华润微电子(重庆)有限公司

CRTD038N03L4A

Trench N-MOSFET 30V, 2.8mΩ, 100A

Features

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

Product Summary

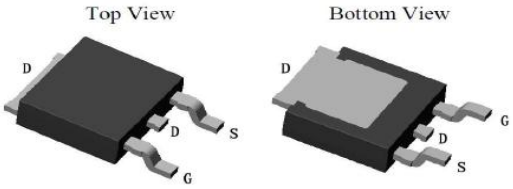
V_{DS}	30V
$R_{DS(on).typ}$	2.8mΩ
I_D	100A

100% DVDS Tested
100% Avalanche Tested

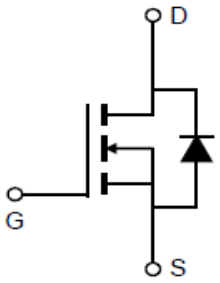
Applications

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

TO-252



CRTD038N03L4A



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD038N03L4A	CRTD038N03L	TO-252	Tape	N/A	N/A	2500pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	30	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 100 60 63	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	240	A
Avalanche energy, single pulse (I_D = 27A, Rg=25Ω)[1]	E_{AS}	180	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	77	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 =27A, VGS = 10V.
2.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.62	°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}	30	-	-	V	V_{GS}=0V, I_D=250uA
		30	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	0.9	1.3	2.0	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=30V,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	$R_{DS(on)}$	-	2.8	3.6		VGS=10V, ID=19A
		-	3.8	4.8		VGS=4.5V, ID=19A
Transconductance	g_{fs}	-	57.6	-	S	V_{DS}=5V, I_D=19A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2582	-	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Output Capacitance	C_{oss}	-	302	-		
Reverse Transfer Capacitance	C_{rss}	-	281	-		
Gate Total Charge	Q_G	-	55.3	-	nC	V_{GS}=10V, V_{DS}=15V, I_D=19A
Gate-Source charge	Q_{gs}	-	6.0	-		
Gate-Drain charge	Q_{gd}	-	11.0	-		
Turn-on delay time	$t_{d(on)}$	-	16.8	-	ns	V_{GS}=10V, V_{DD}=15V, R_{G_ext}=2.5Ω
Rise time	t_r	-	8.4	-		
Turn-off delay time	$t_{d(off)}$	-	68.4	-		
Fall time	t_f	-	10.4	-		
Gate resistance	R_G	-	2.0	-	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}	-	0.82	1.4	V	V_{GS}=0V,I_{SD}=19A
Body Diode Reverse Recovery Time	t_{rr}	-	42.4	-	ns	I_F=19A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	35.0	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

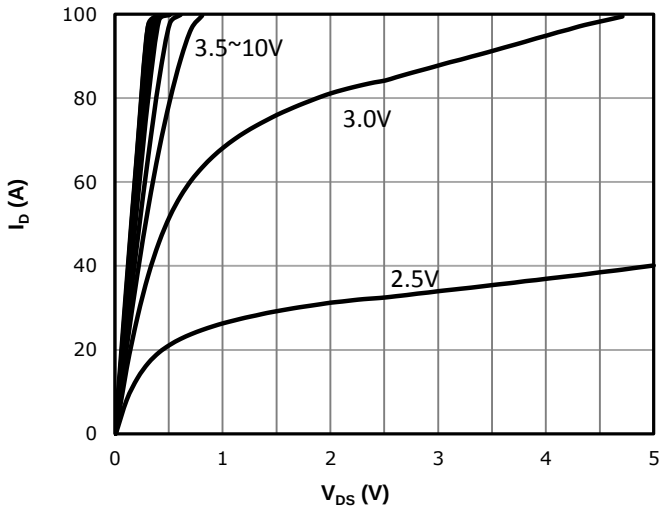


Fig 2: Transfer Characteristics

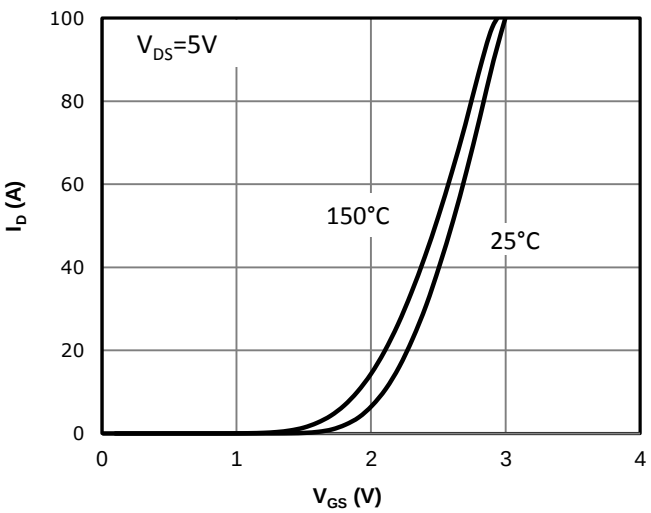


Fig 3: Rds(on) vs Drain Current and Gate Voltage

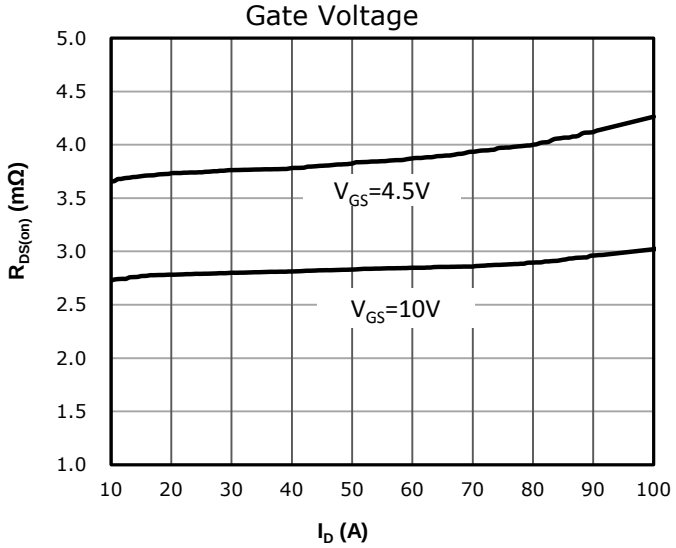


Fig 4: Rds(on) vs Gate Voltage

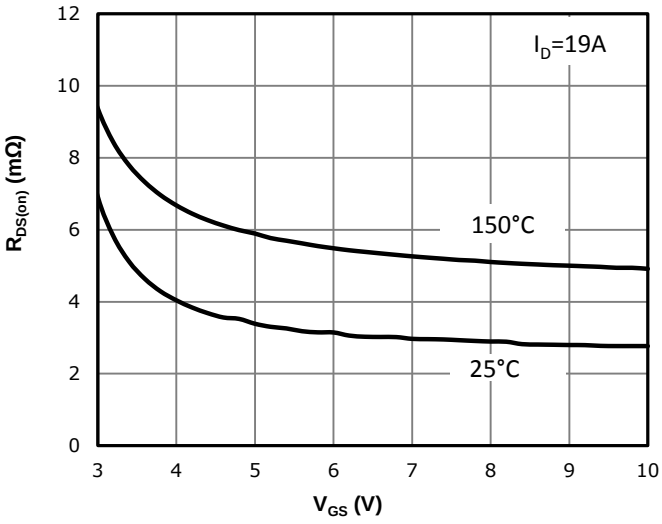


Fig 5: Rds(on) vs. Temperature

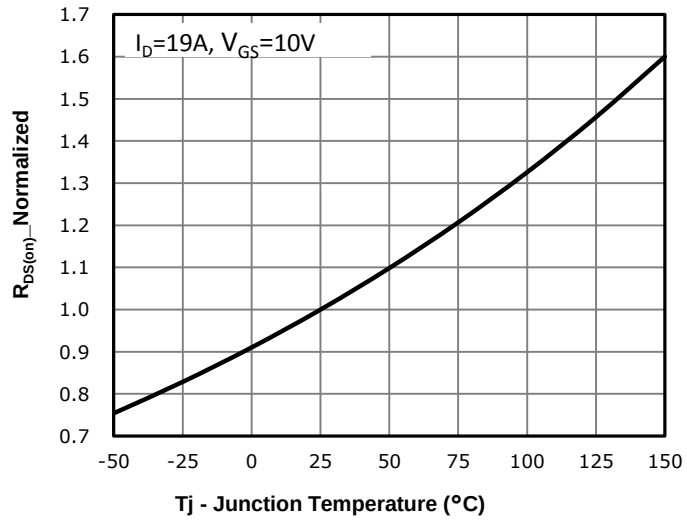


Fig 6: Vgs(th) vs. Temperature

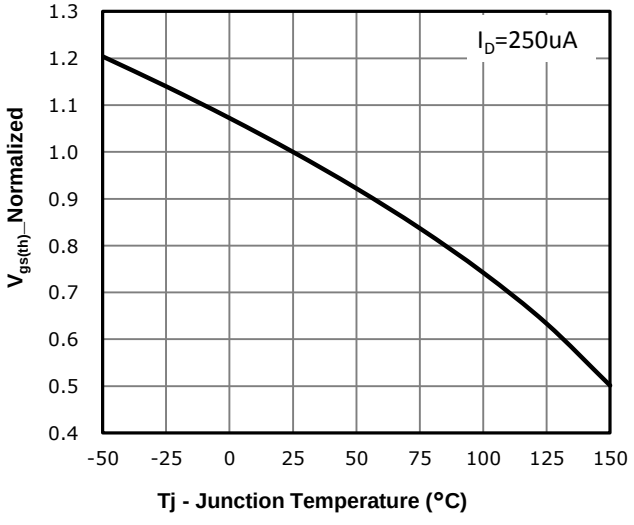


Fig 7: BVdss vs. Temperature

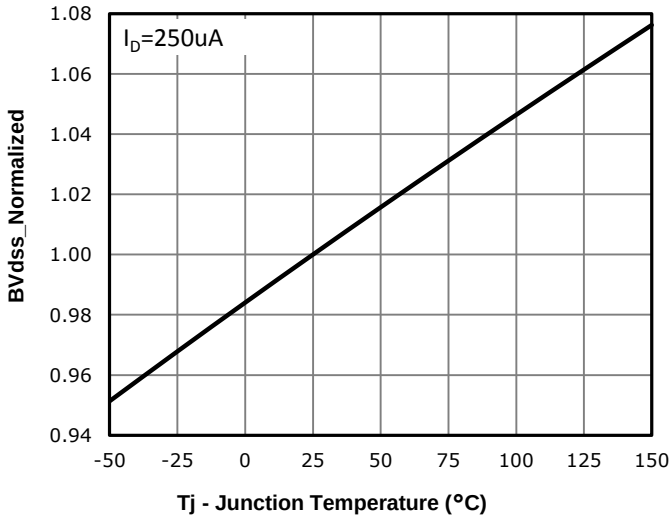


Fig 8: Capacitance Characteristics

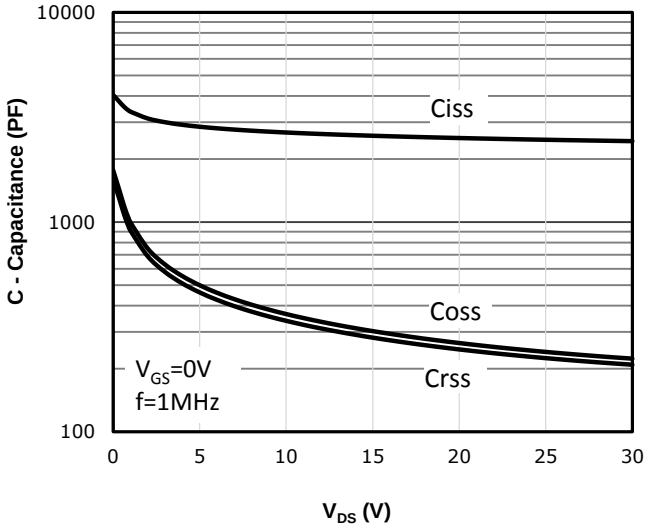


Fig 9: Gate Charge Characteristics

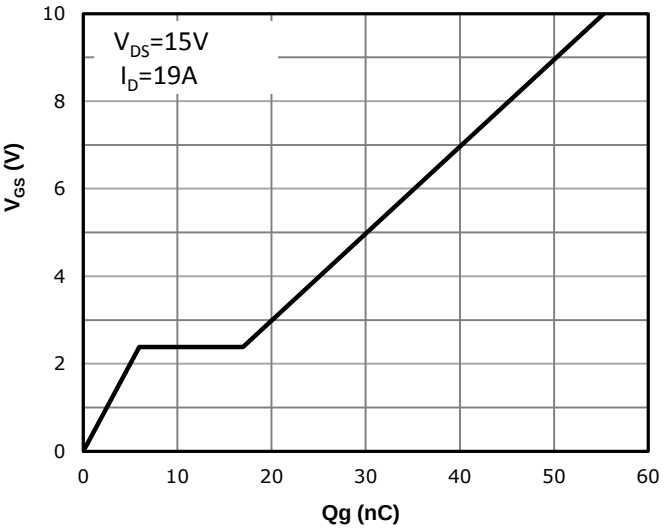


Fig 10: Body-diode Forward Characteristics

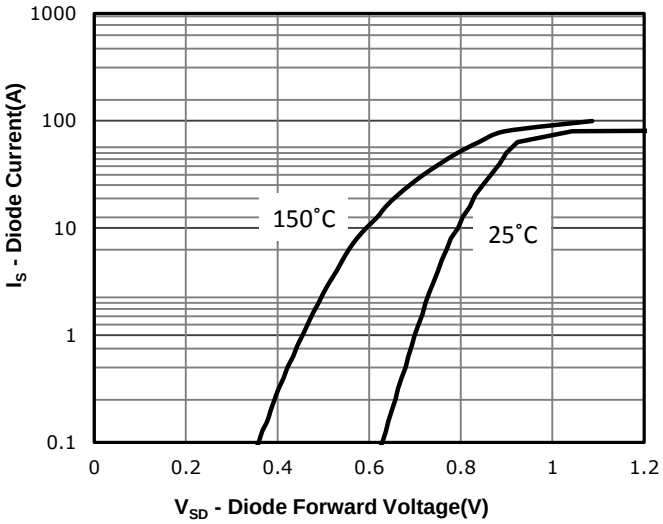


Fig 11: Power Dissipation

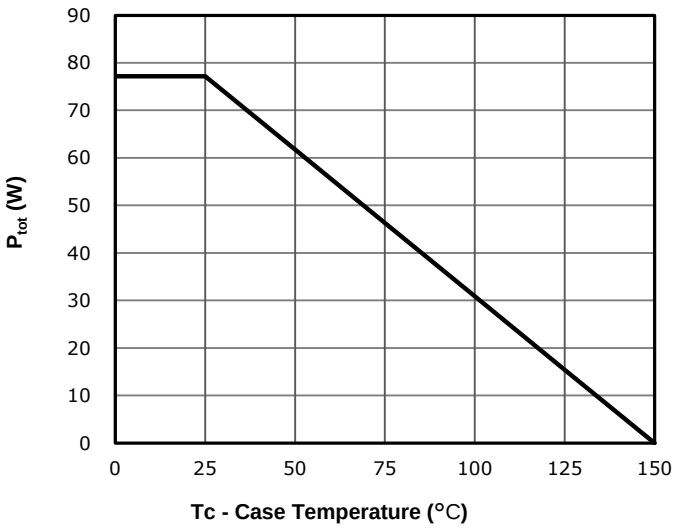


Fig 12: Drain Current Derating

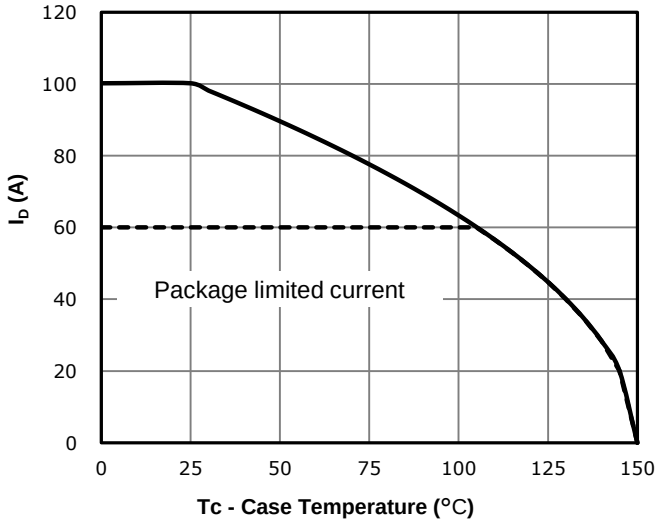


Fig 13: Safe Operating Area

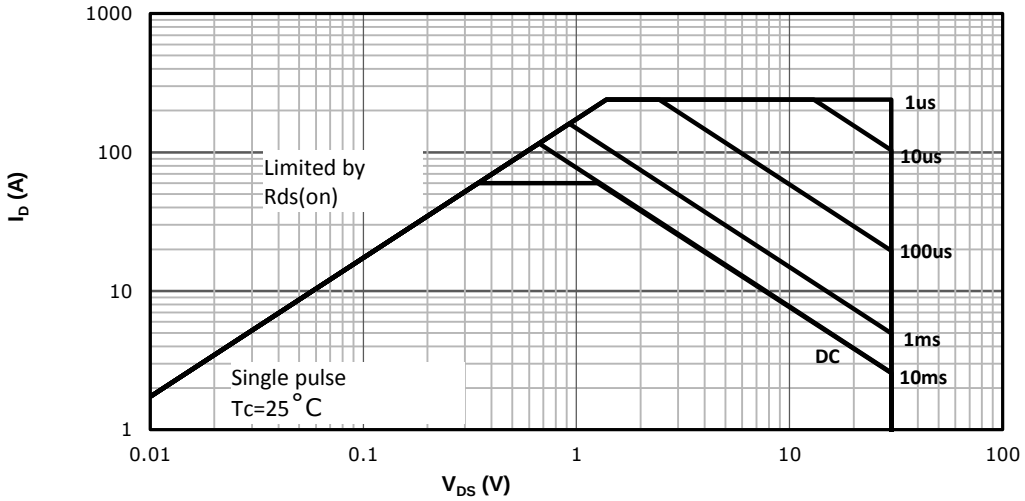
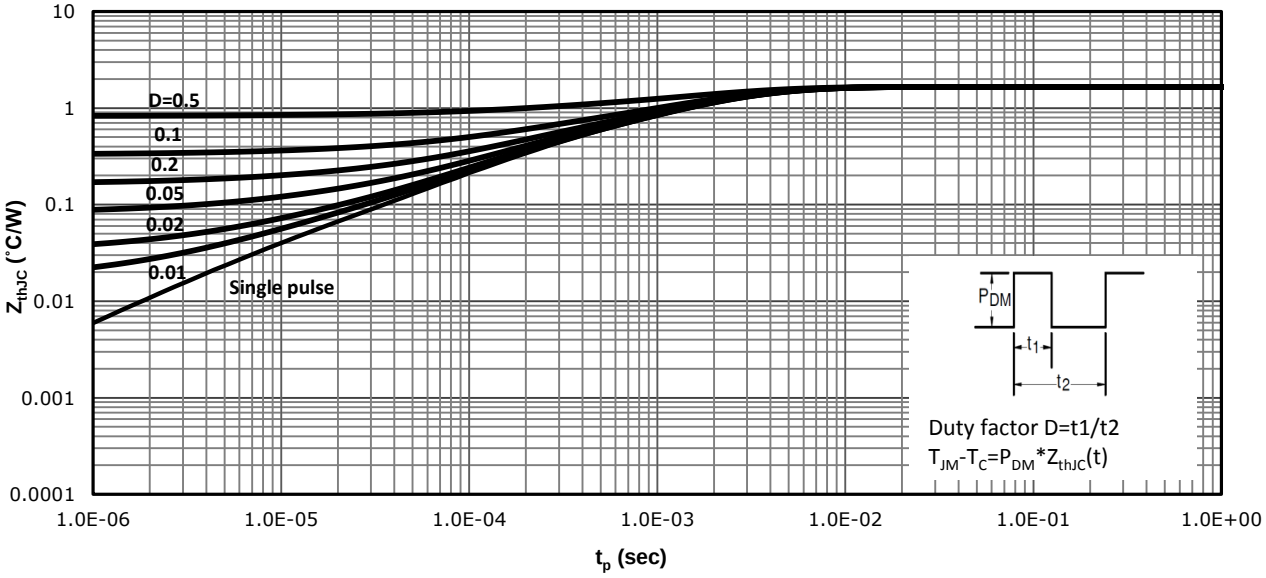
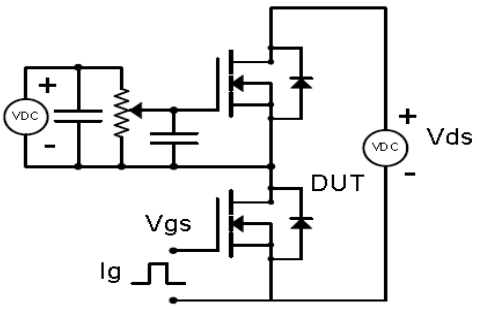


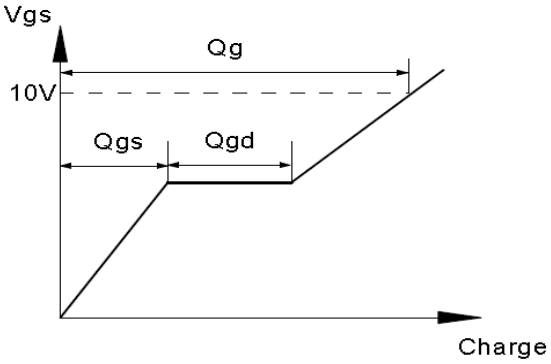
Fig 14: Max. Transient Thermal Impedance



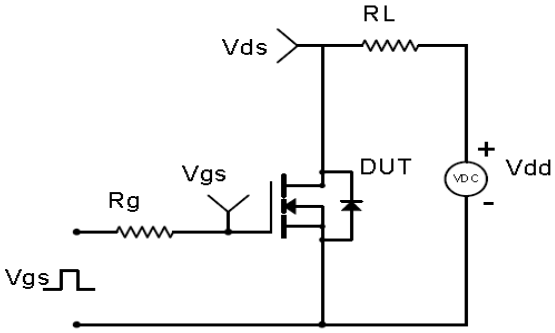
Test Circuit & Waveform

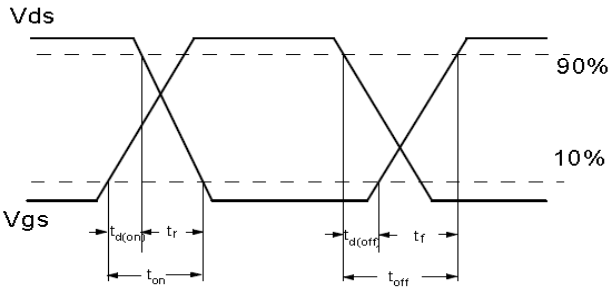
Gate Charge Test Circuit & Waveform



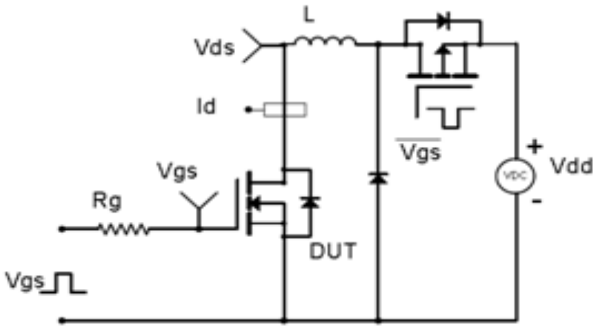


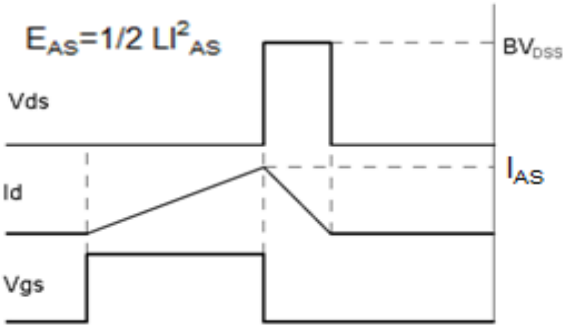
Resistive Switching Test Circuit & Waveforms



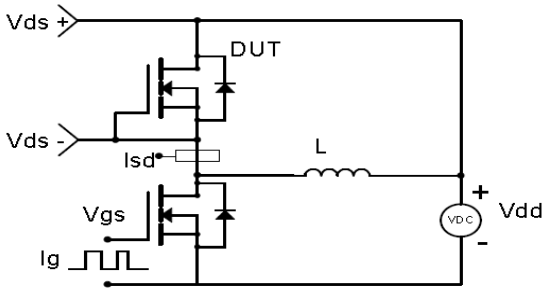


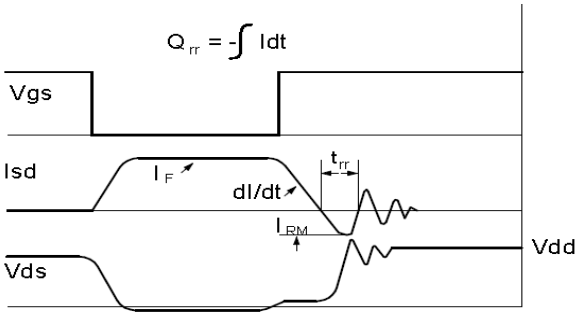
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



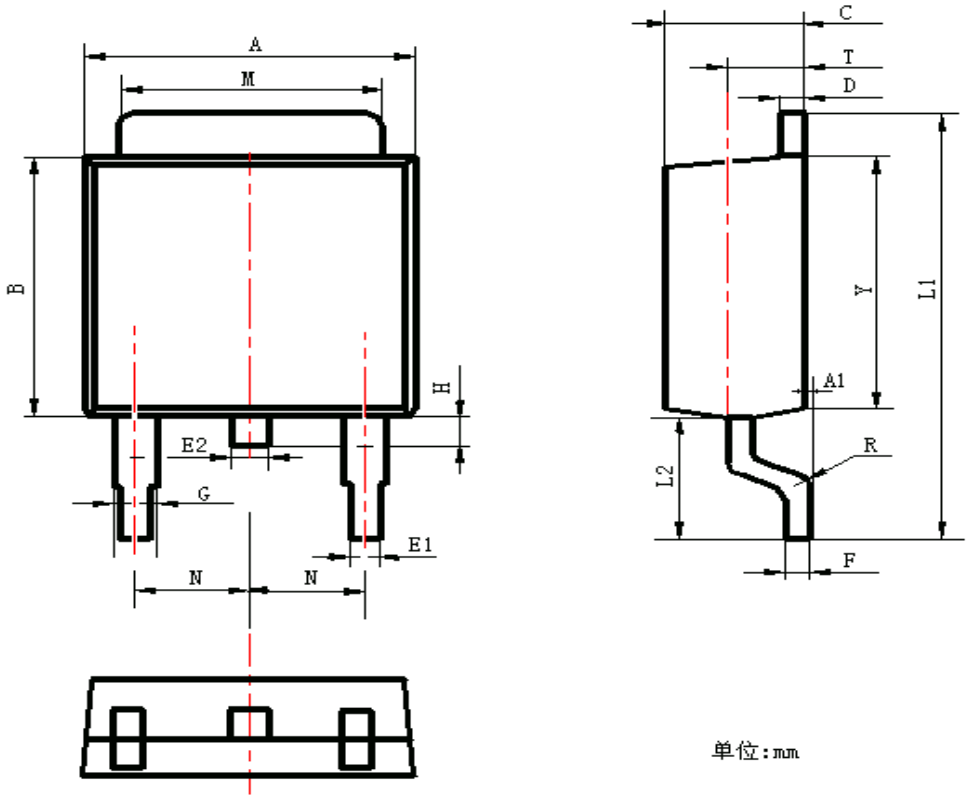


Diode Recovery Test Circuit & Waveforms





Package Outline: TO-252



Symbol	Values(mm)	
	Min.	Max.
A	6.300	6.900
A1	0.000	0.160
B	5.700	6.300
C	2.100	2.500
D	0.300	0.700
E1	0.600	0.900
E2	0.700	1.000
F	0.300	0.600
G	0.700	1.200
L1	9.600	10.500
L2	2.700	3.100
H	0.400	1.000
M	5.100	5.500
N	2.090	2.490
R	0.300	
T	1.400	1.600
Y	5.100	6.300

Marking

NOTE:
AABXXXG
AA —cycle code
B —Fab code
XXX —Assembly lot code

Revision History

Revision	Date	Major changes
1.0	2024/6/24	Release of Preliminary version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial
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.