CRST187N25N5Z

SkyMOS5 N-MOSFET 250V, 16.3mΩ, 90A

Features

- Uses CRM(CQ) advanced SkyMOS5 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

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

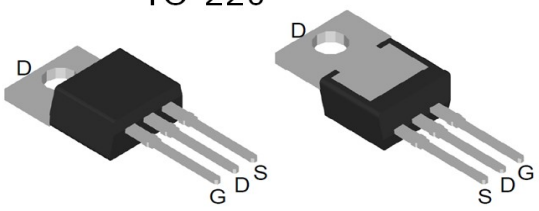
Product Summary

V_{DS}	250V
$R_{DS(on).typ}$	16.3mΩ
I_D	90A

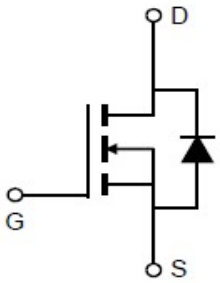
100% DVDS Tested
100% Avalanche Tested

RoHS HF

TO-220



CRST187N25N5Z



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRST187N25N5Z	CRST187N25N5Z	TO-220	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	250	V
Continuous drain current	I_D		A
T_C = 25°C (Silicon limit)		90	
T_C = 25°C (Package limit)		180	
T_C = 100°C (Silicon limit)		57	
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\,pulse}$	360	A
Avalanche energy, single pulse (ID =53A, Rg=25Ω)[1]	E_{AS}	690	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	291	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 =53A, VGS = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.43	°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}	250	-	-	V	V_{GS}=0V, I_D=250uA
		250	-	-	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}=250V,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	$R_{DS(on)}$	-	16.3	18.7	mΩ	VGS=10V, ID=40A
Transconductance	g_{fs}	58.5	87.7	131.6	S	V_{DS}=5V, I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	3005	4508	6762	pF	V_{GS}=0V, V_{DS}=125V, f=1MHz
Output Capacitance	C_{oss}	201	302	453		
Reverse Transfer Capacitance	C_{rss}	3.8	7.6	15.2		
Gate Total Charge	Q_G	41.8	62.7	94.1	nC	V_{GS}=10V, V_{DS}=125V, I_D=40A
Gate-Source charge	Q_{gs}	18.5	27.8	41.7		
Gate-Drain charge	Q_{gd}	3.9	7.7	15.4		
Turn-on delay time	$t_{d(on)}$	-	14.4	-	ns	V_{GS}=10V, V_{DD}=125V, R_{G_ext}=2.7Ω
Rise time	t_r	-	48.4	-		
Turn-off delay time	$t_{d(off)}$	-	52.1	-		
Fall time	t_f	-	30.8	-		
Gate resistance	R_G	-	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}	-	0.85	1.4	V	V_{GS}=0V,I_{SD}=40A
Body Diode Reverse Recovery Time	t_{rr}	-	167.0	-	ns	I_F=40A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	1055.0	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

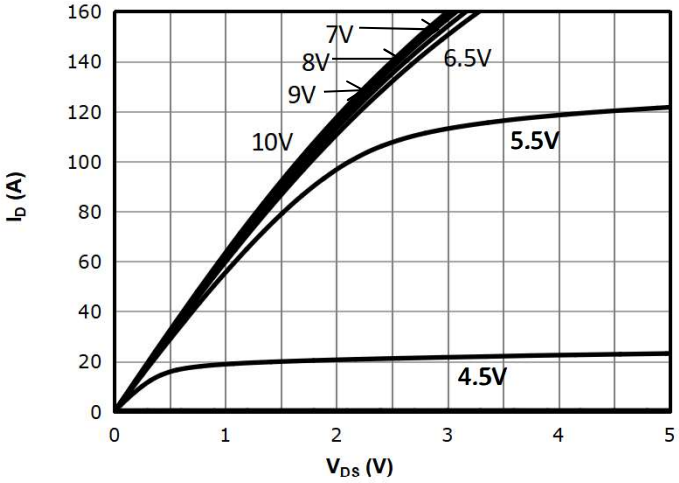


Fig 2: Transfer Characteristics

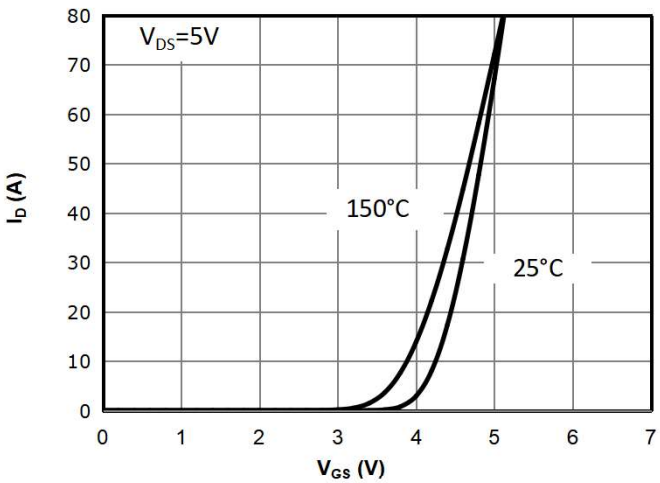


Fig 3: Rds(on) vs Drain Current and Gate Voltage

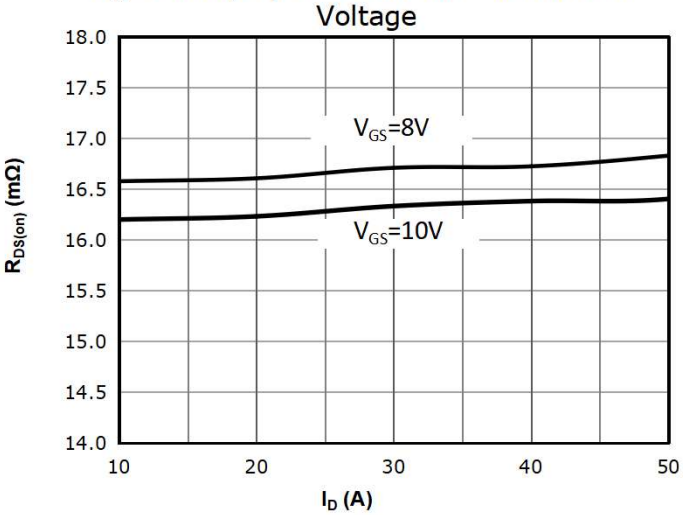


Fig 4: Rds(on) vs Gate Voltage

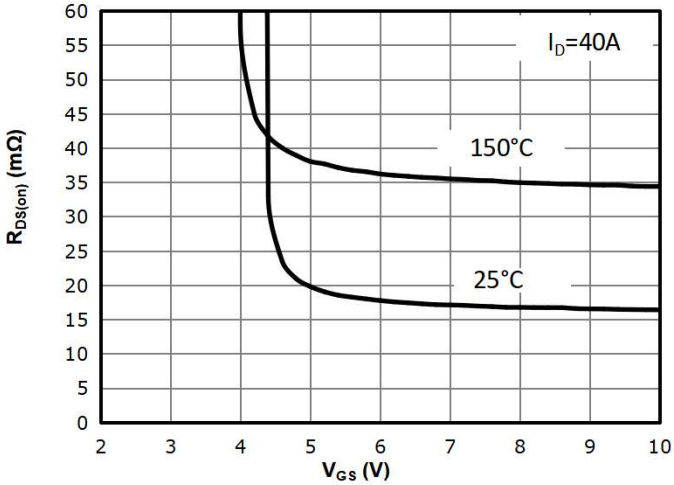


Fig 5: Rds(on) vs. Temperature

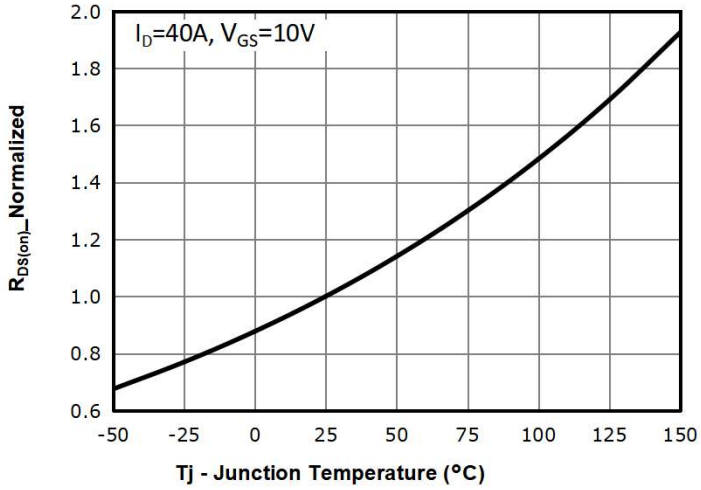


Fig 6: Vgs(th) vs. Temperature

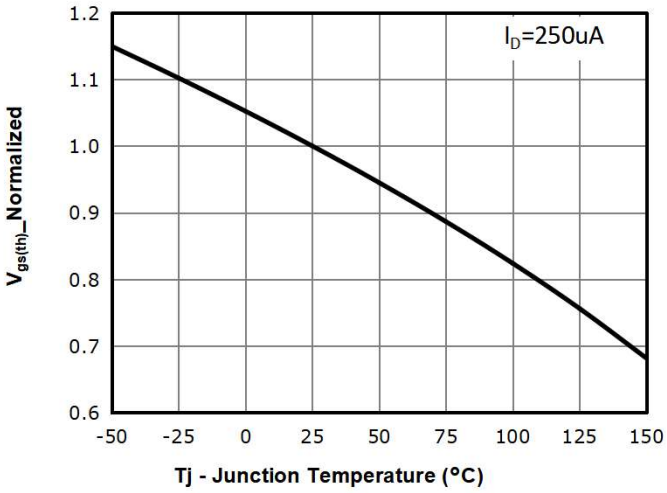


Fig 7: BVdss vs. Temperature

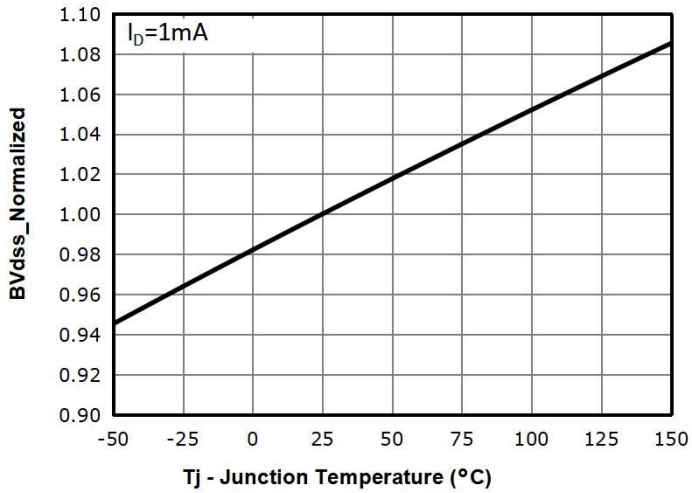


Fig 8: Capacitance Characteristics

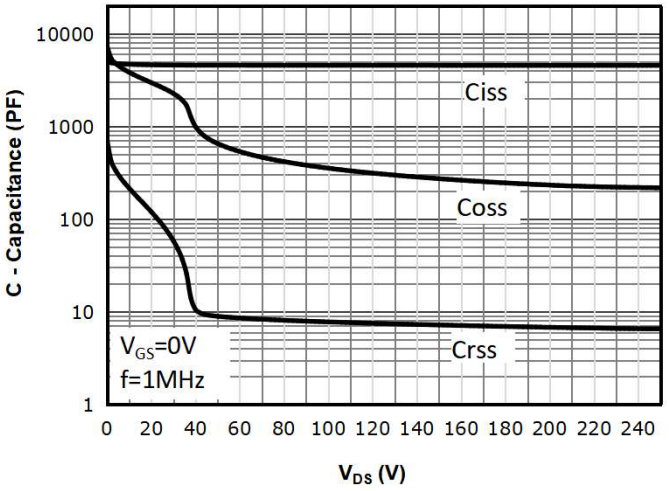


Fig 9: Gate Charge Characteristics

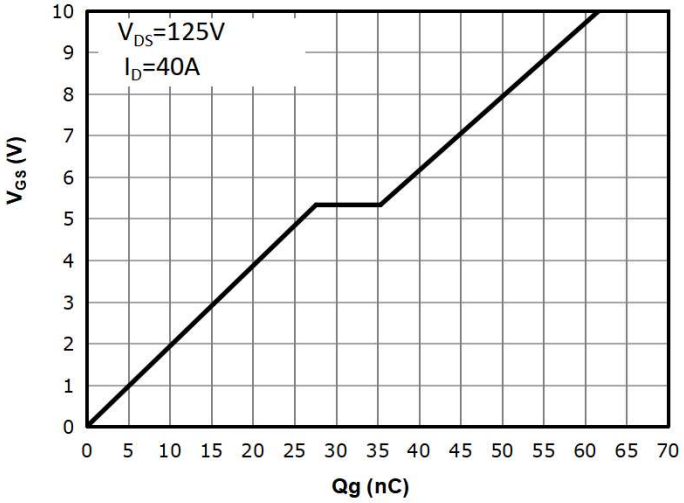


Fig 10: Body-diode Forward Characteristics

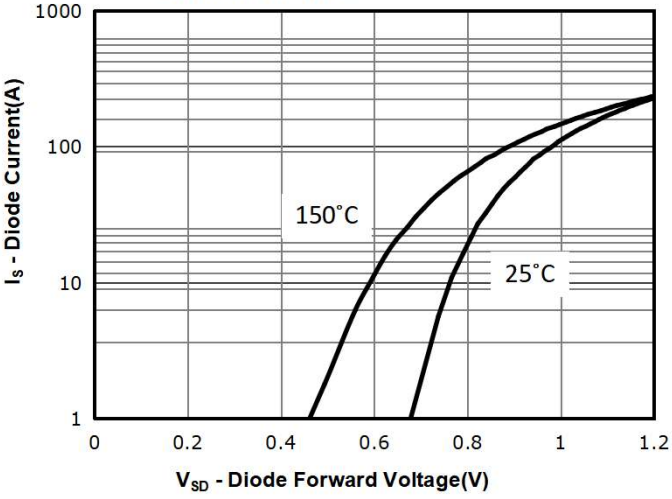


Fig 11: Power Dissipation

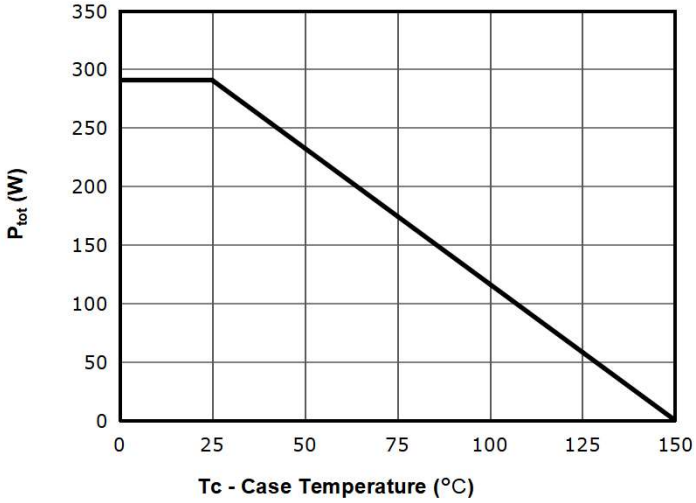


Fig 12: Drain Current Derating

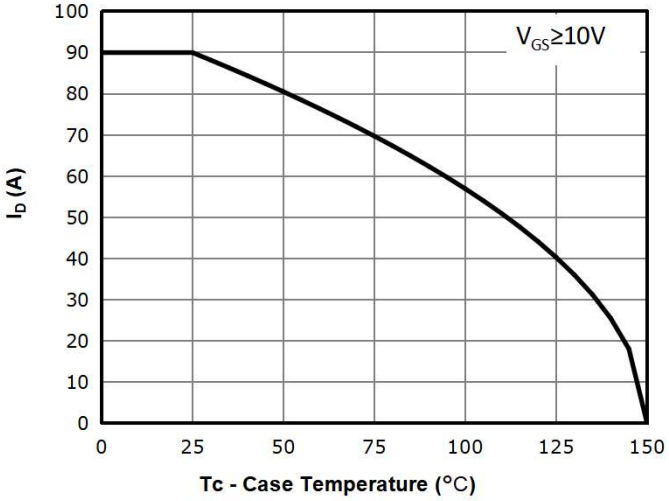


Fig 13: Safe Operating Area

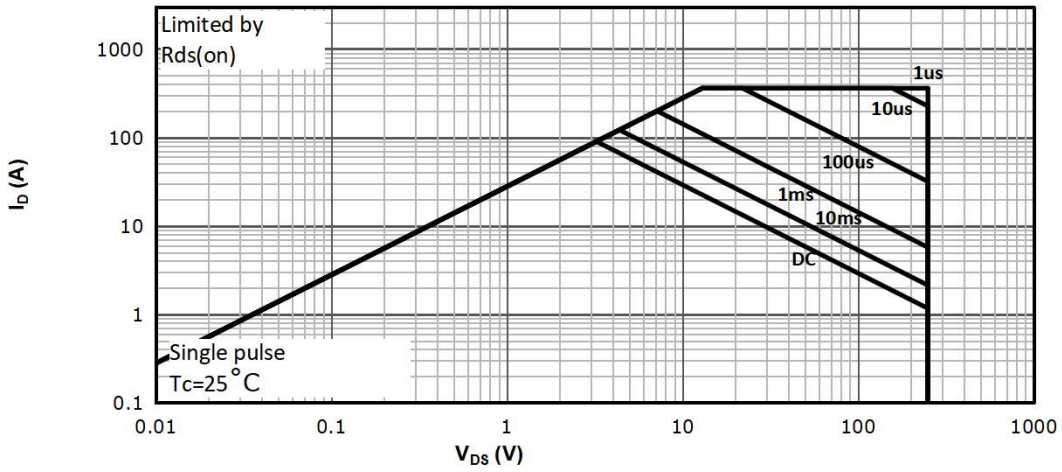
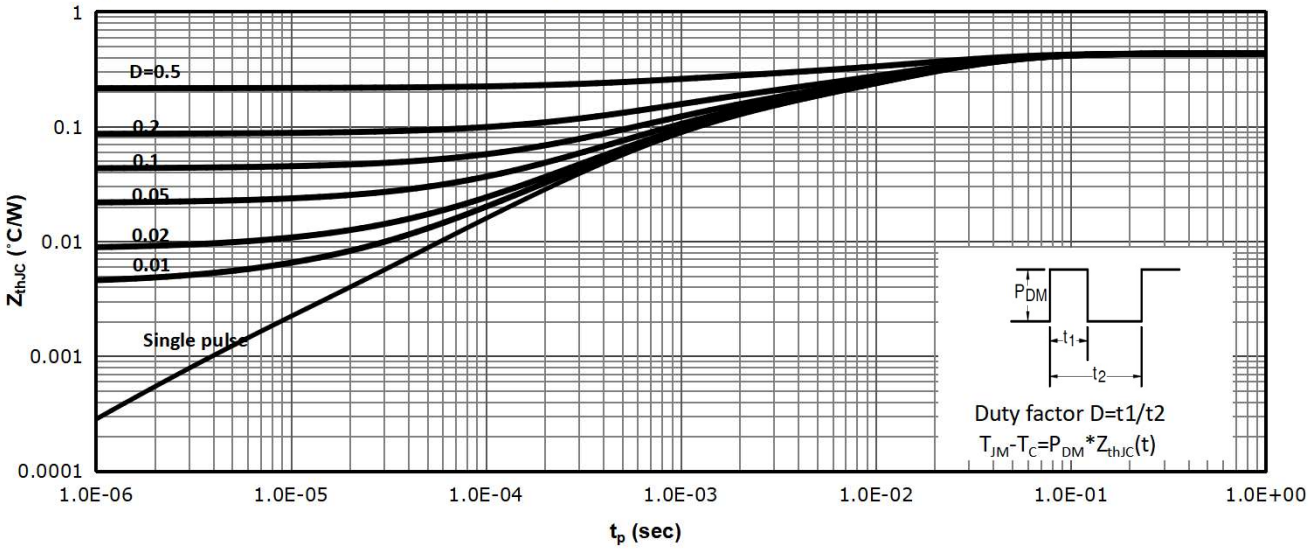
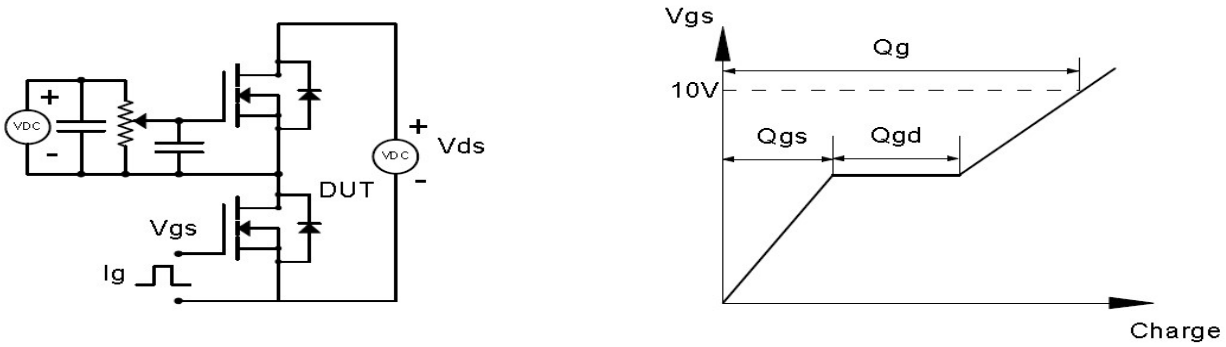


Fig 14: Max. Transient Thermal Impedance

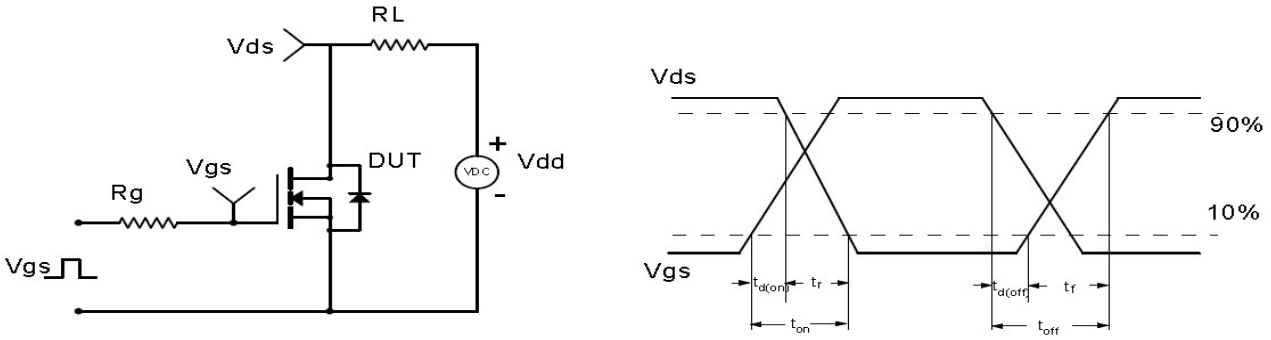


Test Circuit & Waveform

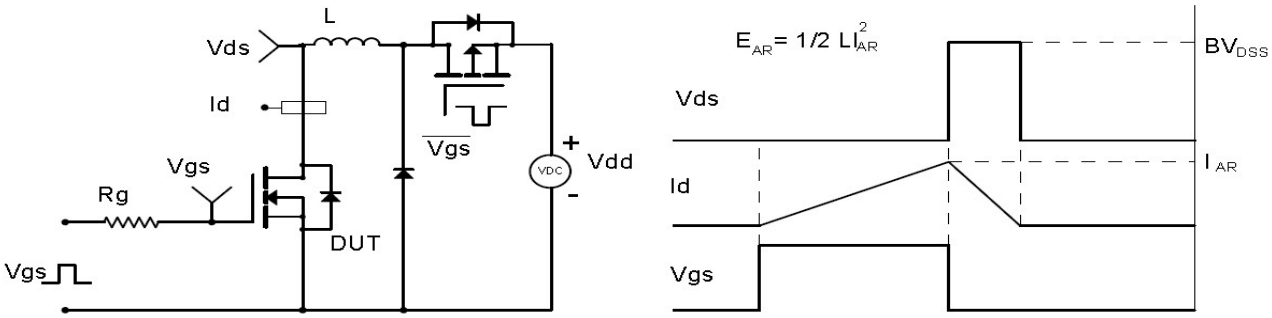
Gate Charge Test Circuit & Waveform



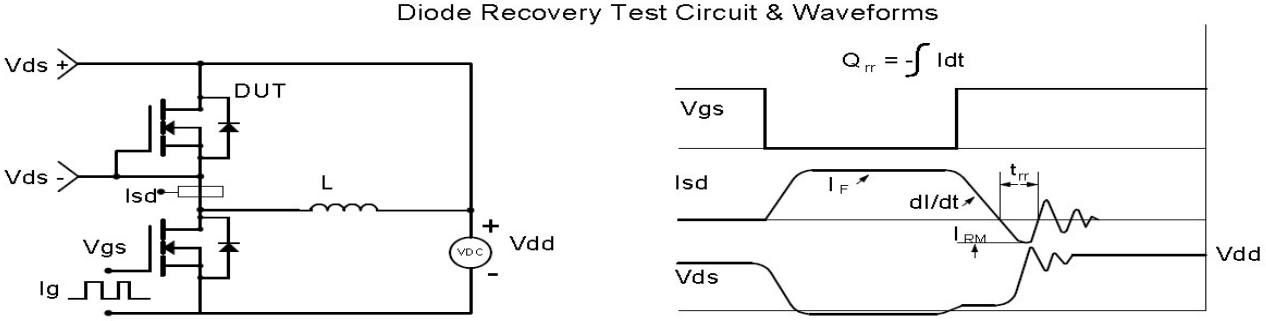
Resistive Switching Test Circuit & Waveforms



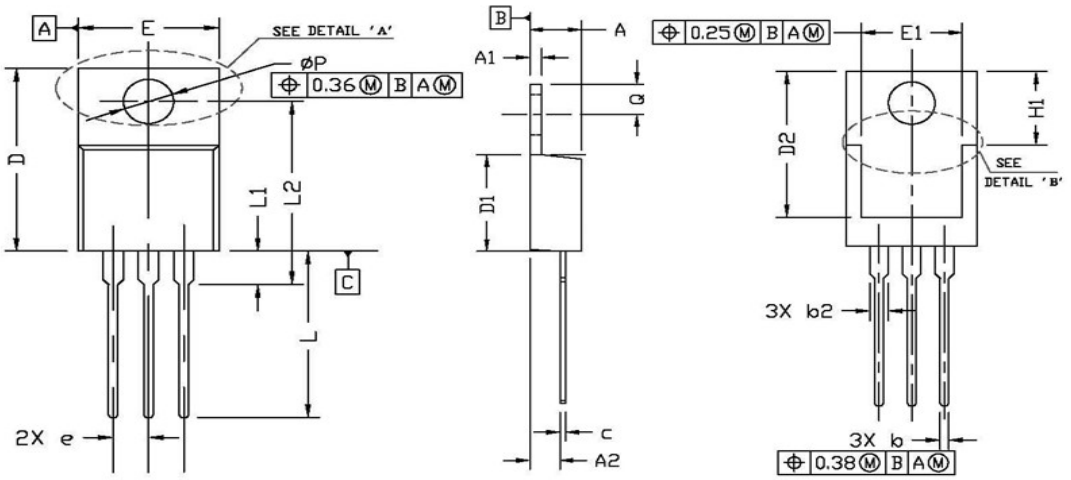
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-220 Type T





Detail 'A' 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	1.44	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	8.90	0.276	0.350
H1	6.00	7.00	0.236	0.276
L	12.60	14.80	0.496	0.583
L1	2.50	3.90	0.098	0.154
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

Marking



NOTE:
NXBBAAAA-Y

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	2024/5/16	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 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.