华润微电子(重庆)有限公司

CRST030N10NZ

SkyMOS1 N-MOSFET 100V, 2.5mΩ, 180A

Features

- Uses CRM(CQ) advanced SkyMOS1 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria
- 175°C Operating Temperature

Applications

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

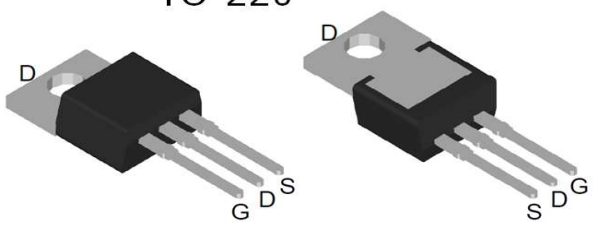
Product Summary

V_{DS}	100V
$R_{DS(on)}$	2.5mΩ
I_D	180A

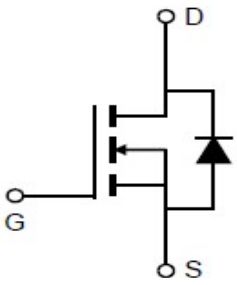
100% DVDS Tested

100% Avalanche Tested

TO-220



CRST030N10NZ



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRST030N10NZ	CRST030N10NZ	TO-220	Tube	N/A	N/A	50pcs

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 = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 238 180 169	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	720	A
Avalanche energy, single pulse (ID = 46A, Rg=25Ω)	E_{AS}	529	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	299	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.30	0.50	°C/W	
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	-	-	62	°C/W	

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
Gate threshold voltage	$V_{GS(th)}$	2.2	3.0	3.8	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	0 0	0.05 -	1 100	μA	V_{DS}=100V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	0	±10	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.5	3.0	mΩ	V_{GS}=10V, I_D=90A Tj=25°C
Transconductance	g_{fs}	50	197	300	S	V_{DS}=5V,I_D=90A
Dynamic Characteristic						
Input Capacitance	C_{iss}	7570	11355	17035.5	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	964	1446	2169		
Reverse Transfer Capacitance	C_{rss}	36	54	108		
Gate Total Charge	Q_G	113	169	254	nC	V_{GS}=10V, V_{DS}=50V, I_D=90A
Gate-Source charge	Q_{gs}	45	67	101		
Gate-Drain charge	Q_{gd}	20	30	60		

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Turn-on delay time	$t_{d(on)}$	23	35	53	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=3.0Ω
Rise time	t_r	74	111	222		
Turn-off delay time	$t_{d(off)}$	56	84	126		
Fall time	t_f	75	112	224		
Gate resistance	R_G	1.5	2.3	3.5	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}	0.5	0.9	1.4	V	V_{GS}=0V,I_{SD}=90A
Body Diode Continuous Forward Current	I_S	-	-	180	A	T_C = 25°C
Body Diode Pulsed Current	$I_{S\ pulse}$	-	-	720	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	51	101	202	ns	I_F=90A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	169	338	676	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

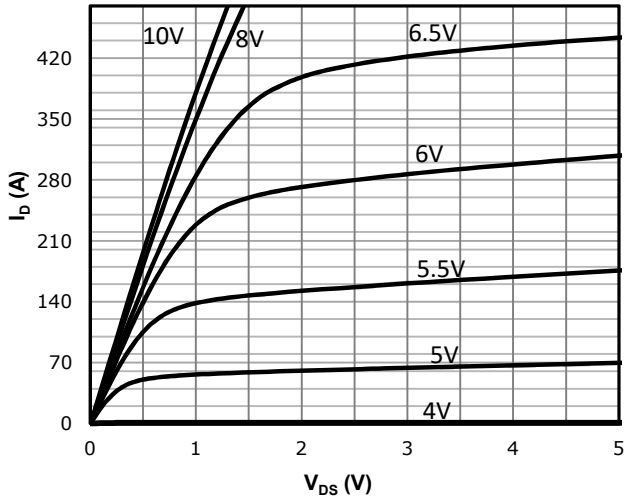
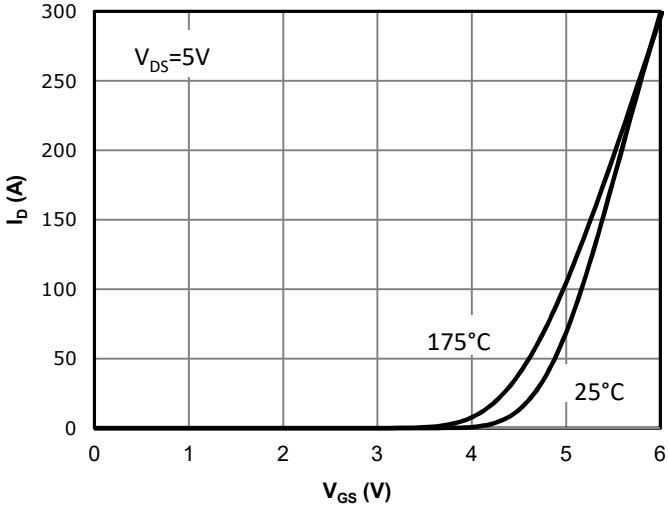


Fig 2: Transfer Characteristics



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

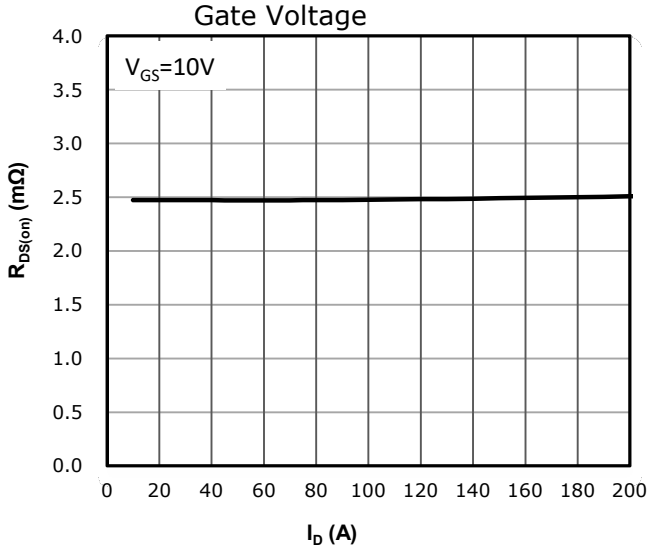


Fig 4: Rds(on) vs Gate Voltage

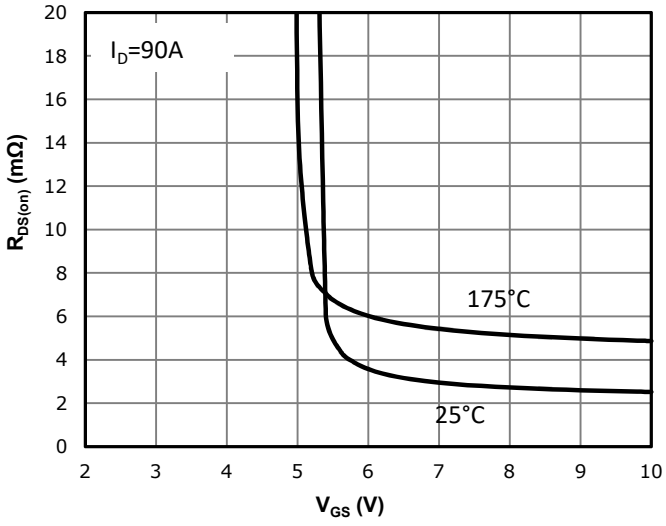


Fig 5: Rds(on) vs. Temperature

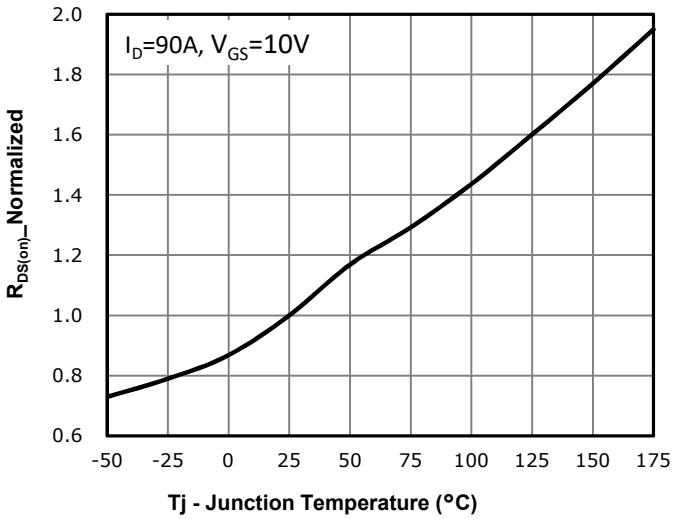
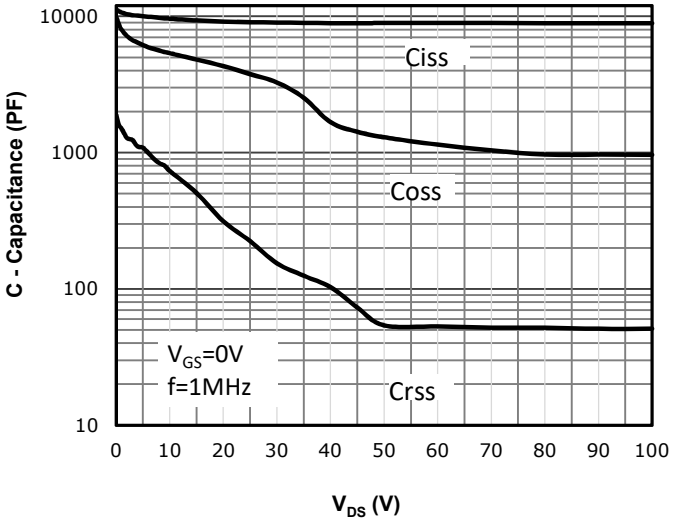


Fig 6: Capacitance Characteristics



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Fig 7: Vgs(th) vs. Temperature

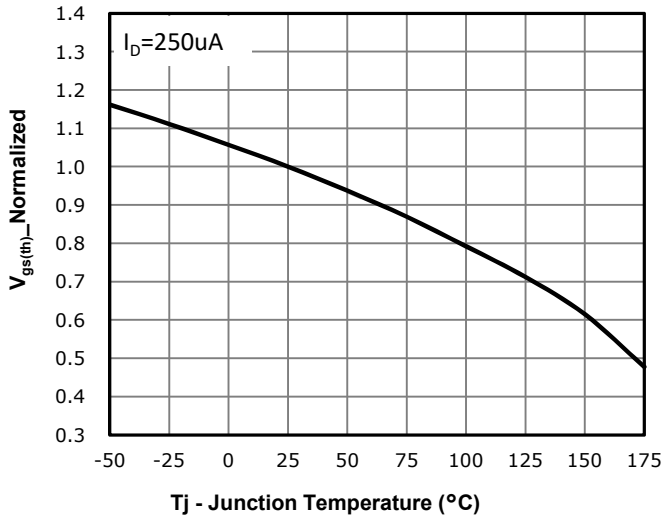


Fig 8: BVdss vs. Temperature

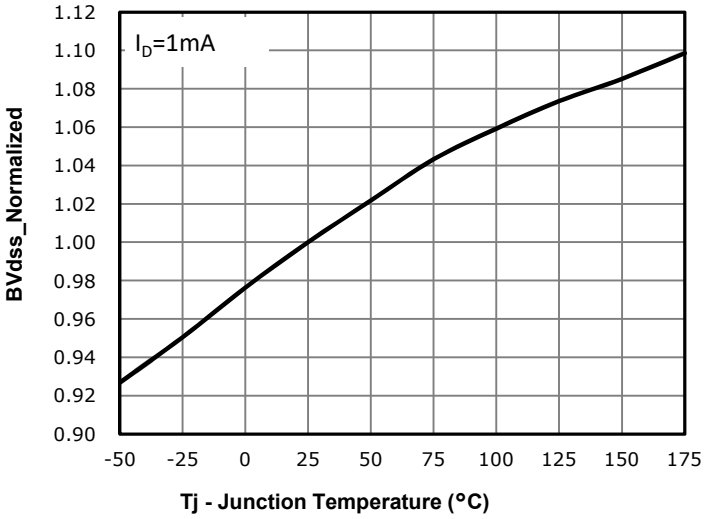


Fig 9: Gate Charge Characteristics

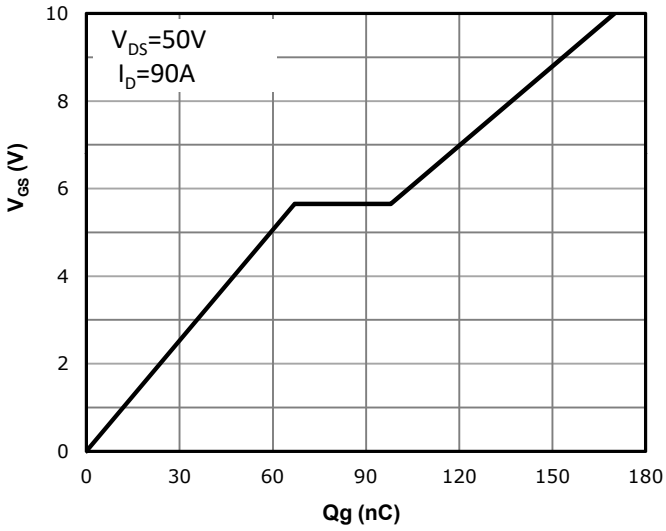


Fig 10: Body-diode Forward Characteristics

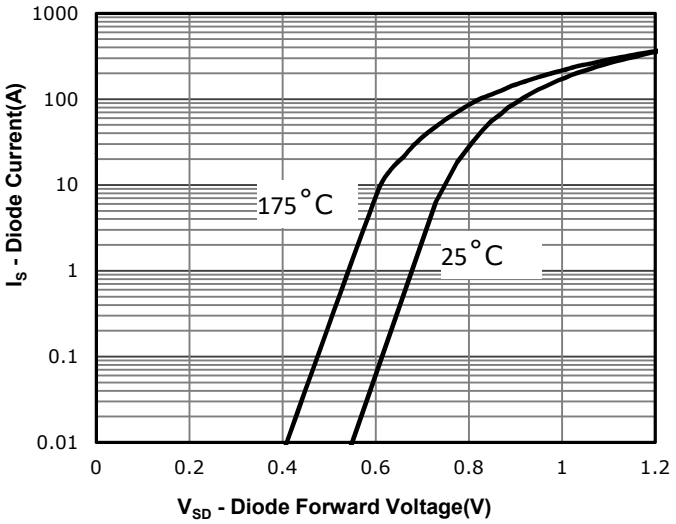


Fig 11: Power Dissipation

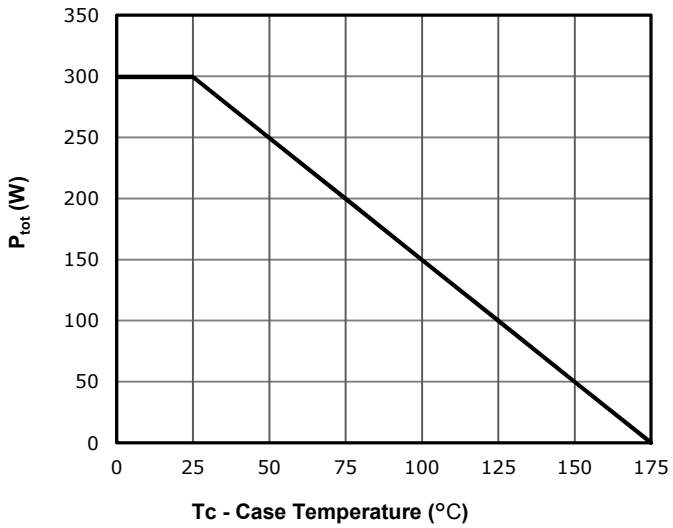
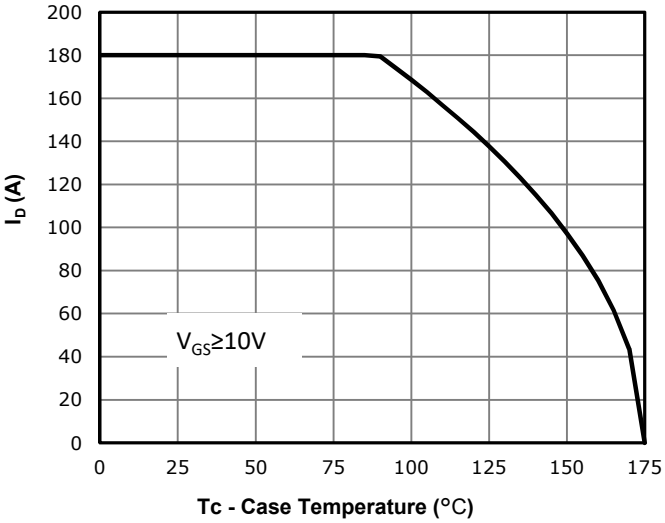


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

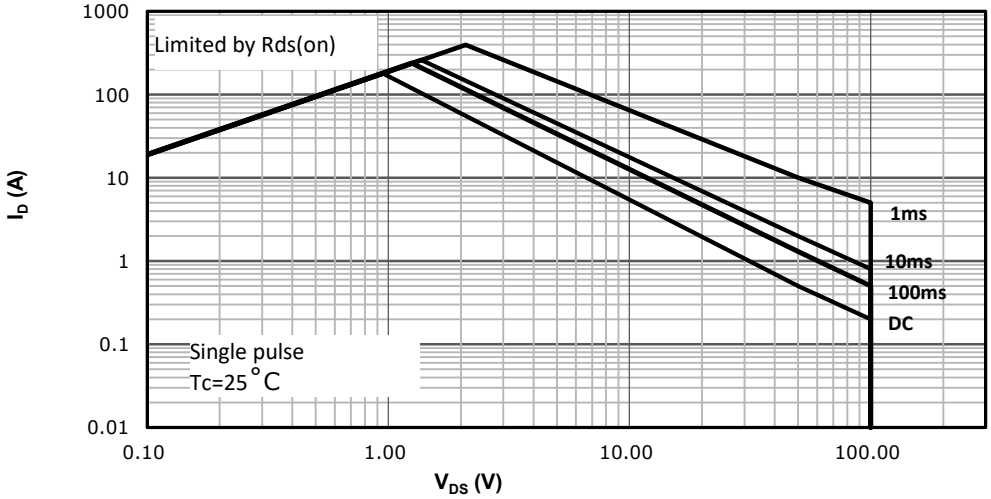
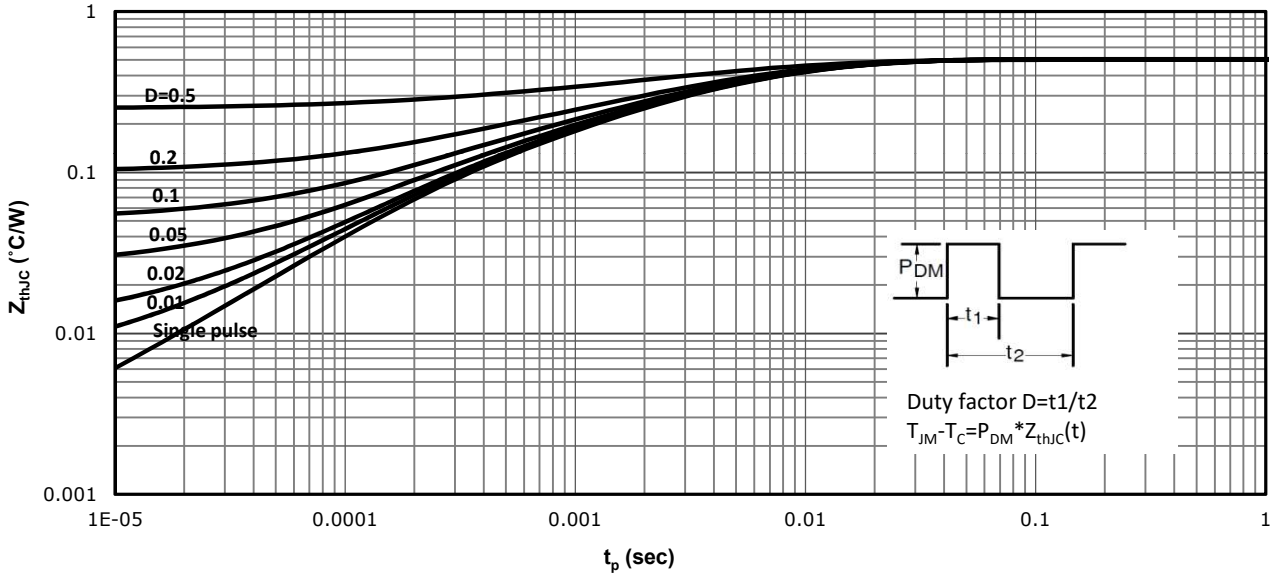


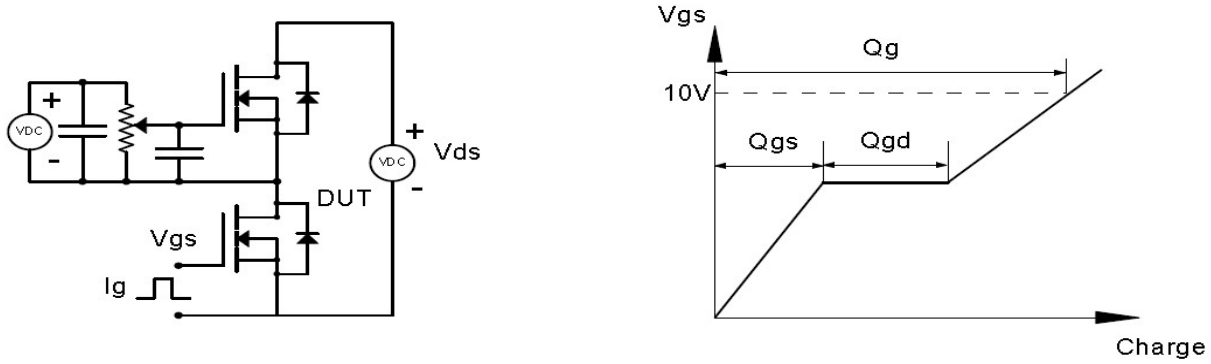
Fig 12: Max. Transient Thermal Impedance



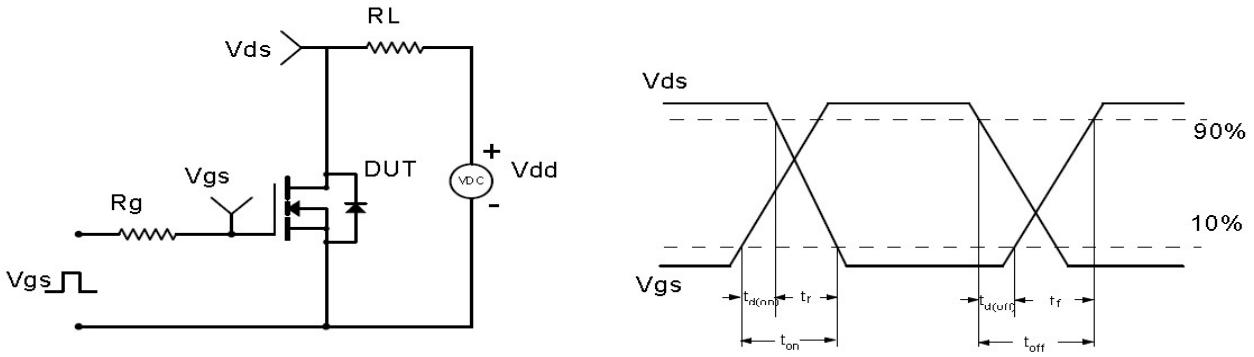
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Test Circuit & Waveform

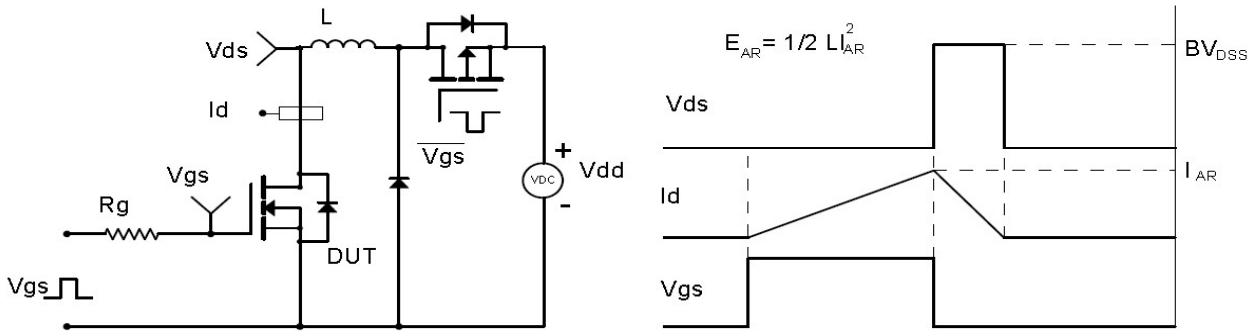
Gate Charge Test Circuit & Waveform



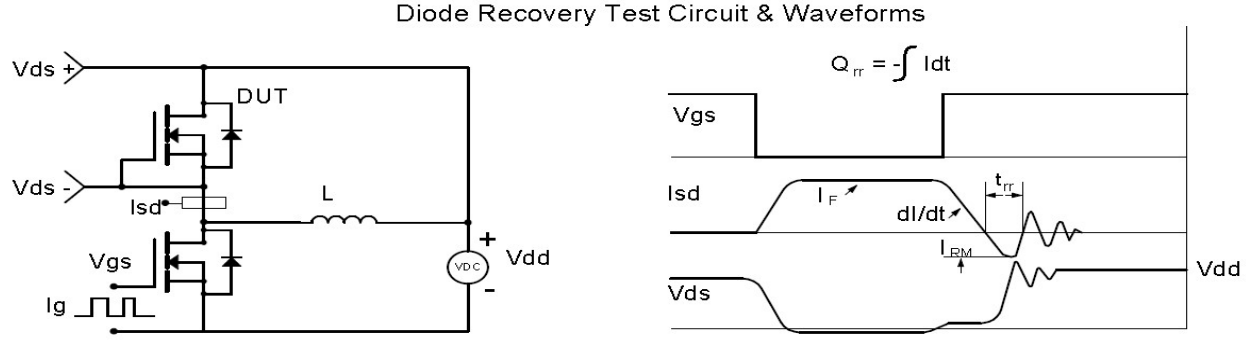
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

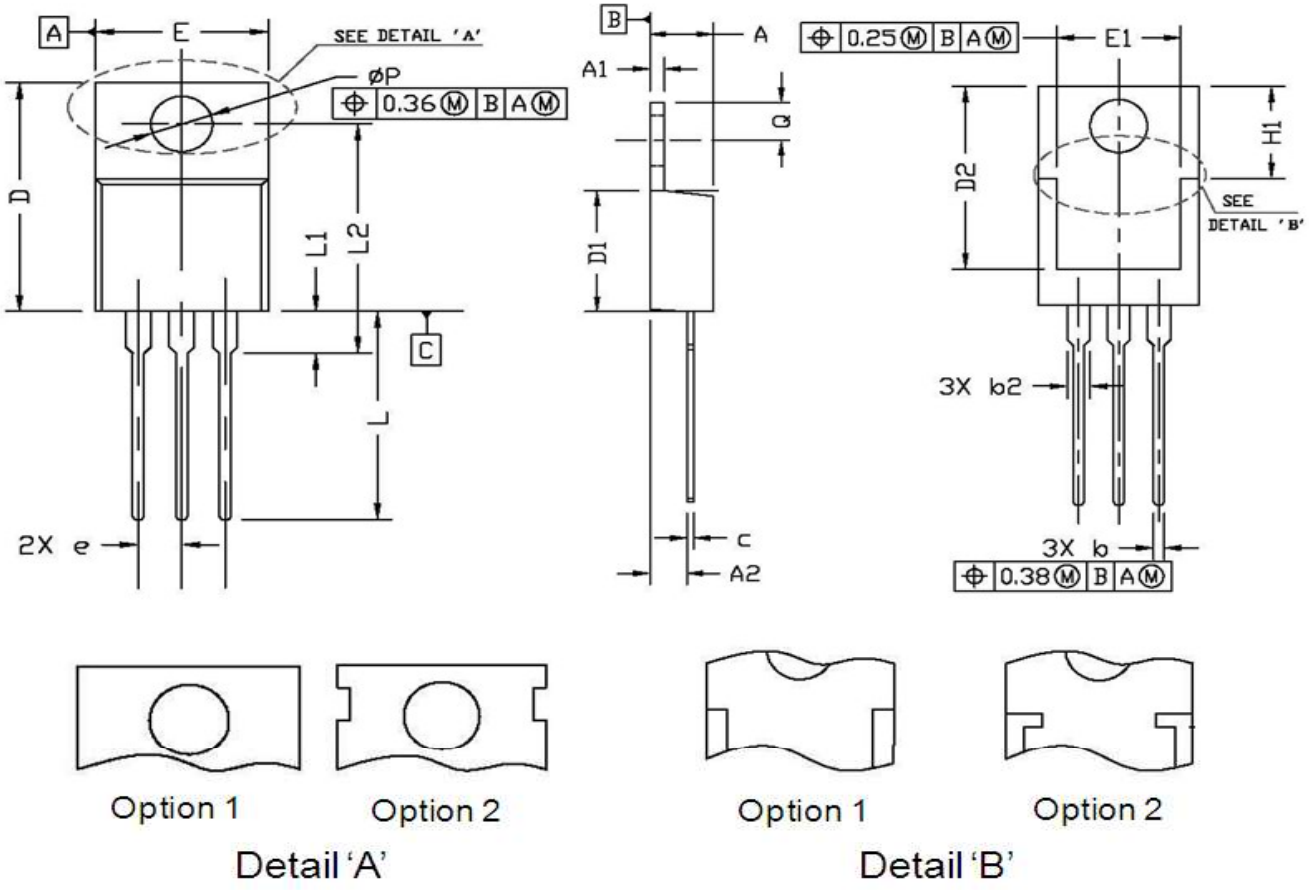


Diode Recovery Test Circuit & Waveforms



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Package Outline: TO-220-3L



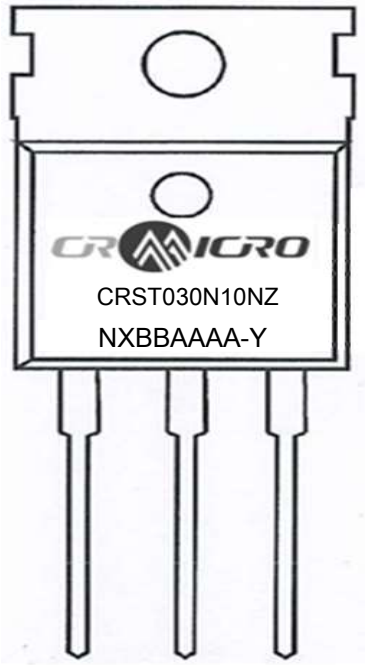
Detail 'A'

Detail 'B'

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.42	4.72	0.174	0.186
A1	1.20	1.40	0.047	0.055
A2	2.35	2.90	0.093	0.114
b	0.71	0.91	0.028	0.036
b2	1.20	1.38	0.047	0.054
c	0.45	0.60	0.018	0.024
D	14.70	16.00	0.579	0.630
D1	8.80	9.50	0.346	0.374
D2	11.75	13.60	0.463	0.535
e	2.54 BSC.		0.100 BSC.	
E	9.70	10.40	0.382	0.409
E1	7.00	8.90	0.276	0.350
H1	6.10	6.50	0.240	0.256
L	12.80	14.80	0.504	0.583
L1	2.50	3.90	0.098	0.154
L2	12.13	16.50	0.478	0.650
Q	2.60	3.00	0.102	0.118
P	3.60	3.95	0.142	0.156

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Marking



NOTE:
NXBBAAAA-Y

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

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Revision History

Revison	Date	Major changes
1.0	2022/8/31	Release of formal version.
2.0	2024/11/13	Tjmax update to 175°C & Ron spec Debug.

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.

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