CRTD140P04L2-G

Trench P-MOSFET -40V, 11mΩ, -60A

Features

- Uses CRM advanced Trench 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}	-40V
$R_{DS(on)}$ typ.	11mΩ
I_D	-60A

100% DVDS Tested

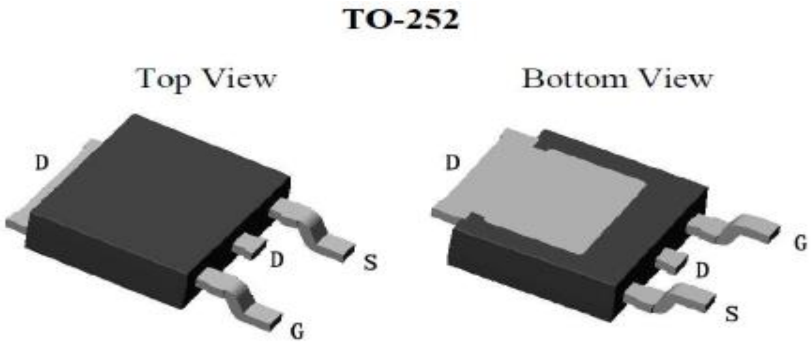
100% Avalanche Tested

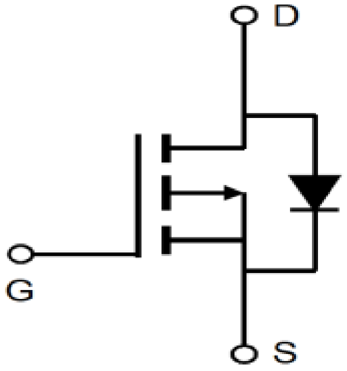
Applications

- Motor control and drive
- Electrical tools
- Lithium battery protection

RoHS

H F





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD140P04L2-G	T140P04L2	TO-252	Reel	N/A	N/A	2500pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	-40	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	-60 -38.5	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	-200	A
Avalanche energy, single pulse (L=0.5mH)	E_{AS}	190	mJ
Gate-Source voltage	V_{GS}	±18	V
Power dissipation (T_C = 25°C)	P_{tot}	73.5	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	Typ	Max	Unit
Thermal resistance, junction – ambient(min. footprint)	R_{thJC}	-	1.7	℃/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}	-40	-	-	V	V_{GS}=0V, I_D=-250uA
Gate threshold voltage	$V_{GS(th)}$	-1	-2	-3	V	V_{DS}=V_{GS}, I_D=-250uA
Zero gate voltage drain current	I_{DSS}	-	-	-1	μA	V_{DS}=-40V, V_{GS}=0V T_j=25°C
		-	-	-100		T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$				mΩ	T_j=25°C
		-	11	14.0		V_{GS}=-10V, I_D=-19A
		-	15	20.0		V_{GS}=-4.5V, I_D=-19A
Transconductance	g_{fs}		59.29		S	V_{DS}=-5V, I_D=-19A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	3768	-	pF	VGS=0V, VDS=-20V f=1MHz
Output Capacitance	C_{oss}	-	249	-		
Reverse Transfer Capacitance	C_{rss}	-	188	-		
Gate Total Charge	Q_g	-	62.9	-	nC	VGS=-10V, VDS=-20V ID=-19A
Gate-Source charge	Q_{gs}	-	8.6	-		
Gate-Drain charge	Q_{gd}	-	10.4	-		
Turn-on delay time	$t_{d(on)}$	-	19	-	ns	V_{GS}=-10V, VDS=-20V RG=3.0Ω, ID=-19A
Rise time	t_r	-	6	-		
Turn-off delay time	$t_{d(off)}$	-	100	-		
Fall time	t_f	-	32	-		
Gate resistance	R_G	-	8.5	-	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}	-	-	-1.2	V	V_{GS}=0V, I_{SD}=-19A
Body Diode Continuous Forward Current	I_S	-	-	-60	A	T_C = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	25.12	-	ns	I_F=-19A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	19.26	-	nC	

a1：Repetitive rating; pulse width limited by maximum junction temperature

Typical Performance Characteristics

Fig 1: Output Characteristics

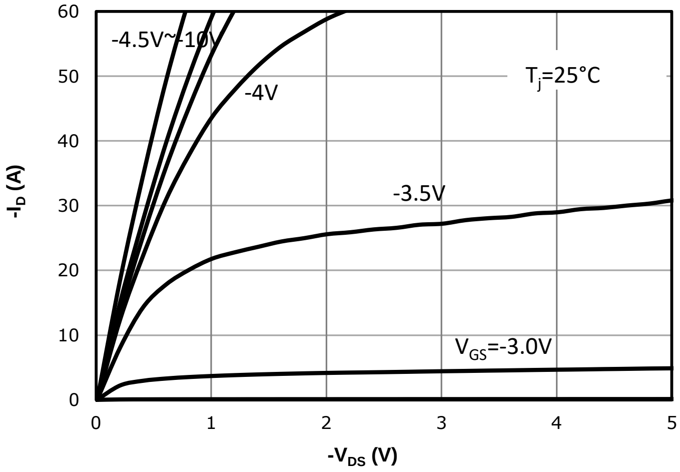


Fig 2: Transfer Characteristics

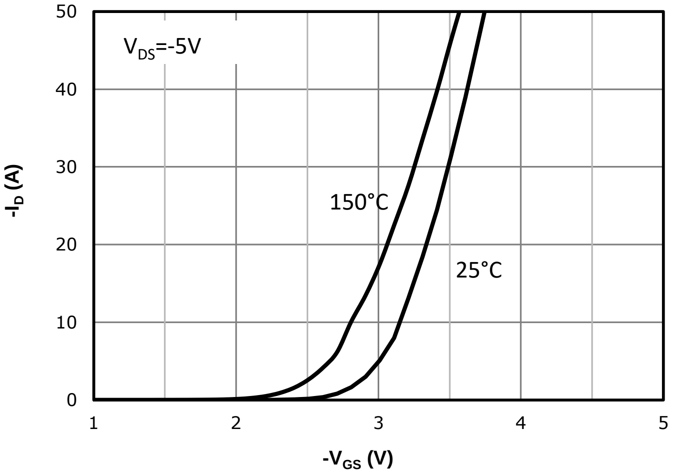


Fig 3: Rds(on) vs Drain Current and Gate Voltage

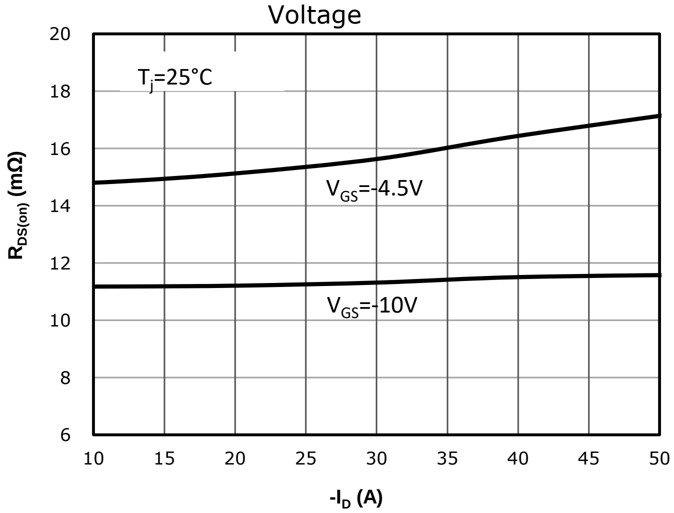


Fig 4: Rds(on) vs Gate Voltage

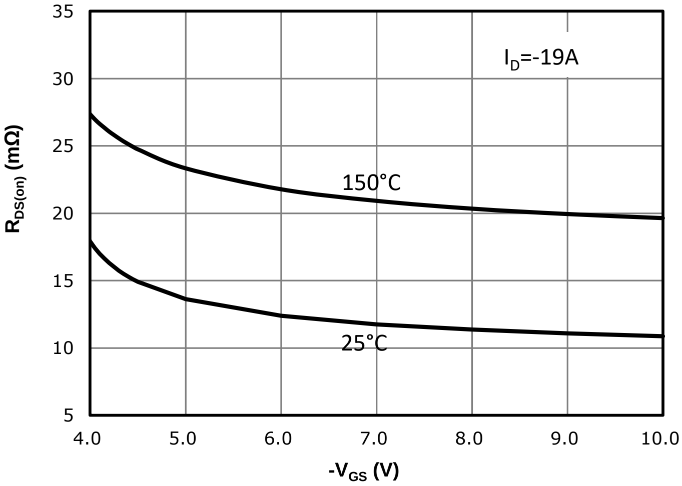


Fig 5: Rds(on) vs. Temperature

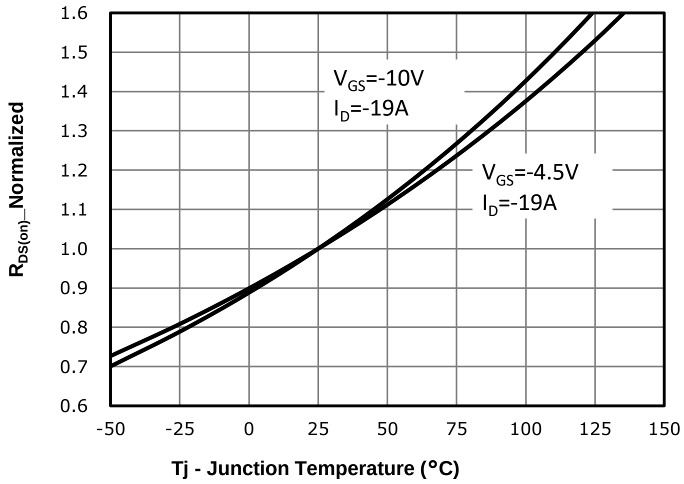


Fig 6: Vgs(th) vs. Temperature

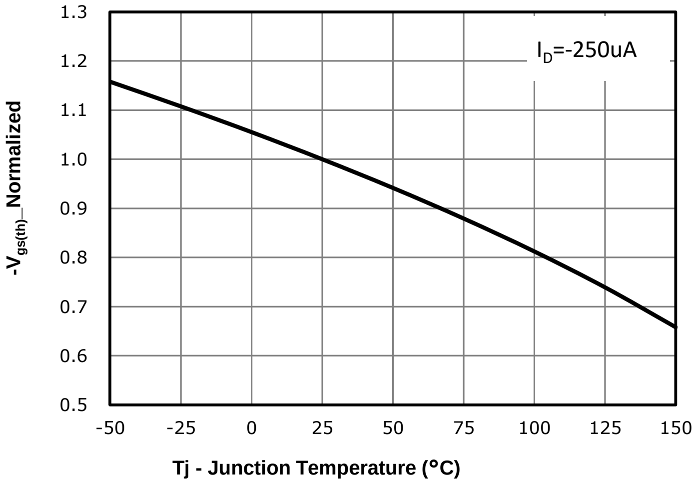


Fig 7: BVdss vs. Temperature

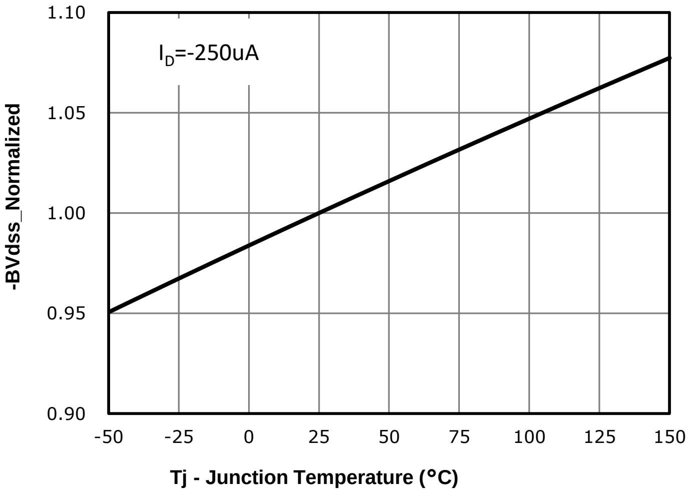


Fig 8: Body-diode Forward Characteristics

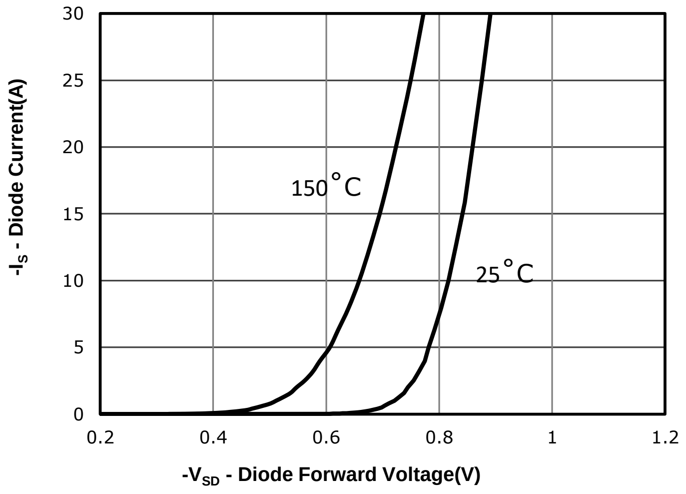


Fig 9: Gate Charge Characteristics

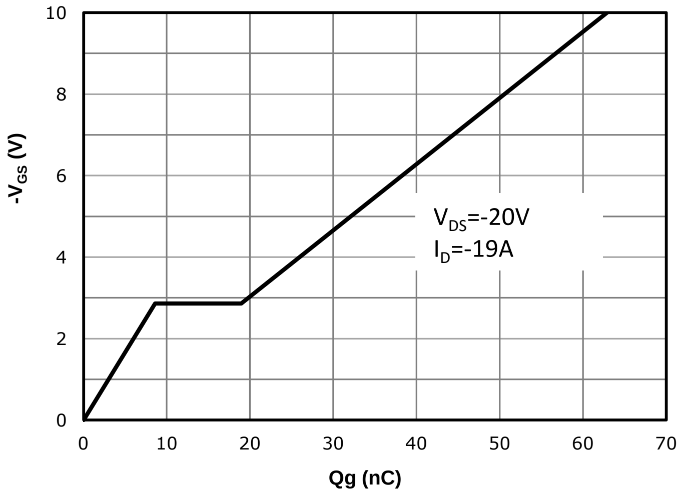


Fig 10: Capacitance Characteristics

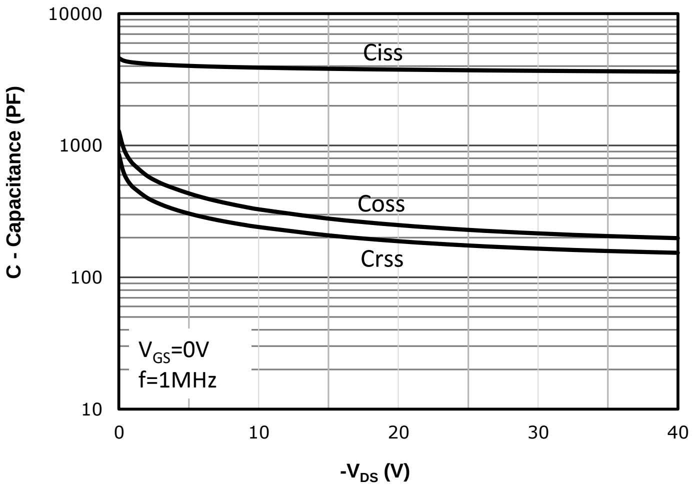


Fig 11: Drain Current Derating

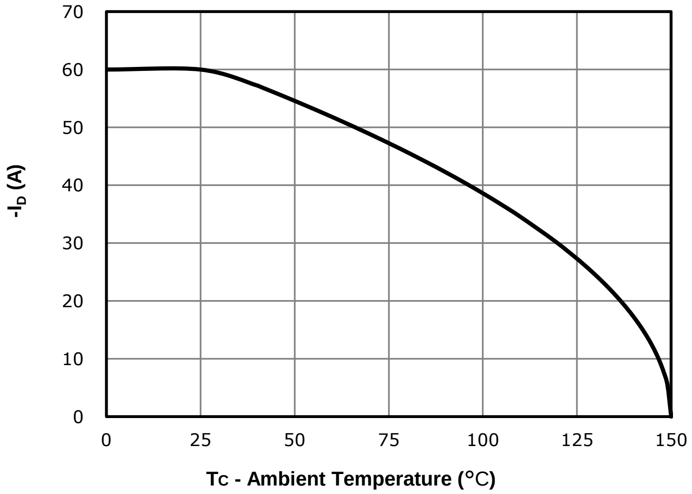


Fig 12: Power Dissipation

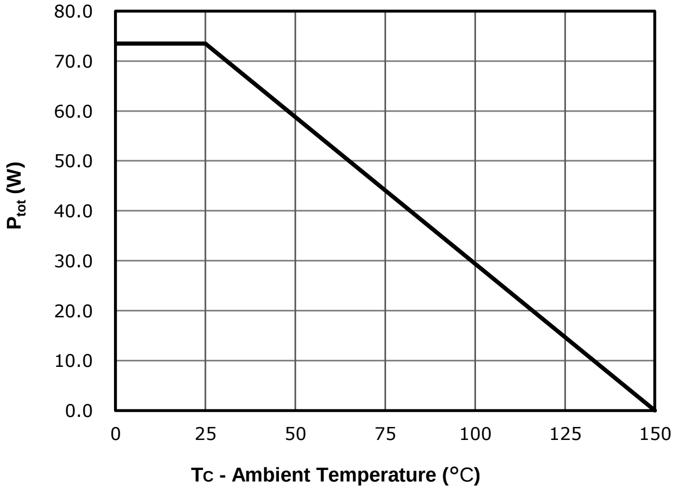


Fig 13: Safe Operating Area

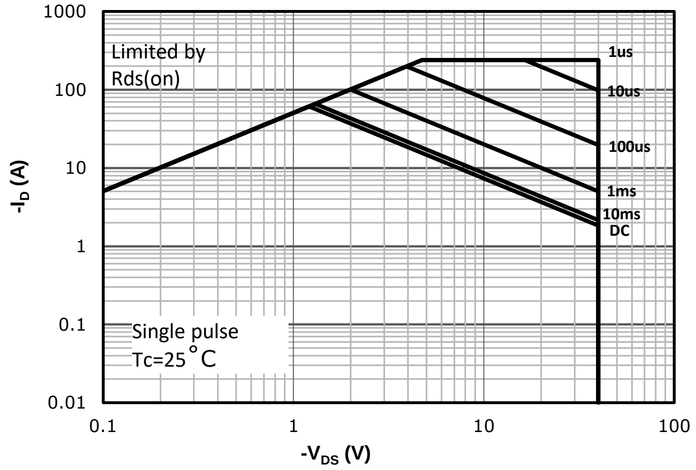
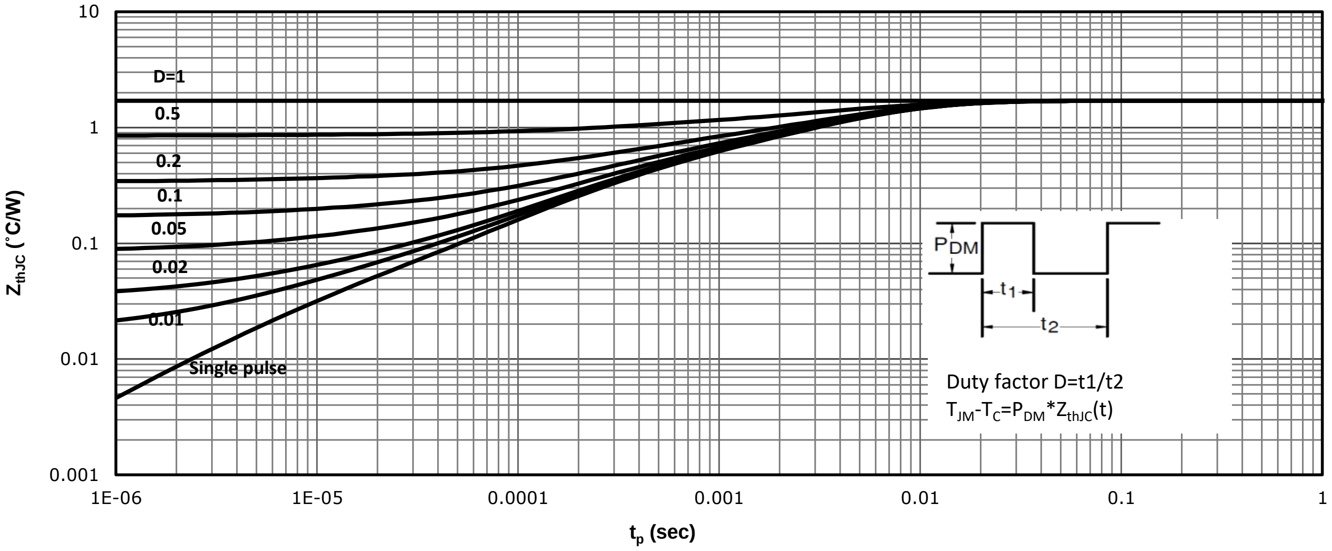
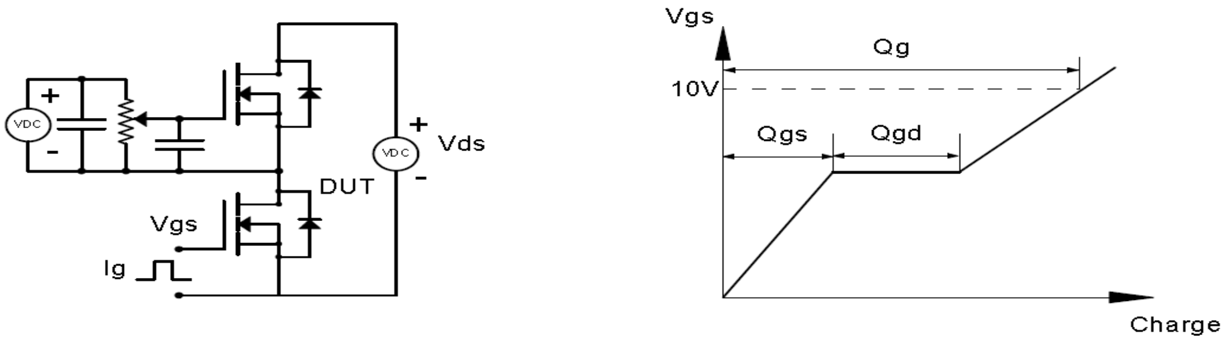


Fig 14: Max. Transient Thermal Impedance

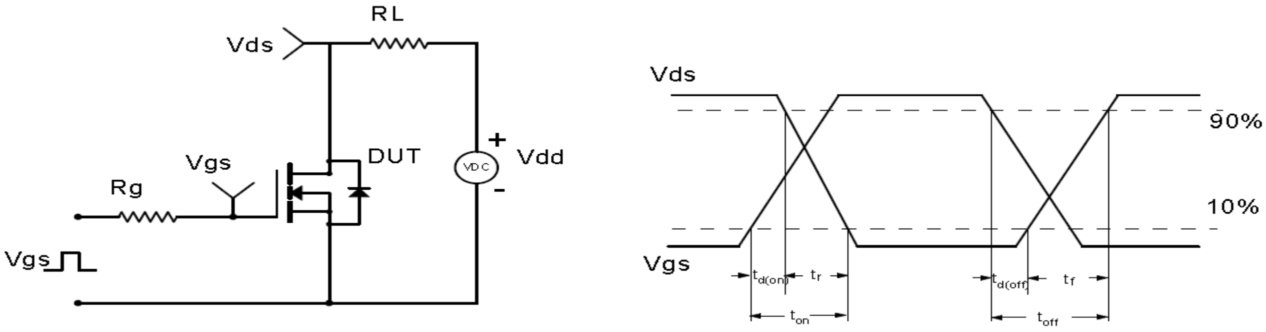


Test Circuit & Waveform

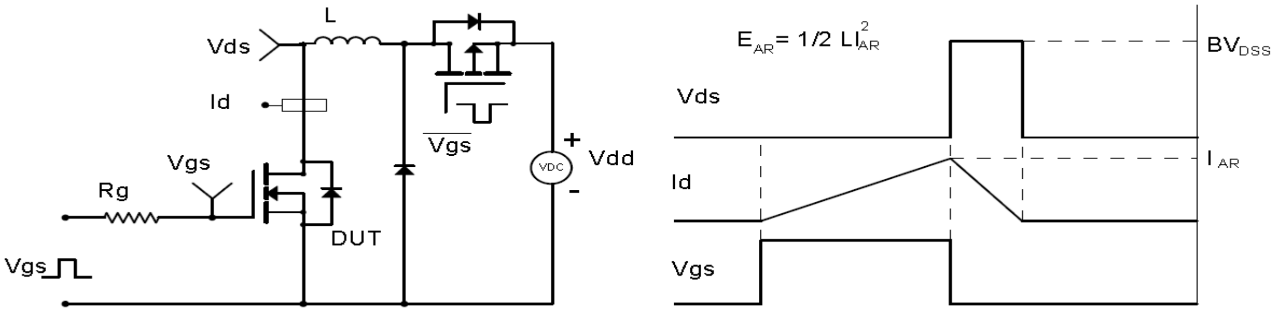
Gate Charge Test Circuit & Waveform



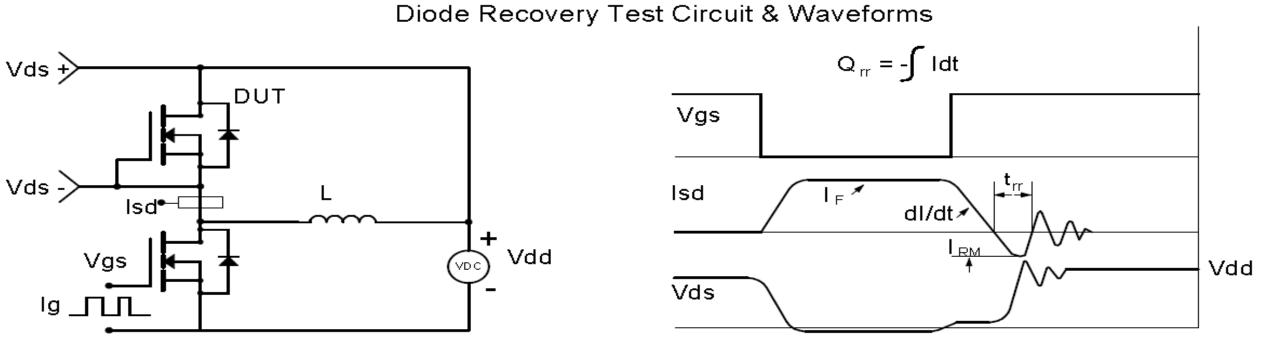
Resistive Switching Test Circuit & Waveforms



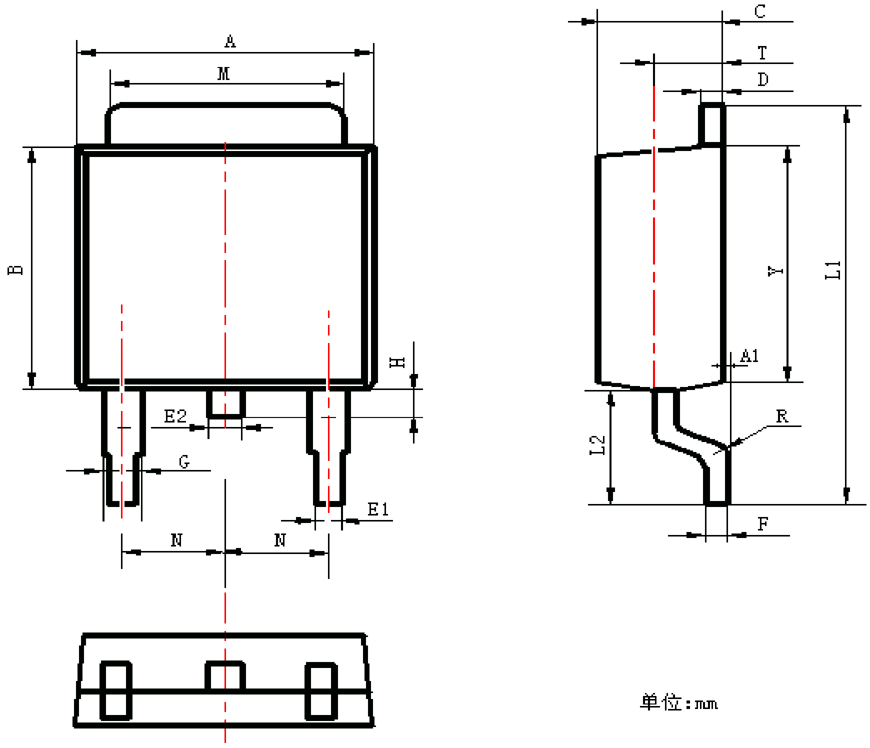
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252



Symbol	Values(mm)	
	Min.	Max.
A	6.30	6.90
A1	0.00	0.16
B	5.70	6.30
C	2.10	2.50
D	0.30	0.70
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.40	1.00
M	5.10	5.50
N	2.09	2.49
R	0.30	
T	1.40	1.60
Y	5.10	6.30

Marking

NOTE:
AABXXXG

AA	—cycle code
B	—Fab code
XXX	—Assembly lot code

Revision History

Revison	Date	Major changes
1.0	2023/4/28	Relaease of formal version
2.0		
3.0		

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 reserves the right to improve product design, function and reliability without notice.