华润微电子(重庆)有限公司

CRTD10DN10L

Trench N-MOSFET 100V, 67mΩ, 15A

Features

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

Applications

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

Product Summary

V_{DS}	100V
$R_{DS(on)}$ typ.	67mΩ
I_D	15A

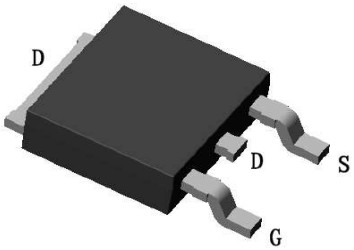
100% DVDS Tested

100% Avalanche Tested

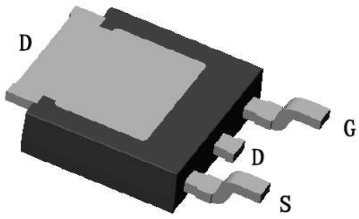
RoHS HF

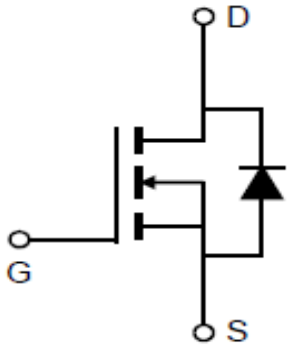
TO-252

Top View



Bottom View





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD10DN10L	CRTD10DN10L	TO-252	Reel	N/A	N/A	2500pcs

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	 15 40 9	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	60	A
Avalanche energy, single pulse (L=0.1mH, Rg=25Ω)	E_{AS}	7	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	40	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)	T_{sold}	260	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	3.12	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	105	

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	$V_{GS(th)}$	1.4	2	2.6	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	0.01	1	μA	V_{DS}=100V,V_{GS}=0V T_j=25°C
		-	-	50		T_j=150°C
Gate-source leakage current	I_{GSS}	-	±10	±100	nA	VGS=±20V,VDS=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	67	100	mΩ	V_{GS}=10V, I_D=8A, Tj=25°C
			150	180		Tj=150°C
		-	74	110		V_{GS}=4.5V, I_D=5A,
Transconductance	g_{fs}	-	22	-	S	V_{DS}=10V,I_D=8A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	596	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	-	36	-		
Reverse Transfer Capacitance	C_{rss}	-	29	-		
Gate Total Charge	Q_G	-	15	-	nC	V_{GS}=10V, V_{DS}=50V, I_D=8A, f=1MHz
Gate-Source charge	Q_{gs}	-	3.0	-		
Gate-Drain charge	Q_{gd}	-	4.5	-		
Turn-on delay time	$t_{d(on)}$	-	8.5	-	ns	V_{GS}=10V, V_{DD}=50V, R_{G_ext}=2.7Ω
Rise time	t_r	-	21	-		
Turn-off delay time	$t_{d(off)}$	-	20	-		
Fall time	t_f	-	30	-		
Gate resistance	R_G	-	2.3	-	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}	-	0.9	1.3	V	V_{GS}=0V,I_{SD}=8A
Body Diode Continuous Forward Current	I_S			15	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	28	-	ns	I_F=8A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	29	-	nC	

*The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Typical Performance Characteristics

Fig 1: Output Characteristics

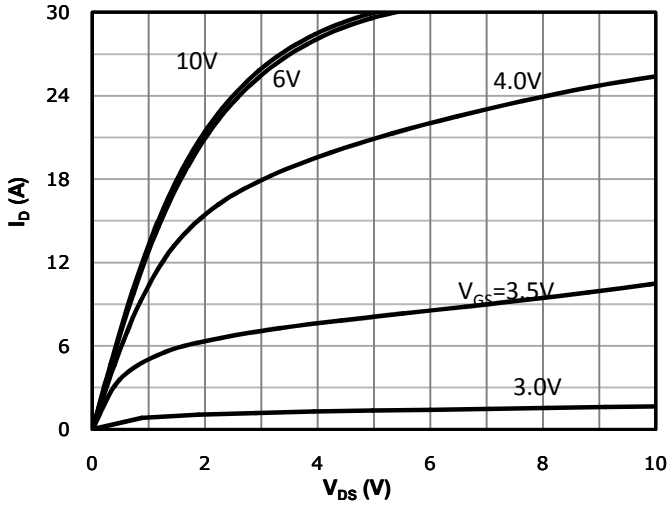


Fig 2: Transfer Characteristics

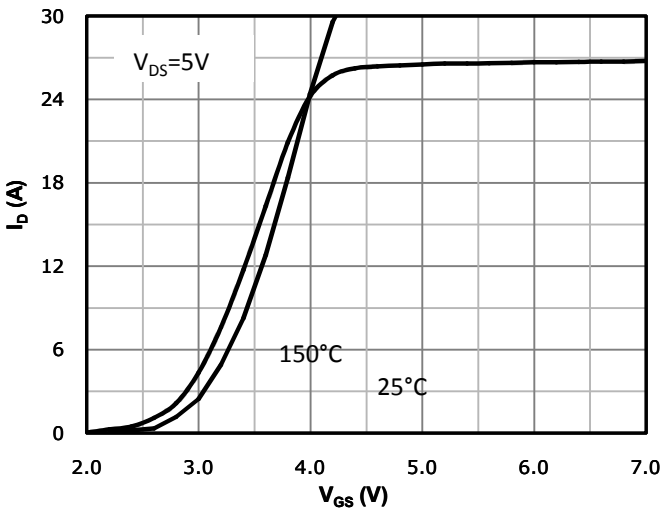


Fig 3: Rds(on) vs Drain Current and Gate Voltage

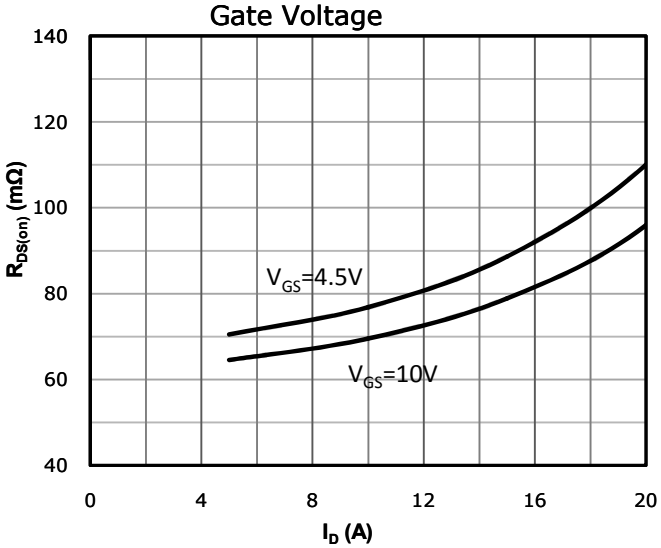


Fig 4: Rds(on) vs Gate Voltage

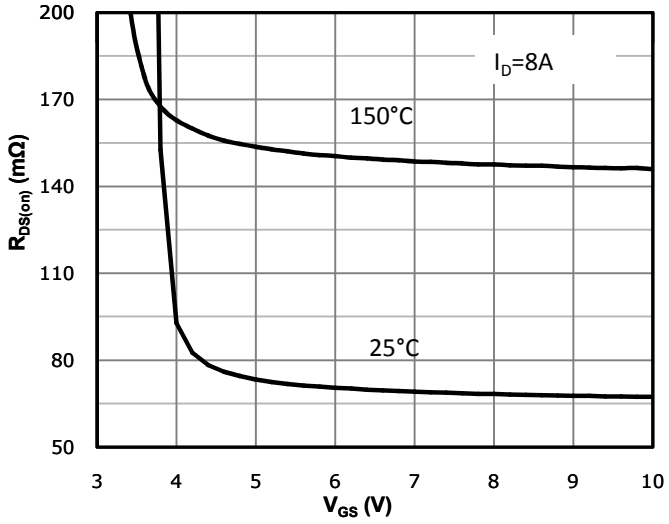


Fig 5: Rds(on) vs. Temperature

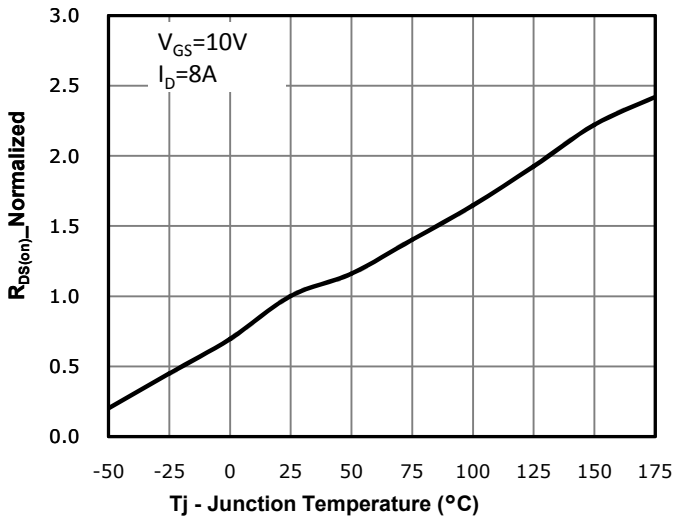


Fig 6: Capacitance Characteristics

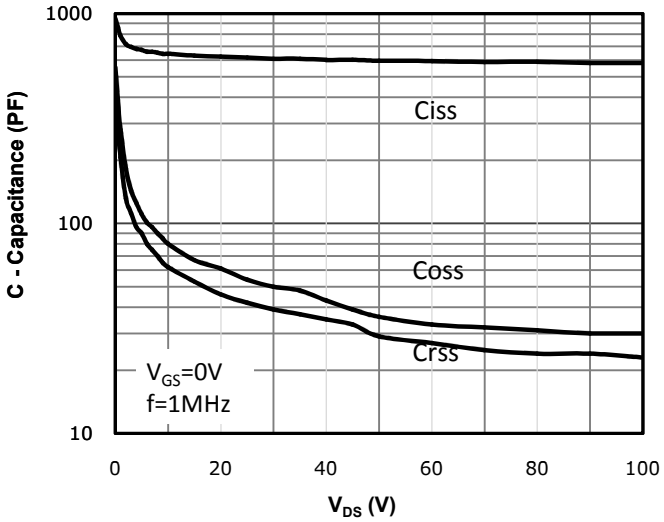


Fig 7: Gate Charge Characteristics

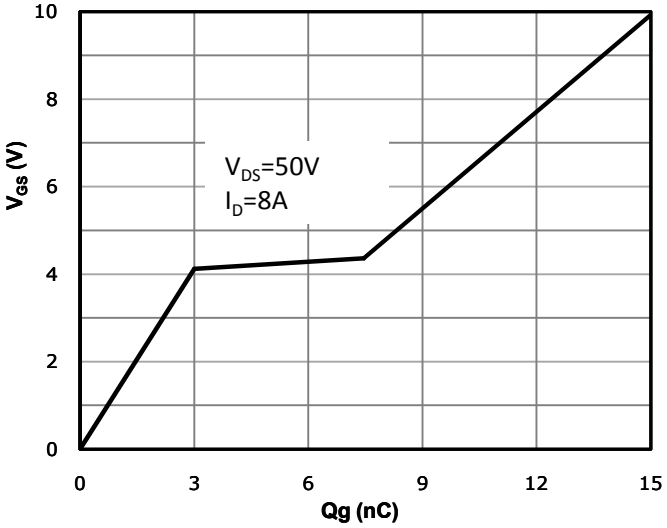


Fig 8: Body-diode Forward Characteristics

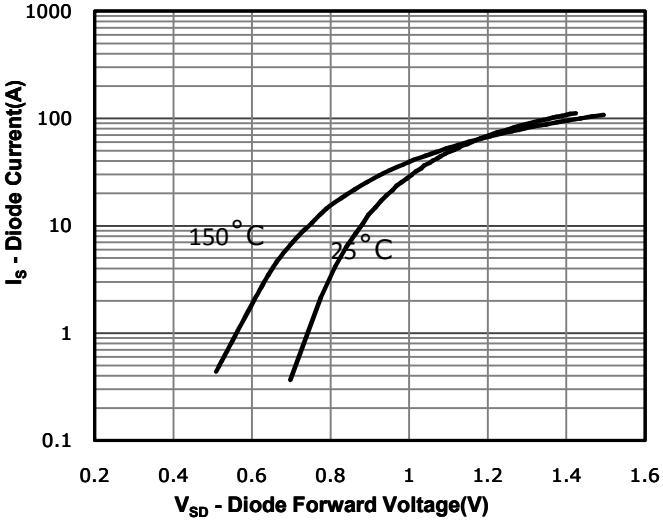


Fig 9: Power Dissipation

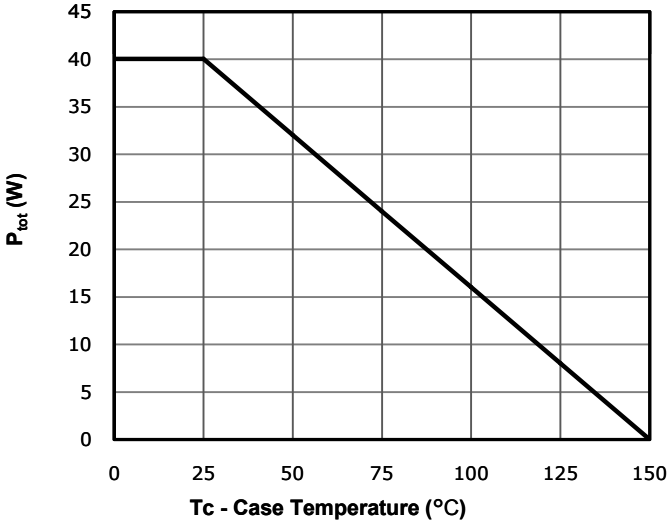


Fig 10: Drain Current Derating

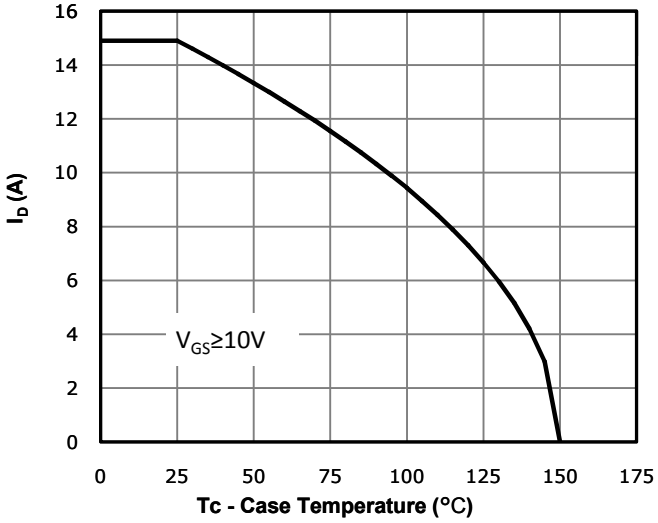


Fig 11: Safe Operating Area

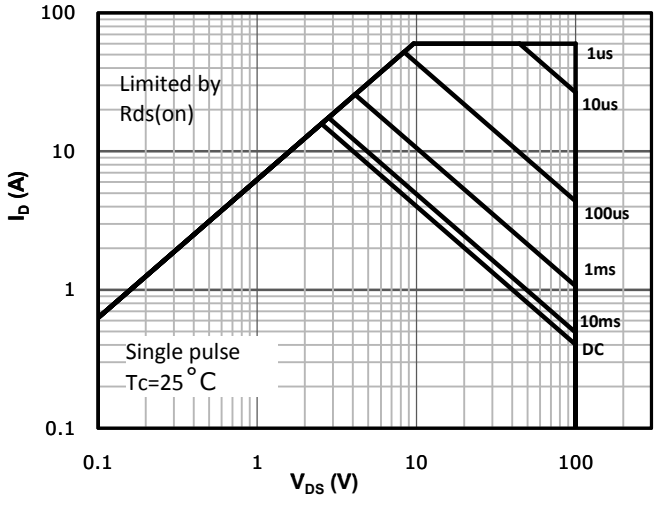
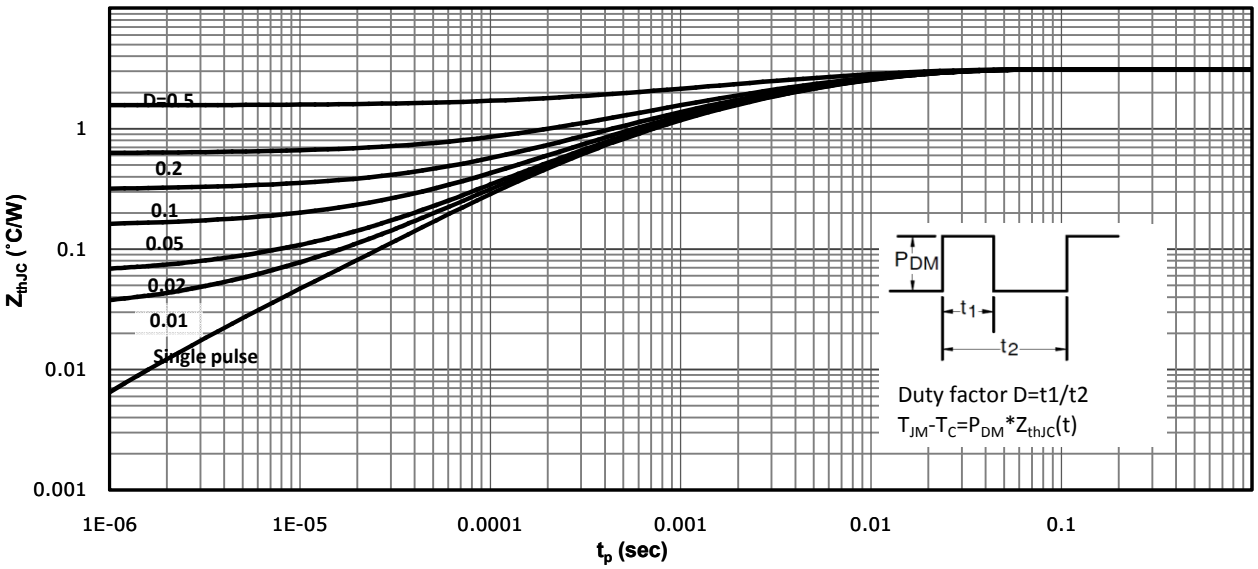
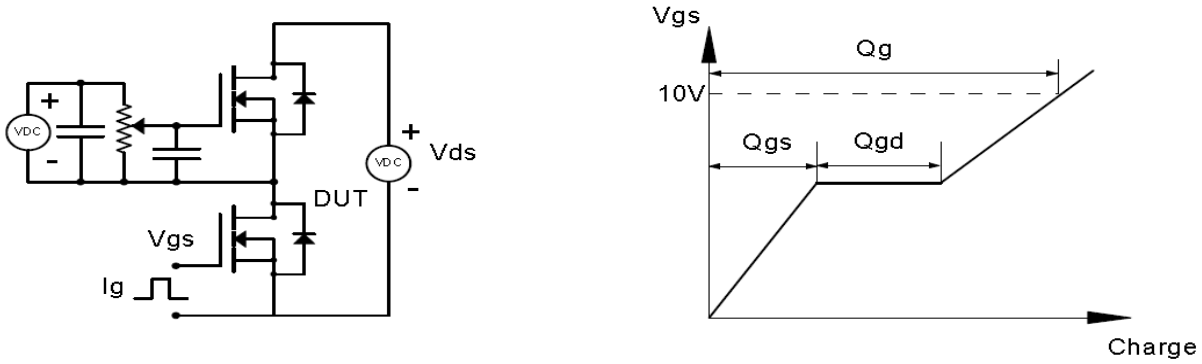


Fig 12: Max. Transient Thermal Impedance

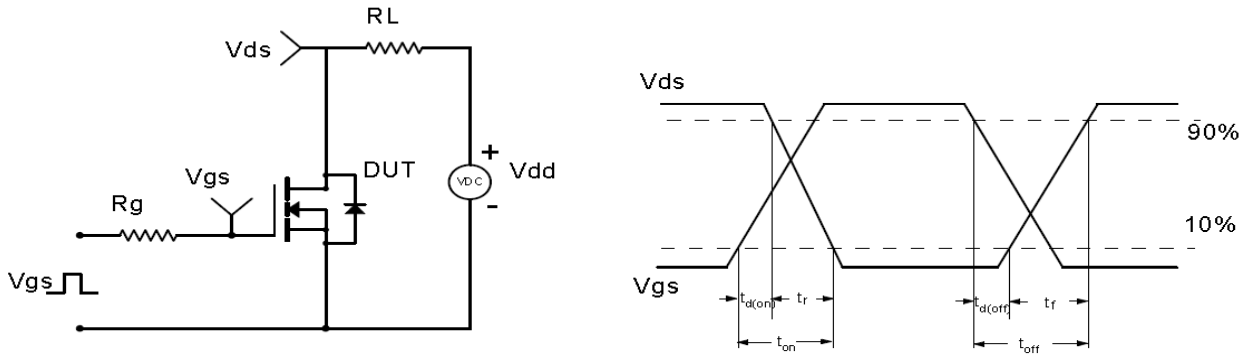


Test Circuit & Waveform

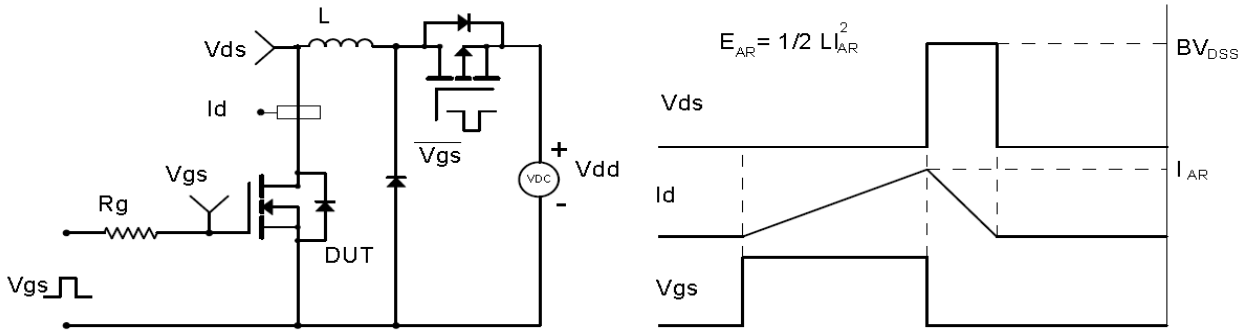
Gate Charge Test Circuit & Waveform



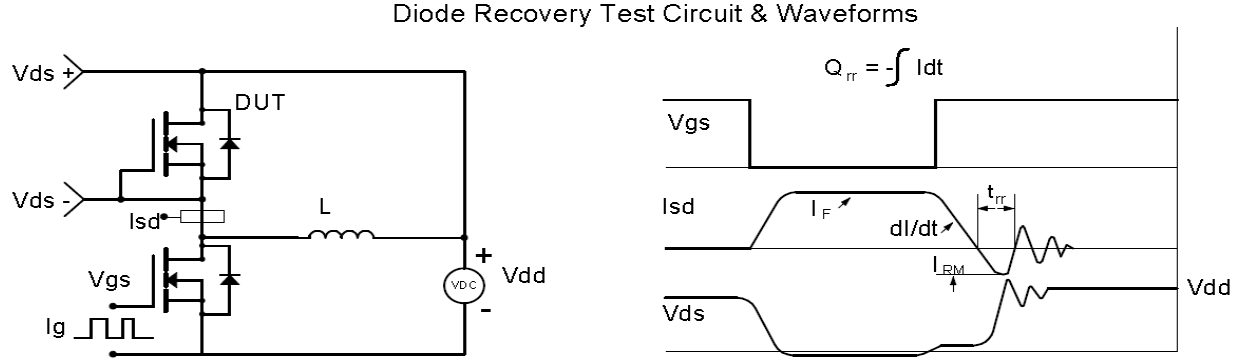
Resistive Switching Test Circuit & Waveforms



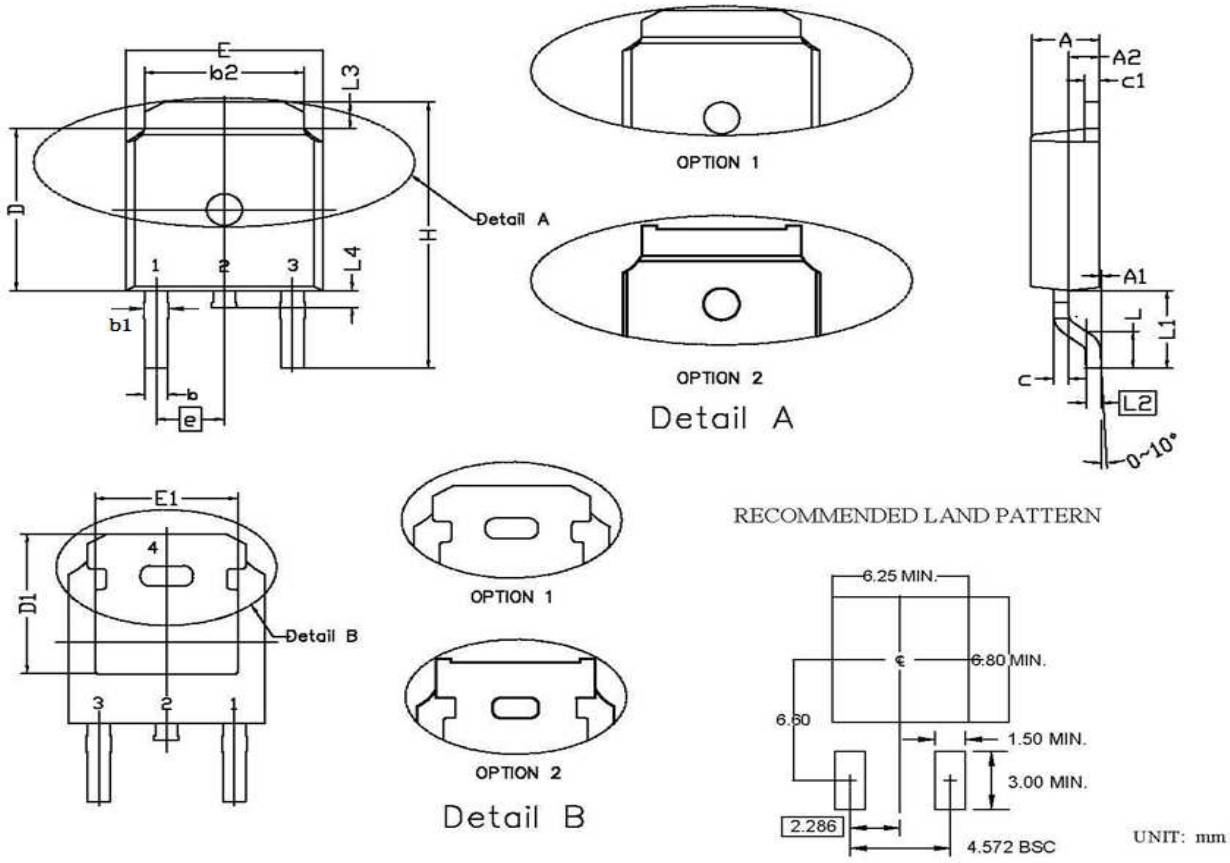
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
A1	0.00	0.15	0.000	0.006
A2	0.76	1.36	0.030	0.054
b	0.60	0.91	0.024	0.036
b1	0.65	1.15	0.026	0.045
b2	5.00	5.64	0.197	0.222
c	0.45	0.61	0.018	0.024
c1	0.36	0.66	0.014	0.026
D	5.80	6.30	0.228	0.248
D1	5.00	6.00	0.197	0.236
e	2.29 BSC.		0.090 BSC.	
E	6.30	6.90	0.248	0.272
E1	4.55	5.30	0.179	0.209
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L1	2.92 REF		0.115 REF	
L2	0.36	0.66	0.014	0.026
L3	0.72	1.35	0.028	0.053
L4	0.60	1.20	0.024	0.047

Revision History

Revison	Date	Major changes
1.0	2019/9/20	Release of formal version

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.