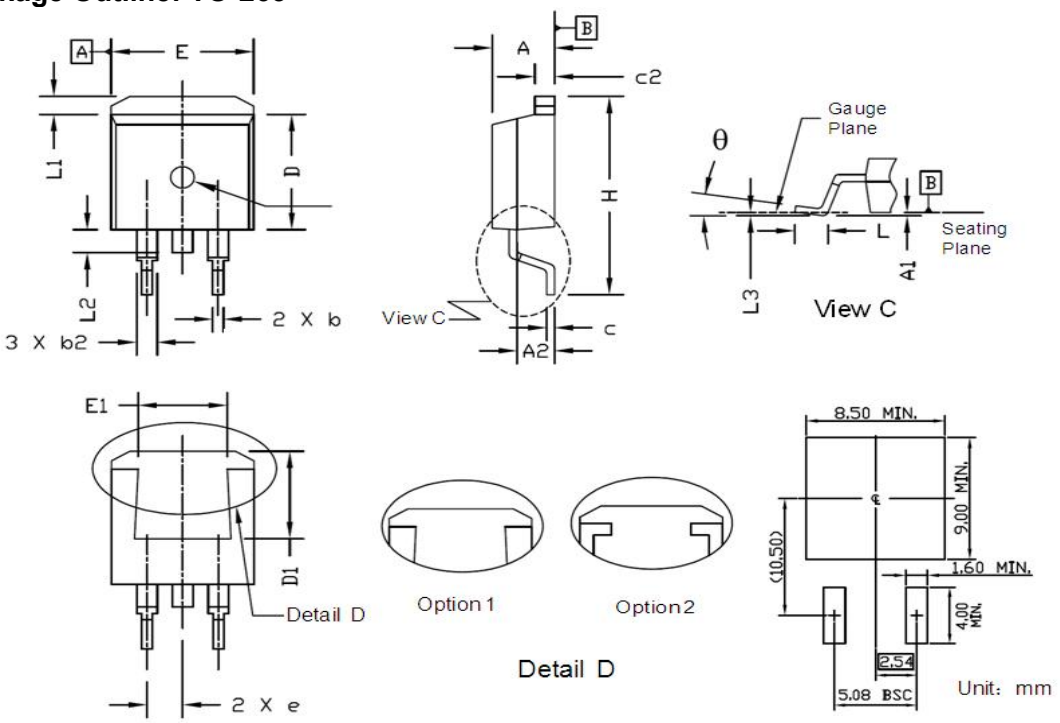


Package Outline: TO-220-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.80	0.169	0.189
A1	1.20	1.45	0.047	0.057
A2	2.20	2.90	0.087	0.114
b	0.69	0.95	0.027	0.037
b2	1.00	1.60	0.039	0.063
c	0.33	0.65	0.013	0.026
D	14.70	16.20	0.579	0.638
D1	8.59	9.65	0.338	0.380
D2	11.75	13.60	0.463	0.535
e	2.54 BSC.		0.100 BSC.	
E	9.60	10.60	0.378	0.417
E1	7.00	8.89	0.276	0.350
H1	6.20	7.00	0.244	0.276
L	12.60	14.80	0.496	0.583
L1	2.70	3.80	0.106	0.150
L2	12.13	16.50	0.478	0.650
Q	2.40	3.10	0.094	0.122
P	3.50	3.95	0.138	0.156

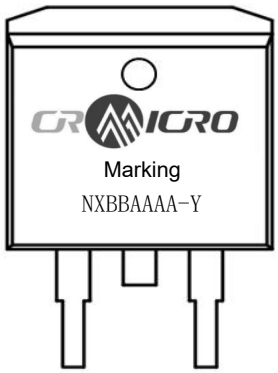
Package Outline: TO-263



Symbol		Dimensions In Millimeters		Dimensions In Inches	
		Min.	Max.	Min.	Max.
A		4.30	4.86	0.169	0.191
A1		0.00	0.25	0.000	0.010
A2		2.20	2.90	0.087	0.114
b		0.68	0.94	0.027	0.037
b2		1.14	1.78	0.045	0.070
c		0.33	0.65	0.013	0.026
c2		1.17	1.40	0.046	0.055
D		8.38	9.45	0.330	0.372
D1		6.90	8.17	0.272	0.322
e		2.54 BSC.		0.100 BSC.	
E		9.78	10.50	0.385	0.413
E1		6.50	8.60	0.256	0.339
H		14.61	15.88	0.575	0.625
L		1.78	2.79	0.070	0.110
L1		0.70	1.60	0.028	0.063
L2		1.00	1.78	0.039	0.070
L3		0.25 BSC.		0.010 BSC.	
θ	Option	-8°	0°	-8°	0°
	Option	0°	8°	0°	8°

Marking





NOTE:
NXBBAAAAY

N	—Wire Bond code	（No wiring is empty）
X	—Assembly location code	
BB	—Fab code	
AAAA	—Lot code	
Y	—Bin code	（No grading is empty）

Revision History

Revision	Date	Major changes
1.0	2025/7/9	Release of Preliminary version.

Disclaimer

CRM reserves the right to change any product or information in this Specification at any time without prior notice.

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