CRST155N20N3,CRSS152N20N3

华润微电子(重庆)有限公司

SkyMOS3 N-MOSFET 200V, 13mΩ, 80A

Features

- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance RDS(on)
- Excellent QgxRDS(on) product(FOM)
- Qualified according to JEDEC criteria

Product Summary

V_{DS}	200V
$R_{DS(on)}$	13mΩ
I_D	80A

100% Avalanche Tested

100% DVDS Tested

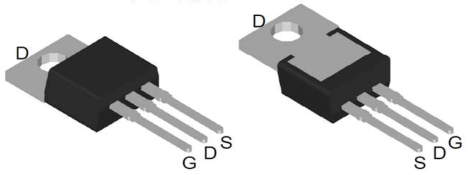
RoHS

H F

Applications

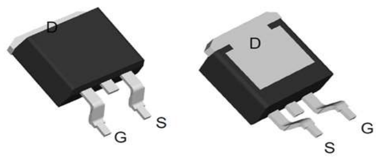
- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)

TO-220

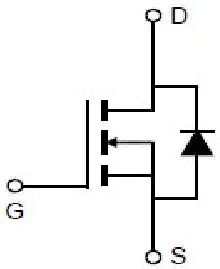


CRST155N20N3

TO-263



CRSS152N20N3



Package Marking and Ordering Information

MARKING	流通码	Package	Packing	Reel Size	Tape Width	Qty
CRST155N20N3	-	TO-220	Tube	N/A	N/A	50pcs
CRSS152N20N3	-	TO-263	Tape	N/A	N/A	1000pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	200	V
Continuous drain current	I_D		A
T_C = 25°C (Silicon limit)		82	
T_C = 25°C (Package limit)		160	
T_C = 100°C (Silicon limit)		52	
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	328	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)[1]	E_{AS}	190	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	234	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

※. Notes:1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS = 27.5A, Vgs=10V.

Thermal Resistance

Parameter	**Symbol**	**Max**	**Unit**
Thermal resistance, junction – case.	R_{thJC}	0.53	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62.5	

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}	200	-	-	V	V_{GS}=0V, I_D=250uA
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}=200V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	13.0 12.7	15.5 15.2	mΩ	VGS=10V, ID=40A TO-220 TO-263
Transconductance	g_{fs}	-	72.7	-	S	V_{DS}=5V,I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	3536	-	pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}	-	287	-		
Reverse Transfer Capacitance	C_{rss}	-	20.8	-		
Gate Total Charge	Q_G	-	55.4	-	nC	V_{GS}=10V, V_{DS}=100V, I_D=40A, f=1MHz
Gate-Source charge	Q_{gs}	-	17.5	-		
Gate-Drain charge	Q_{gd}	-	12.5	-		
Turn-on delay time	$t_{d(on)}$	-	17.53	-	ns	V_{GS}=10V, V_{DD}=100V, R_{G_ext}=2.7Ω
Rise time	t_r	-	66.33	-		
Turn-off delay time	$t_{d(off)}$	-	43.2	-		
Fall time	t_f	-	63.93	-		
Gate resistance	R_G	-	1.8	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.85	1.3	V	V_{GS}=0V,I_{SD}=40A
Diode Continous Forward Current	Is	-	-	82	A	TC = 25°C
Diode Pulse Current	Is,pulse[1]	-	-	328	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	120.1	-	ns	I_F=40A, dI/dt=100A/us Vds=100V
Body Diode Reverse Recovery Charge	Q_{rr}	-	611.4	-	nC	

1. Diode pulse current is defined by thermal and/or package limits

Typical Performance Characteristics

Fig 1: Output Characteristics

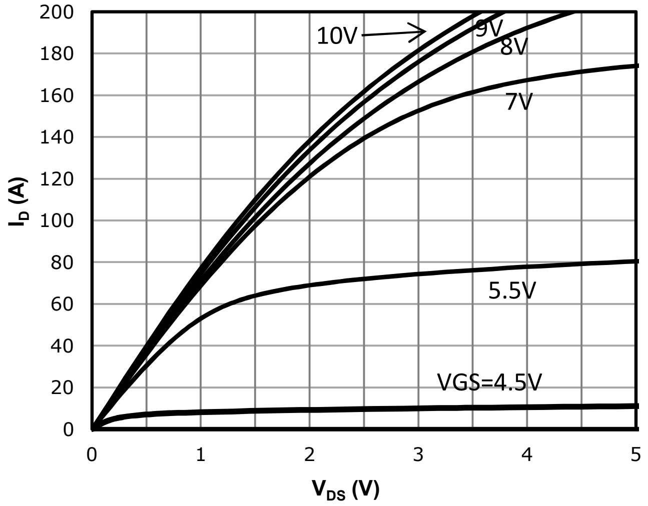


Fig 2: Transfer Characteristics

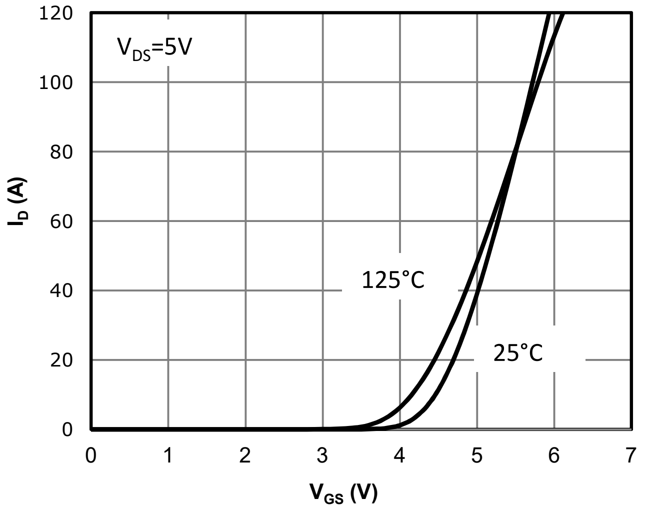


Fig 3: Rds(on) vs Drain Current and Gate Voltage

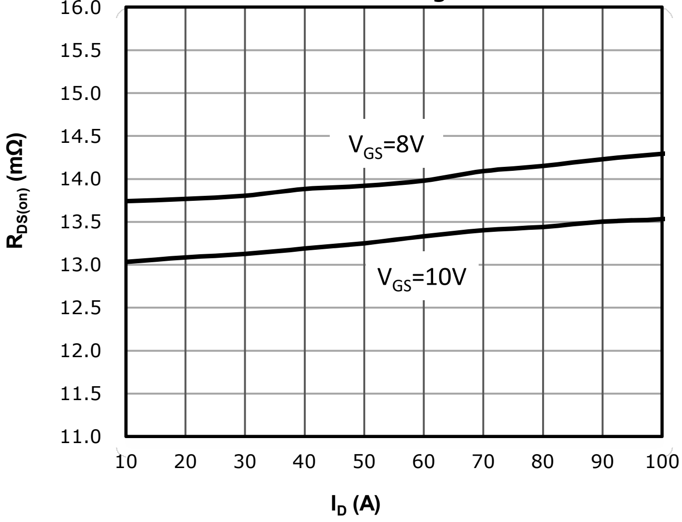


Fig 4: Rds(on) vs Gate Voltage

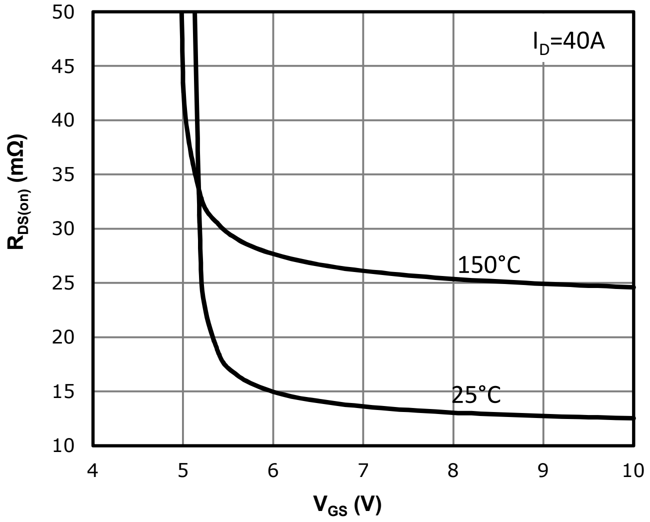


Fig 5: Rds(on) vs. Temperature

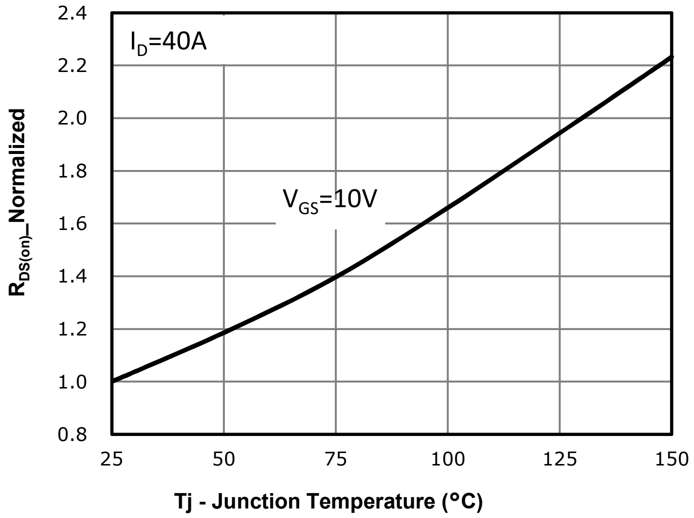


Fig 6: Capacitance Characteristics

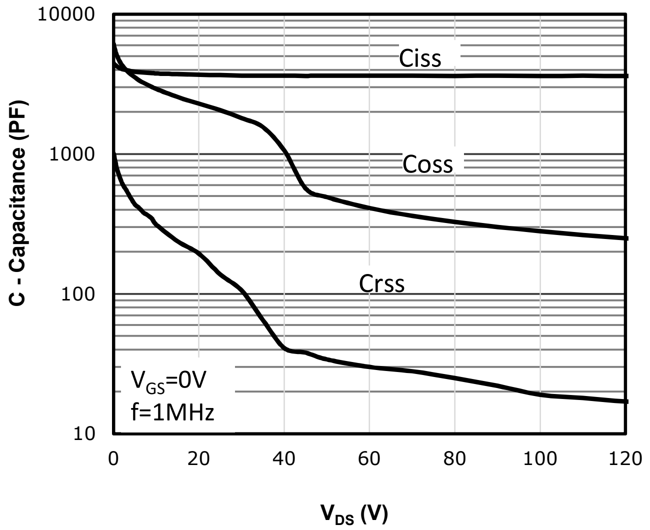


Fig 7: Gate Charge Characteristics

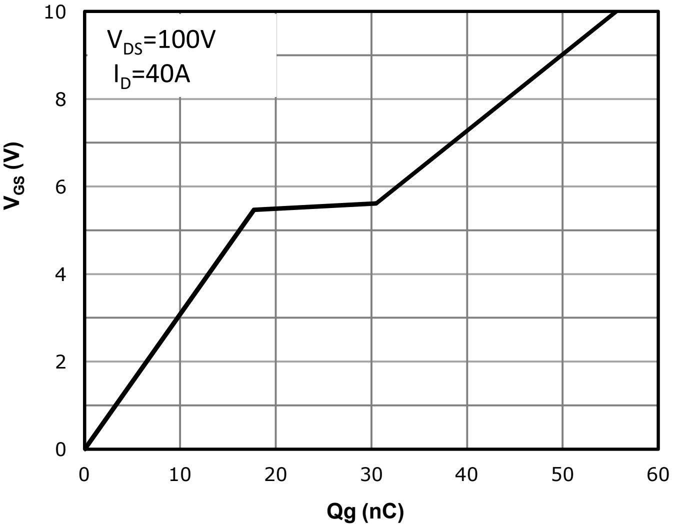


Fig 8: Body-diode Forward Characteristics

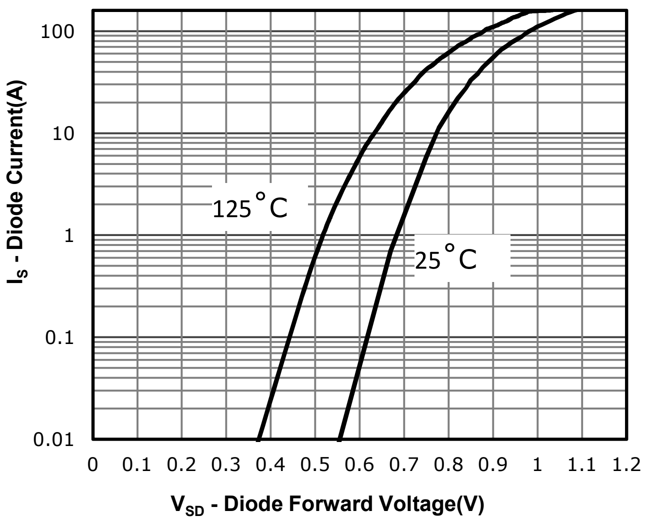


Fig 9: Power Dissipation

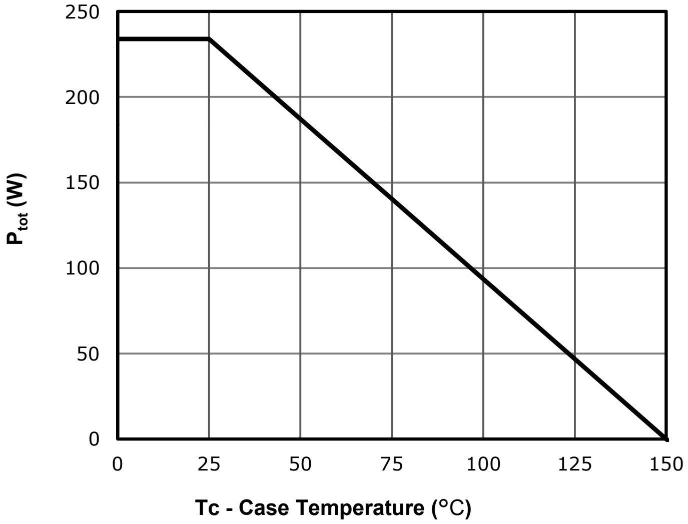


Fig 10: Drain Current Derating

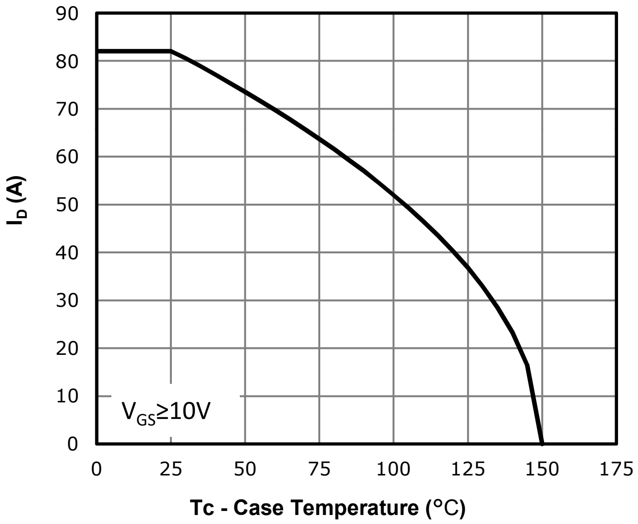


Fig 11: Safe Operating Area

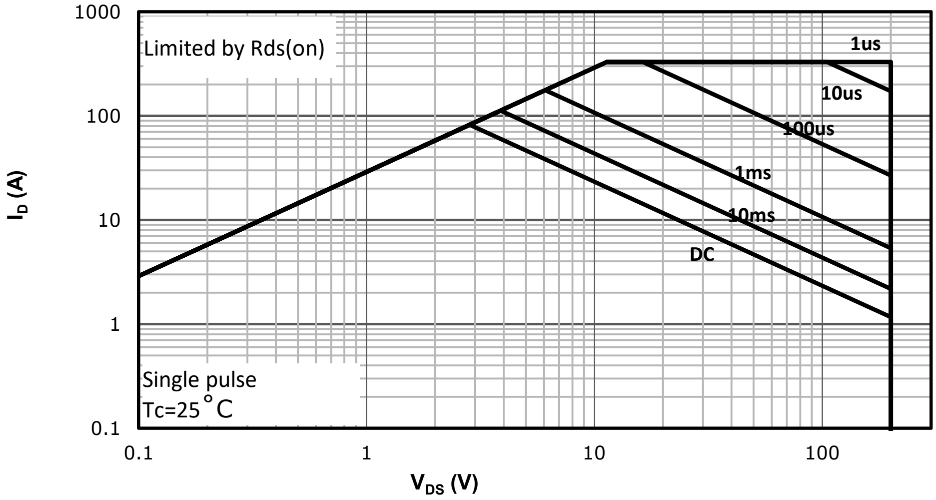
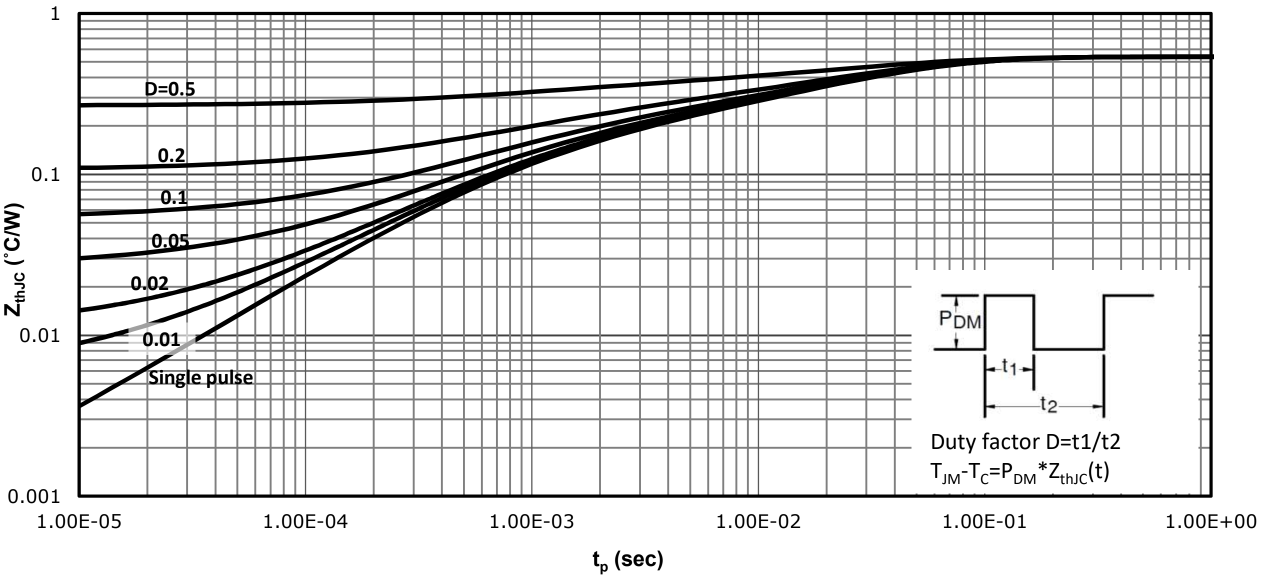
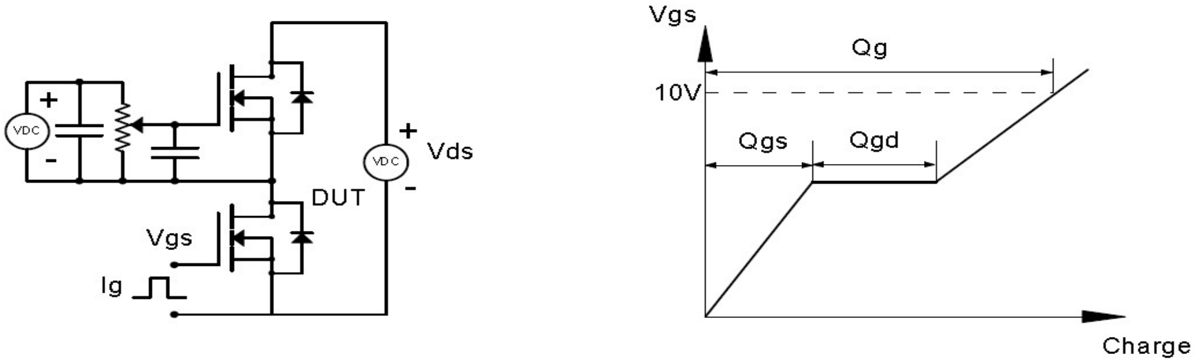


Fig 12: Max. Transient Thermal Impedance

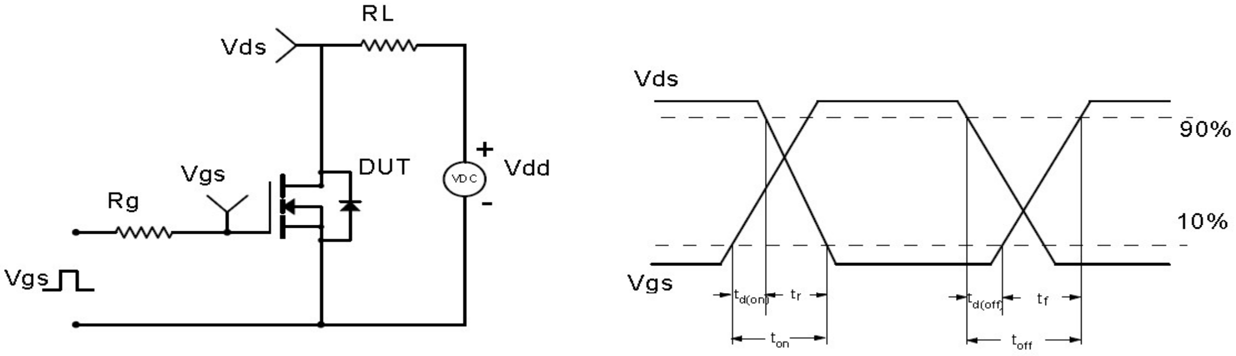


Test Circuit & Waveform

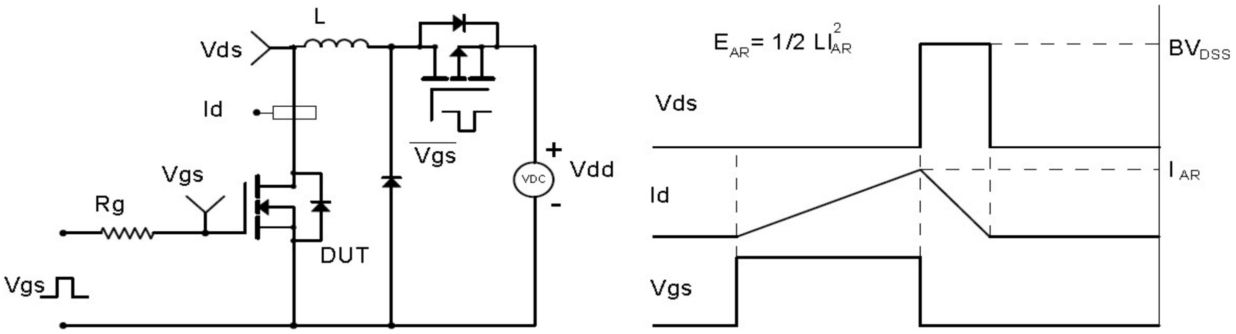
Gate Charge Test Circuit & Waveform



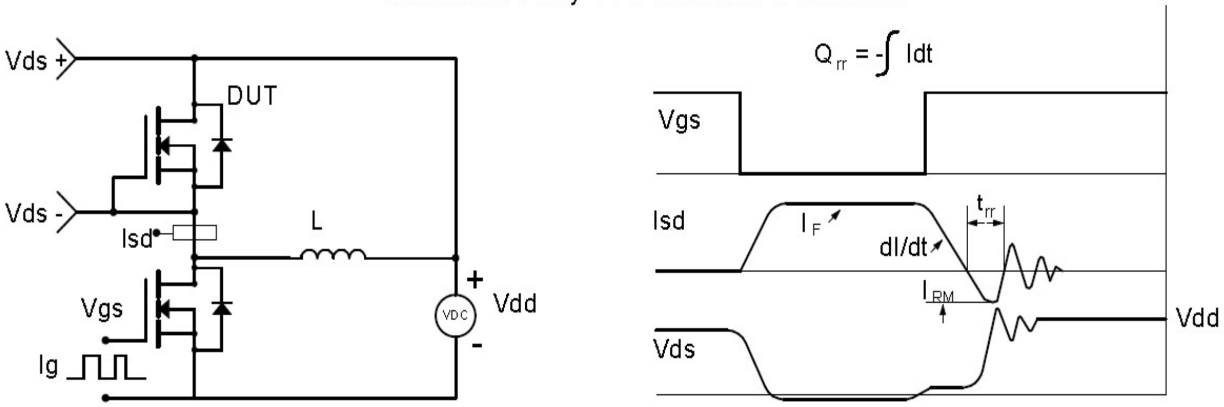
Resistive Switching Test Circuit & Waveforms



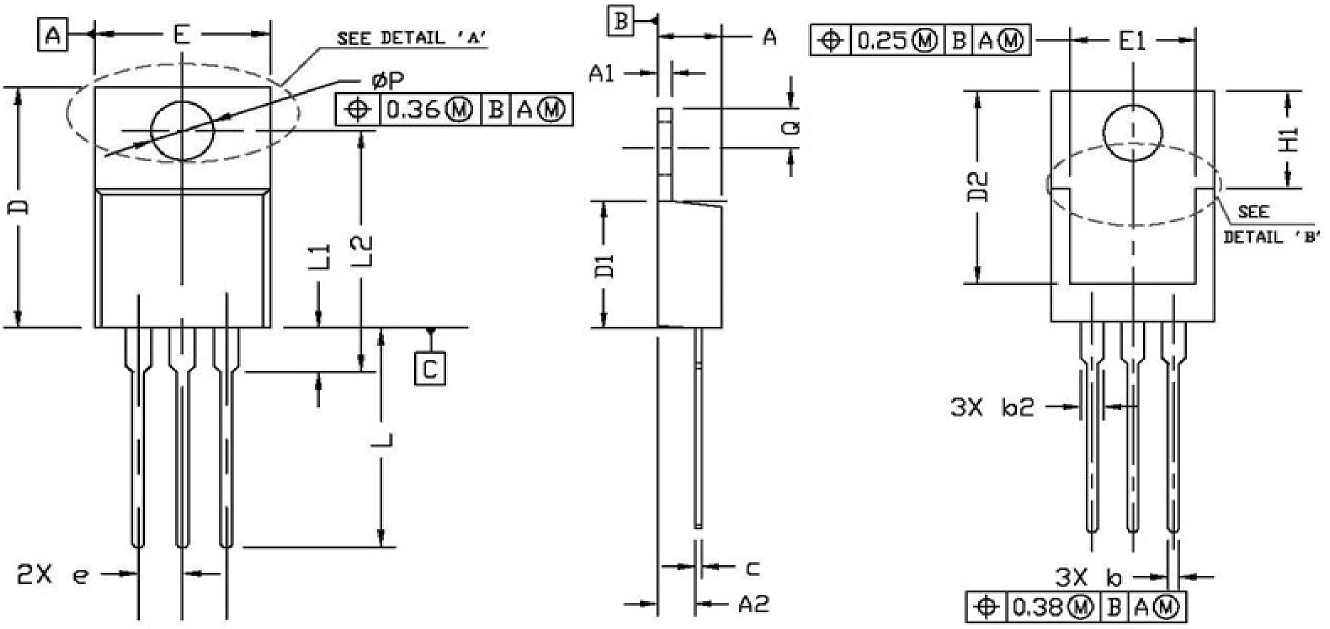
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

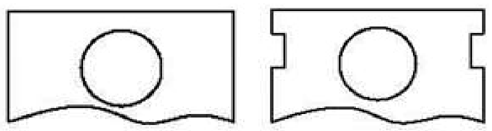


Diode Recovery Test Circuit & Waveforms



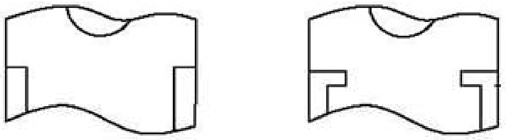
Package Outline: TO-220





Option 1 Option 2

Detail 'A'

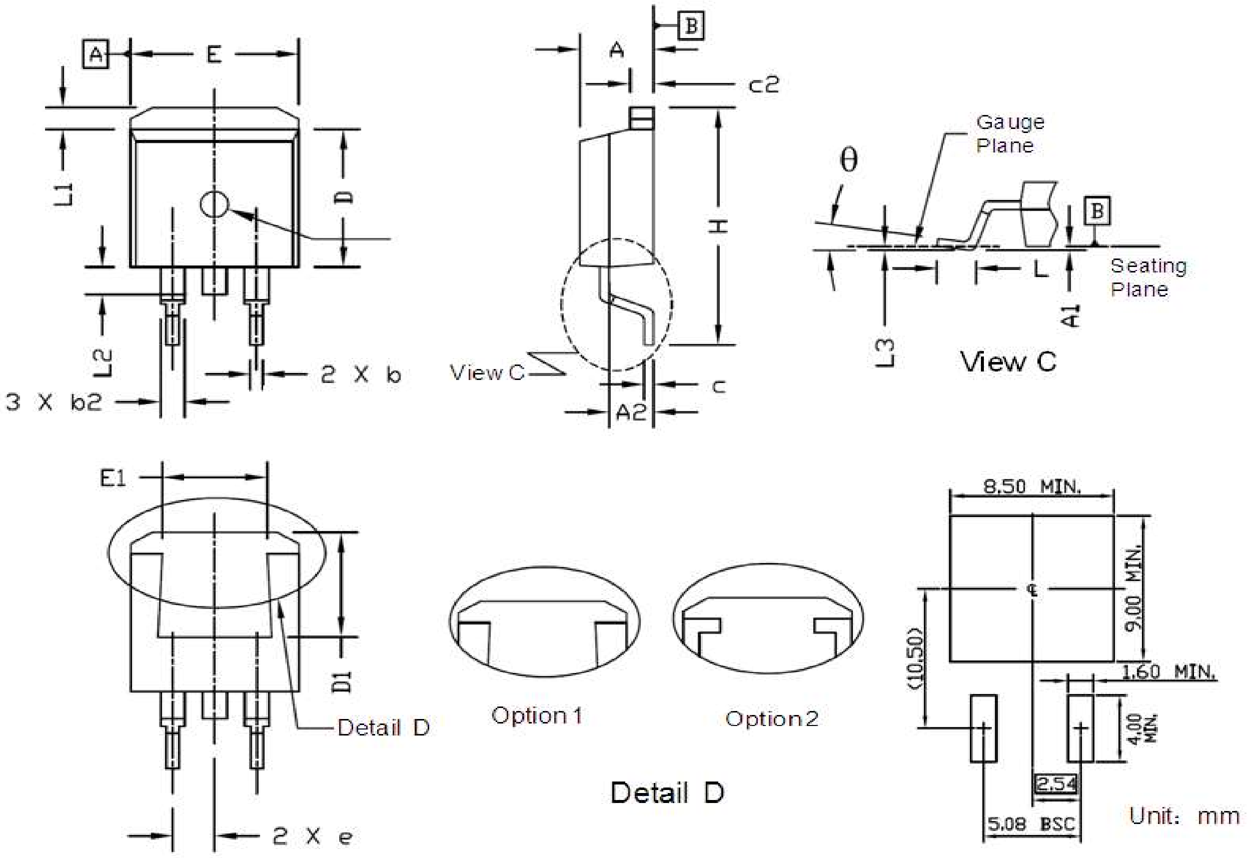


Option 1 Option 2

Detail 'B'

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 A	-8°	0°	-8°	0°
	Option B	0°	8°	0°	8°

Revision History

Revison	Date	Major changes
1.0	2021/11/20	Release of Prelimnary version.
2.0	2023/2/1	Supplement Isd&Isd,Pulse Description.

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(CQ) reserves the right to improve product design, function and reliability without notice.