华润微电子(重庆)有限公司

CRSZ028N12N3Z

SkyMOS3 N-MOSFET 120V, 2.2mΩ, 230A

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}	120V
$R_{DS(on).typ}$	2.2mΩ
I_D	230A

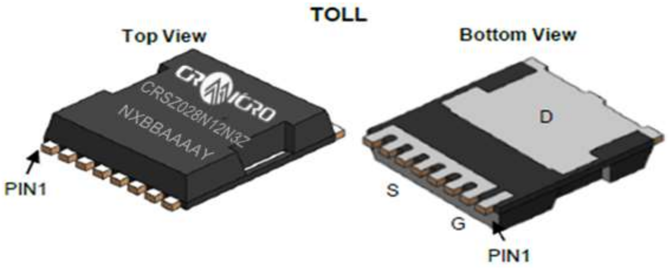
100% DVDS Tested
100% Avalanche Tested

Applications

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

RoHS

H F



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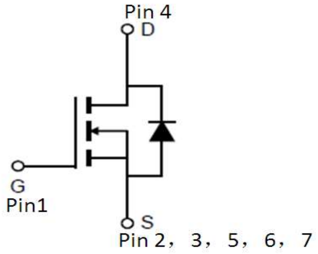


Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSZ028N12N3Z	CRSZ028N12N3Z	TOLL	Tape&Reel	N/A	N/A	2000pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	120	V
Continuous drain current	I_D		A
T_C = 25°C (Silicon limit)		230	
T_C = 25°C (Package limit)		300	
T_C = 100°C (Silicon limit)		145	
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	920	A
Avalanche energy, single pulse (ID = 77A, Rg=25Ω)[1]	E_{AS}	1468	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	278	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 =77A, VGS = 10V.

Thermal Resistance

Parameter	**Symbol**	**Max**	**Unit**
Thermal resistance, junction – case.	R_{thJC}	0.45	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	50	

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}	120	-	-	V	V_{GS}=0V, I_D=250uA
		120	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=120V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	0	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.2	2.8	mΩ	VGS=10V, ID=90A
Transconductance	g_{fs}	111.3	222.6	445.2	S	V_{DS}=5V, I_D=90A
Dynamic Characteristic						
Input Capacitance	C_{iss}	8054	12081	18121.5	pF	V_{GS}=0V, V_{DS}=60V, f=1MHz
Output Capacitance	C_{oss}	912	1368	2052		
Reverse Transfer Capacitance	C_{rss}	22	33	48.75		
Gate Total Charge	Q_G	99	148.9	223.3	nC	V_{GS}=10V, V_{DS}=60V, I_D=90A
Gate-Source charge	Q_{gs}	41	61.0	91.5		
Gate-Drain charge	Q_{gd}	14	28.9	57.7		
Turn-on delay time	$t_{d(on)}$	-	45.3	-	ns	V_{GS}=10V, V_{DD}=60V, R_{G_ext}=2.7Ω
Rise time	t_r	-	84.7	-		
Turn-off delay time	$t_{d(off)}$	-	96.8	-		
Fall time	t_f	-	47.4	-		
Gate resistance	R_G	-	2.6	-	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}	-	0.86	1.4	V	V_{GS}=0V,I_{SD}=90A
Body Diode Reverse Recovery Time	t_{rr}	-	90.2	-	ns	I_F=90A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	276.0	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

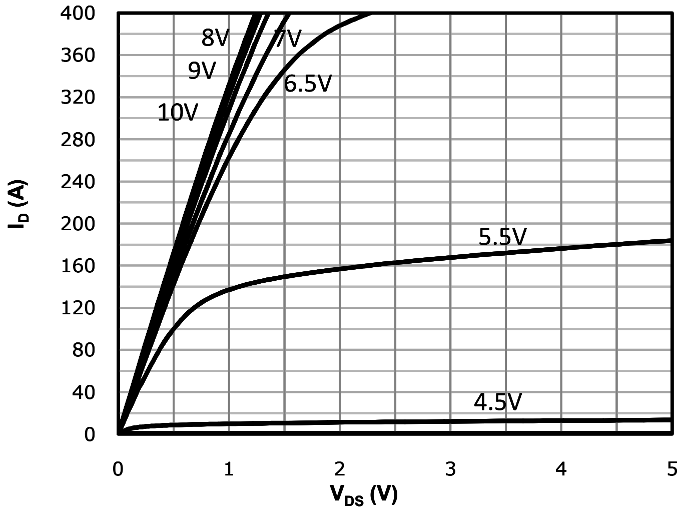


Fig 2: Transfer Characteristics

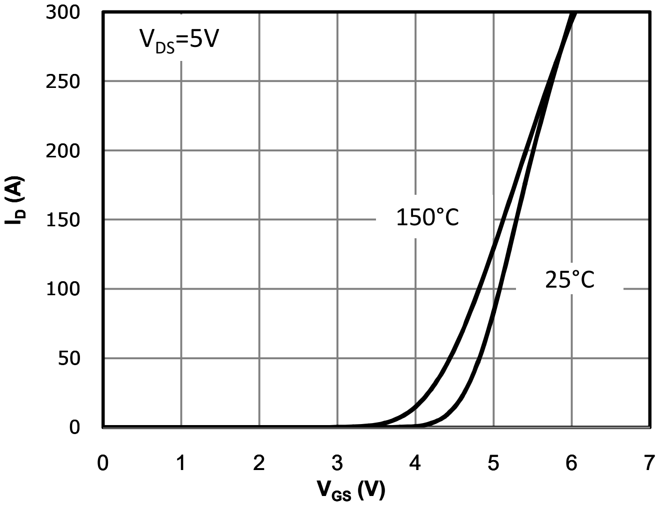


Fig 3: Rds(on) vs Drain Current and Gate Voltage

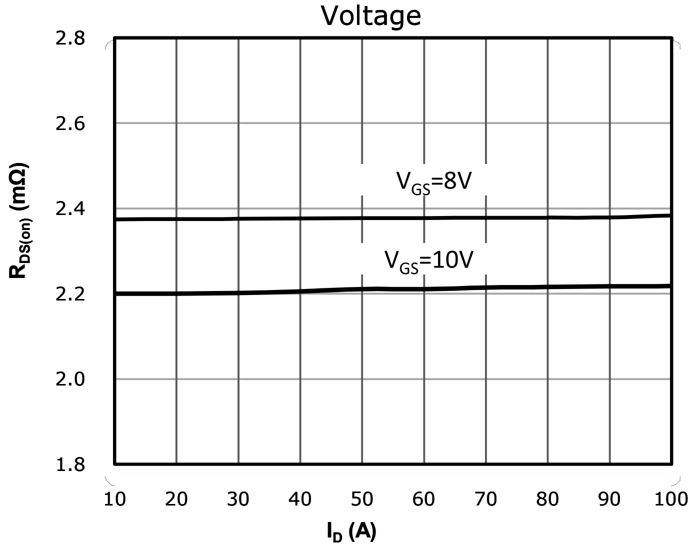


Fig 4: Rds(on) vs Gate Voltage

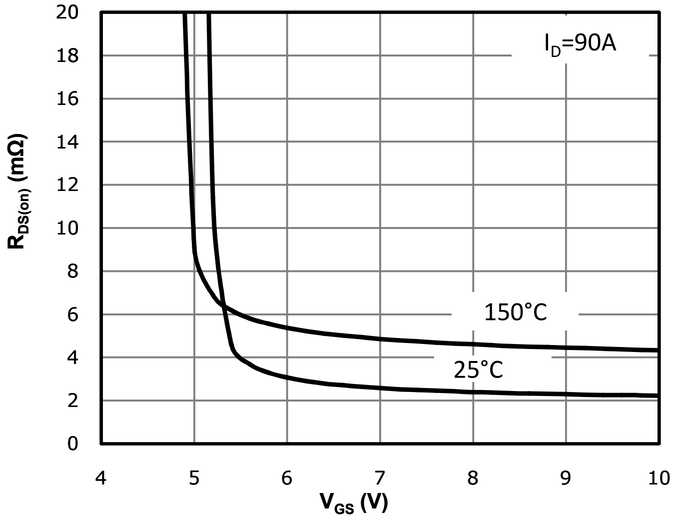


Fig 5: Rds(on) vs. Temperature

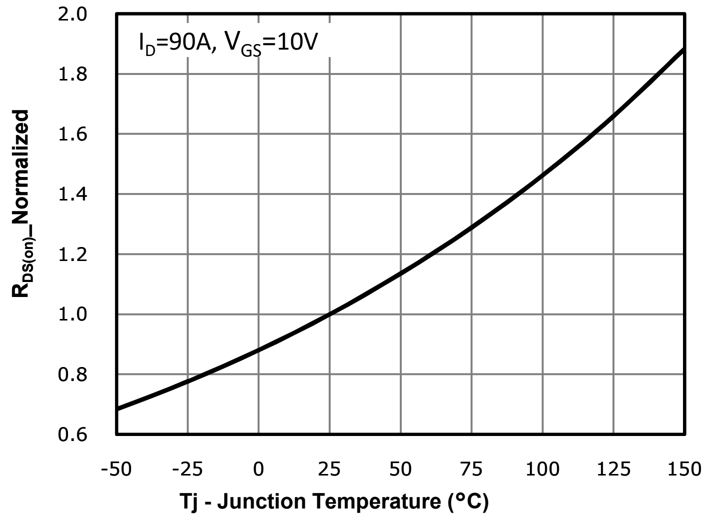


Fig 6: Vgs(th) vs. Temperature

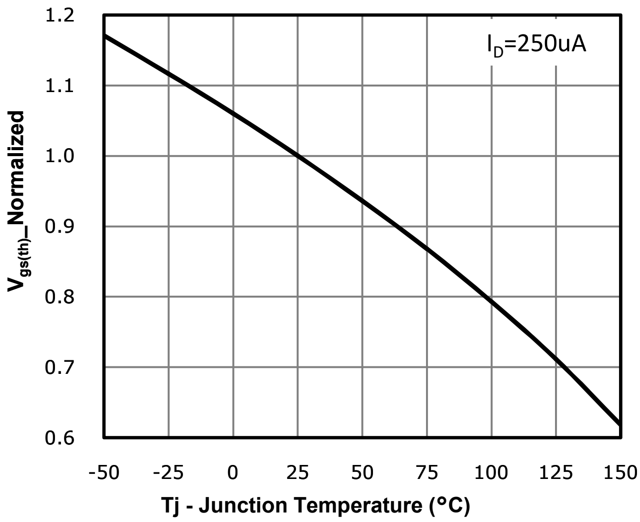


Fig 7: BVdss vs. Temperature

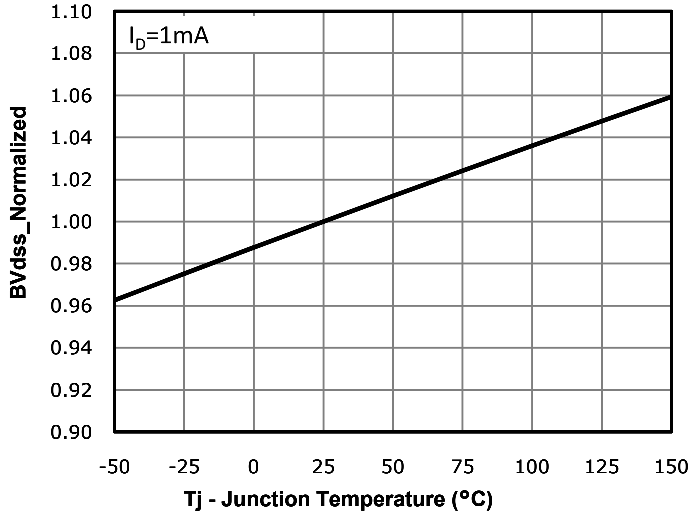


Fig 8: Capacitance Characteristics

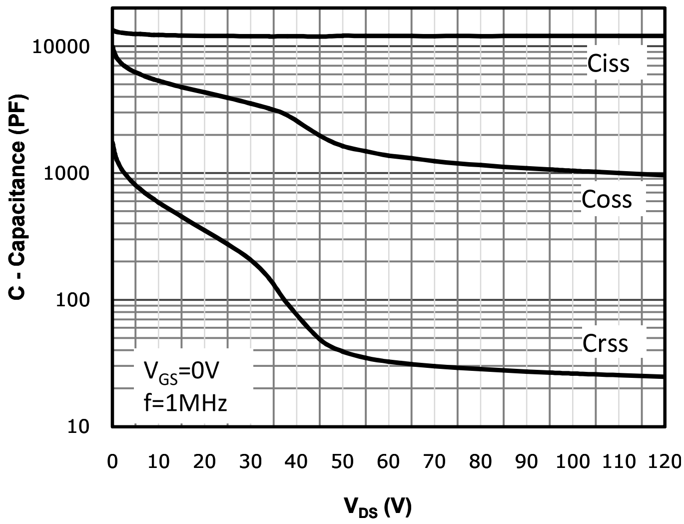


Fig 9: Gate Charge Characteristics

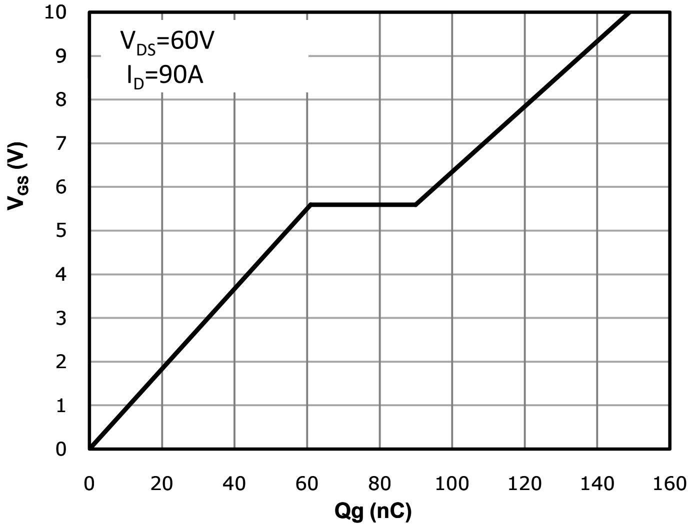


Fig 10: Body-diode Forward Characteristics

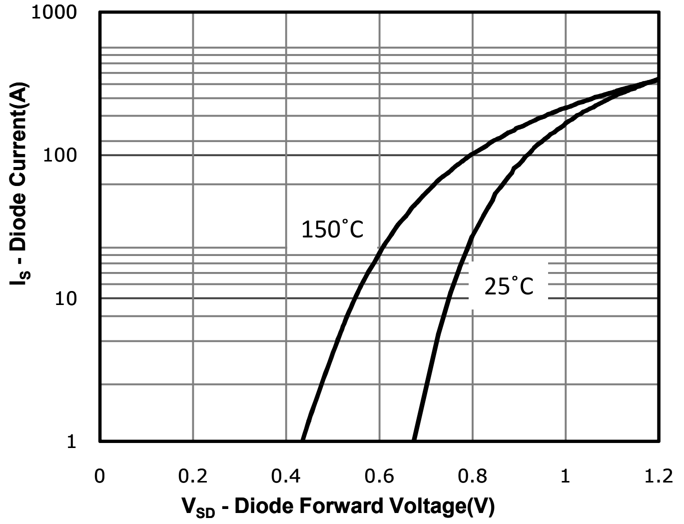


Fig 11: Power Dissipation

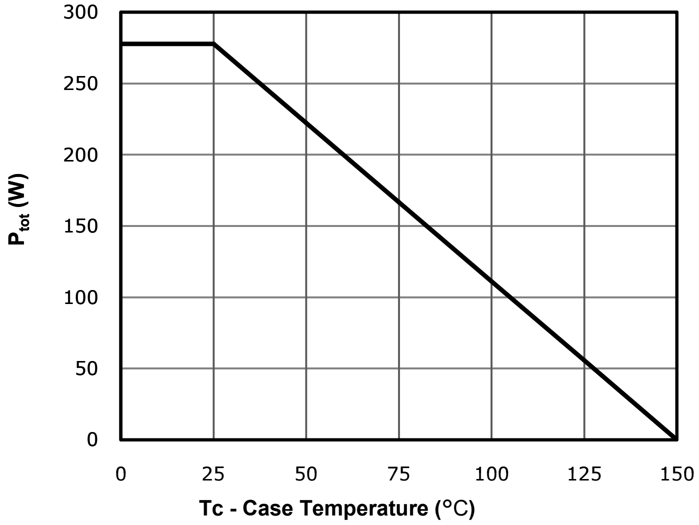


Fig 12: Drain Current Derating

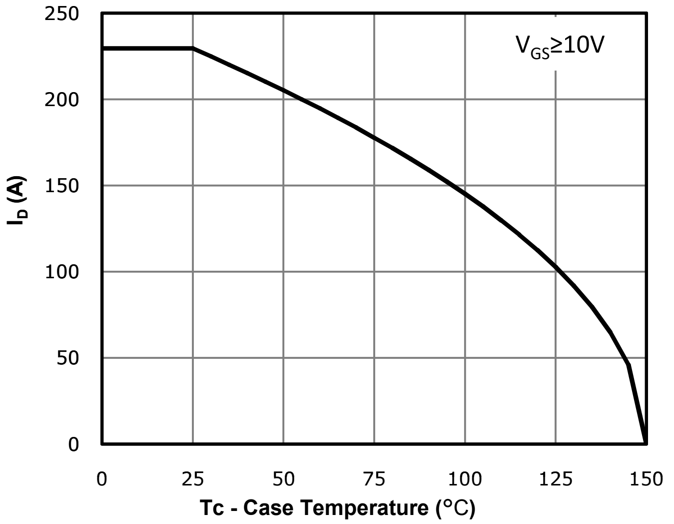


Fig 13: Safe Operating Area

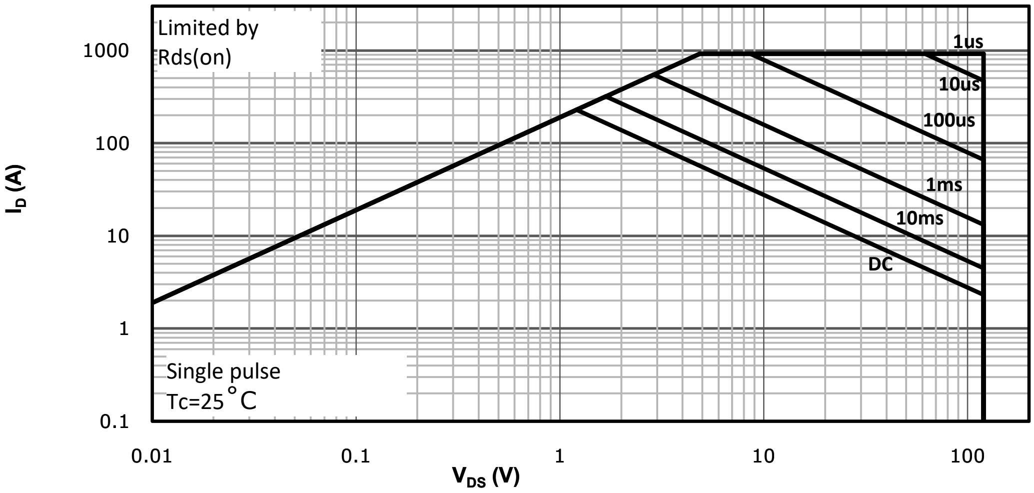
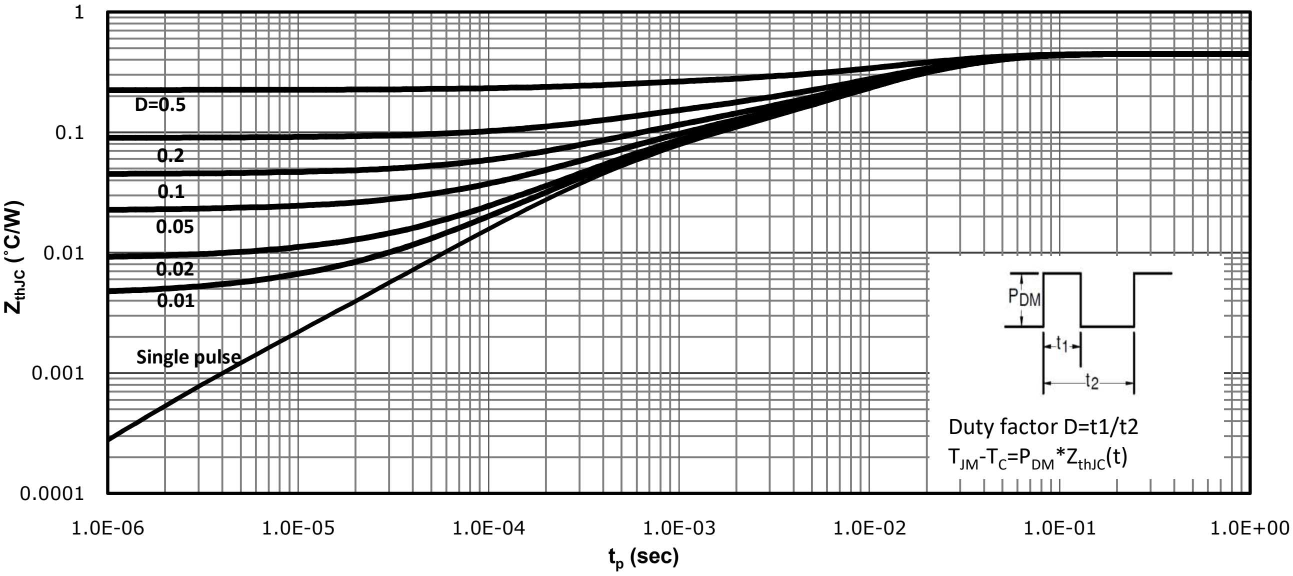
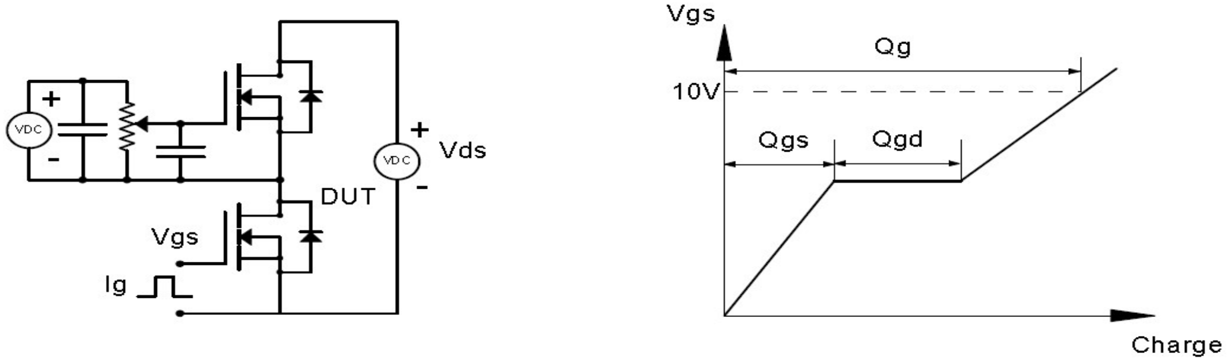


Fig 14: Max. Transient Thermal Impedance

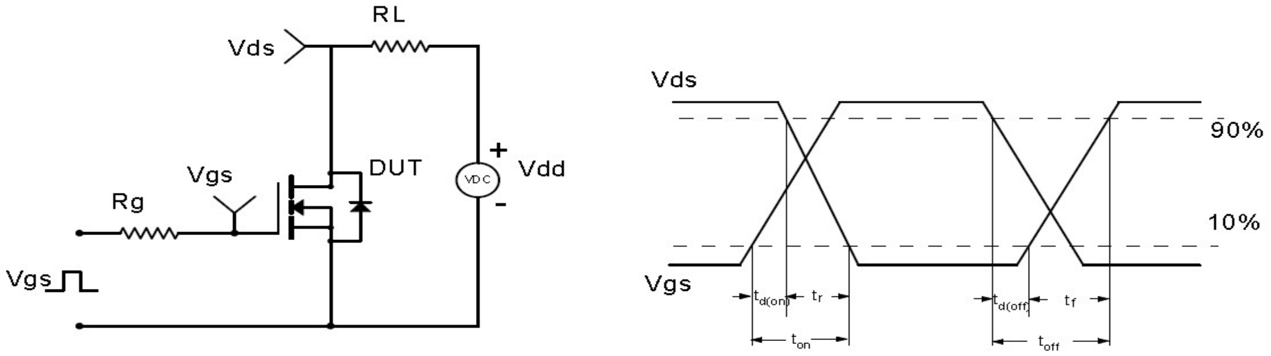


Test Circuit & Waveform

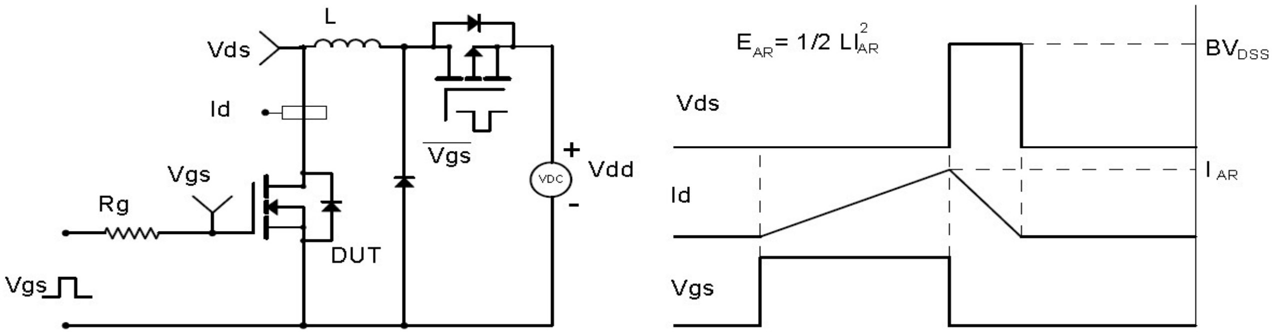
Gate Charge Test Circuit & Waveform



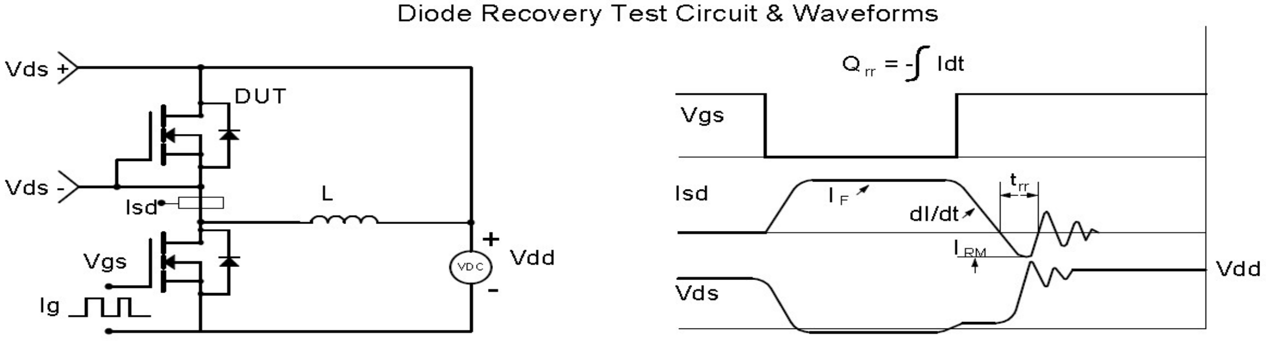
Resistive Switching Test Circuit & Waveforms



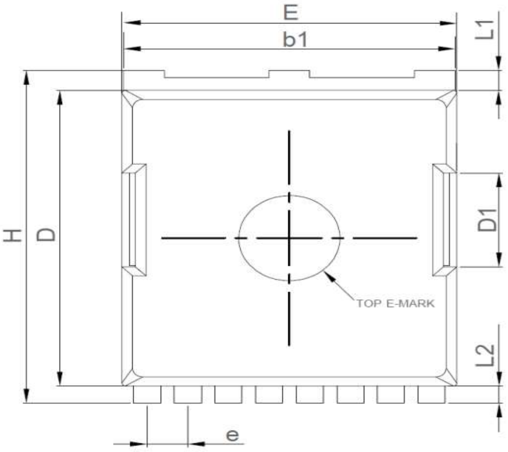
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



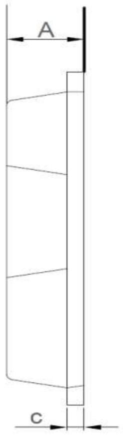
Diode Recovery Test Circuit & Waveforms



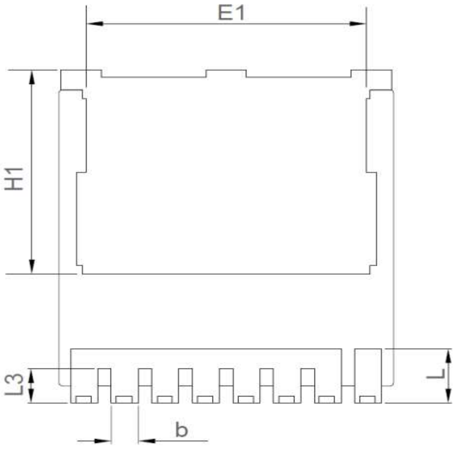
Package Outline: TOLL



TOP VIEW



SIDE VIEW



BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
b	0.60	0.90	0.024	0.035
b1	9.65	9.95	0.380	0.392
c	0.35	0.65	0.014	0.026
D	10.18	10.70	0.401	0.421
D1	3.15	3.45	0.124	0.136
E	9.70	10.10	0.382	0.398
E1	7.35	8.45	0.289	0.333
e	1.10	1.30	0.043	0.051
H	11.45	11.95	0.451	0.470
H1	6.55	7.50	0.258	0.295
L	1.35	2.10	0.053	0.083
L1	0.50	0.90	0.020	0.035
L2	0.40	0.80	0.016	0.031
L3	0.95	1.35	0.037	0.053

Marking

NOTE:
NXBBAAAAY

N	—Wire Bond code
X	—Assembly location code
BB	—Fab code
AAAA	—Lot code
Y	—Bin code

Revision History

Revision	Date	Major changes
1.0	2023/5/29	Release of Preliminary 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 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.