Features

- Uses CRM(CQ) advanced SkyMOS3 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Product Summary

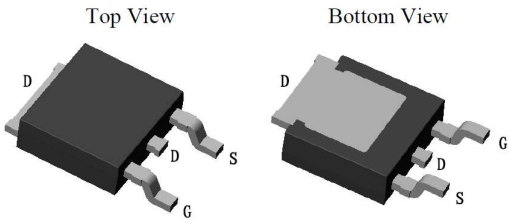
V_{DS}	120V
$R_{DS(on)@10V\ typ}$	7.8mΩ
$R_{DS(on)@8V\ typ}$	8.5mΩ
I_D	80A

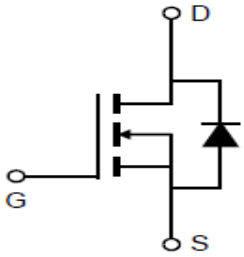
Applications

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

100% Avalanche Tested

TO-252





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSD090N12N	CRSD090N12N	TO-252	Tape\Reel	N/A	N/A	2500pcs

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	120	V
Continuous drain current T_C = 25°C (Silicon limit) TC = 100°C (Silicon limit) TC = 25°C (Package limit)	I_D	 81 51 80	A
Pulsed drain current (T_A = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	324	A
Avalanche Current (L=0.5mH)	I_{AS}	23	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)	EAS(Note 1)	132	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C , R_{thJA}=94 K/W)	P_{tot}	101.2	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 = 23A, VGS = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.24	°C/W
Thermal resistance, junction – ambient(min. footprint)*	R_{thJA}	94	
Soldering temperature, wave and reflow soldering are allowed (reflow MSL1)	T_{sold}	260	°C

* Surface mounted FR-4 board by JEDEC (jesd51-7). Continuous current at TC=25℃ is silicon limited

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}	120	-	-	V	V_{GS}=0V, I_D=250uA
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}=100V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	-	±10	100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	7.8 8.5	9.0 9.8	mΩ	V_{GS}=10V, I_D=40A V_{GS}=8V, I_D=32A
Transconductance	g_{fs}	-	72.5	-	S	V_{DS}=5V,I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	3517.0	-	pF	V_{GS}=0V, V_{DS}=60V, f=1MHz
Output Capacitance	C_{oss}	-	418.3	-		
Reverse Transfer Capacitance	C_{rss}	-	43.3	-		
Gate Total Charge	Q_G	-	51.0	-	nC	V_{GS}=10V, V_{DS}=60V, I_D=40A, f=1MHz
Gate-Source charge	Q_{gs}	-	21.6	-		
Gate-Drain charge	Q_{gd}	-	9.0	-		
Turn-on delay time	$t_{d(on)}$	-	21.1	-	ns	V_{GS}=10V, V_{DD}=60V, R_{G_ext}=2.7Ω
Rise time	t_r	-	103.5	-		
Turn-off delay time	$t_{d(off)}$	-	32.8	-		
Fall time	t_f	-	86.2	-		
Gate resistance	R_G	-	1.80	-	Ω	V_{GS}=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	1.4	V	V_{GS}=0V,I_{SD}=40A
Body Diode Reverse Recovery Time	t_{rr}	-	63.9	-	ns	I_F=40A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	132.8	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

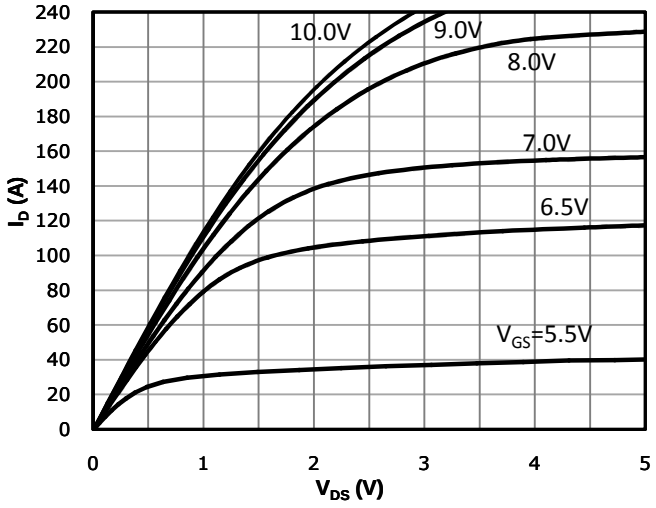


Fig 2: Transfer Characteristics

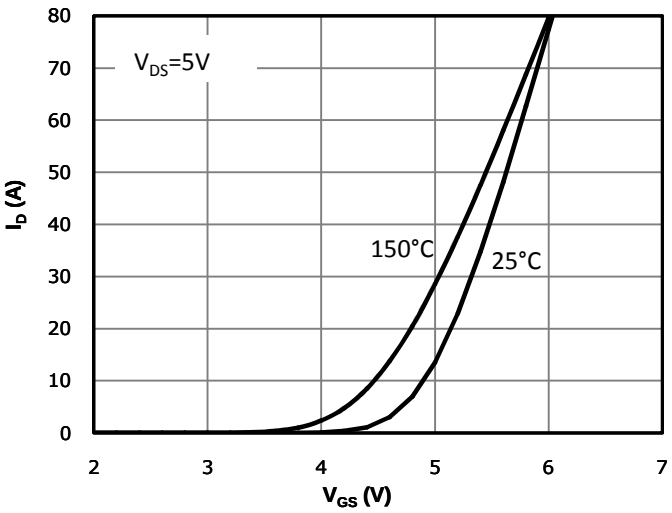


Fig 3: Rds(on) vs Drain Current and Gate Voltage

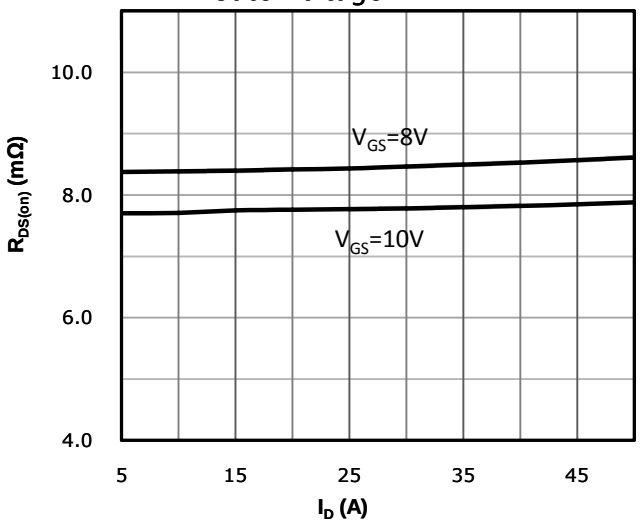


Fig 4: Rds(on) vs Gate Voltage

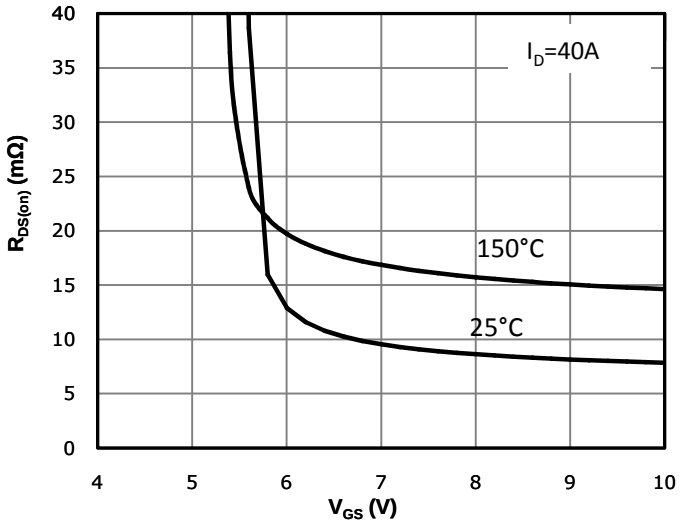


Fig 5: Rds(on) vs. Temperature

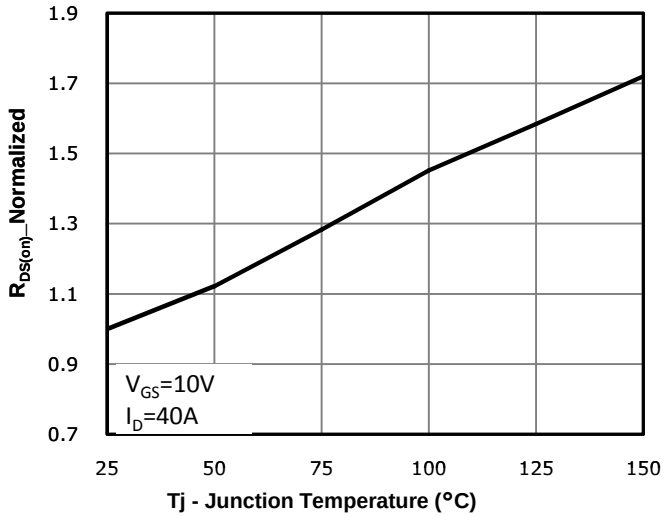


Fig 6: Capacitance Characteristics

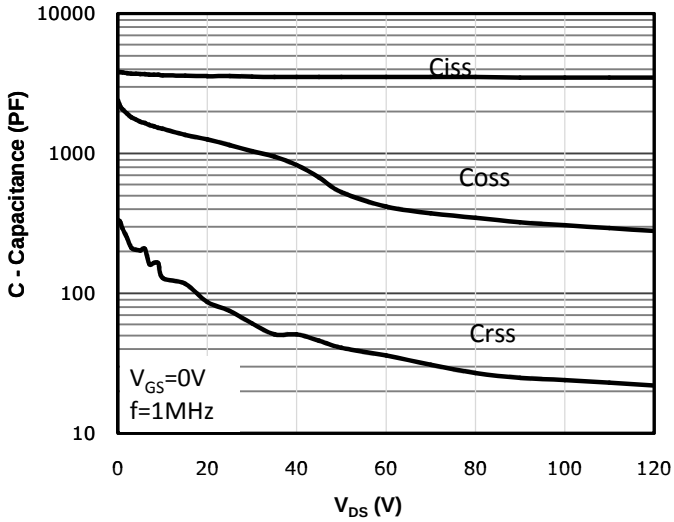


Fig 7: Gate Charge Characteristics

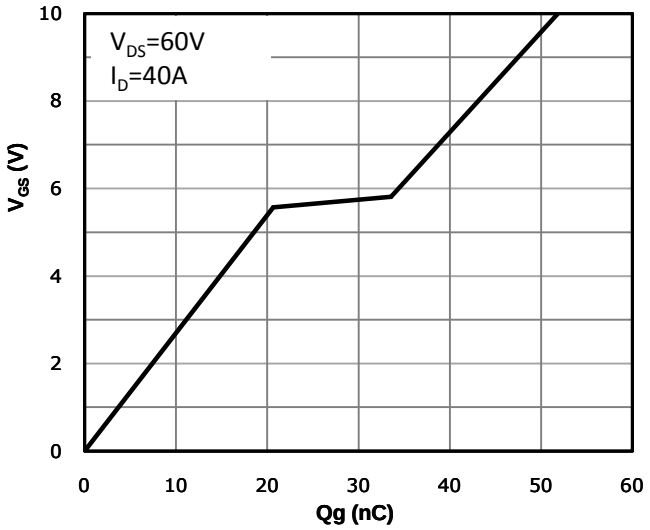


Fig 8: Body-diode Forward Characteristics

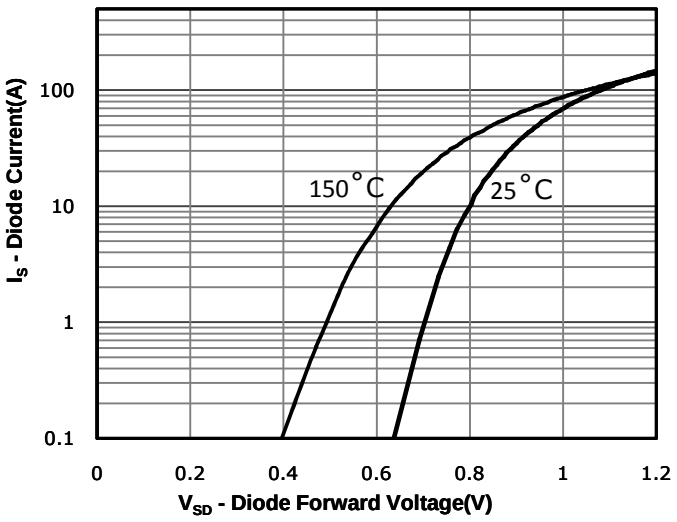


Fig 9: Power Dissipation

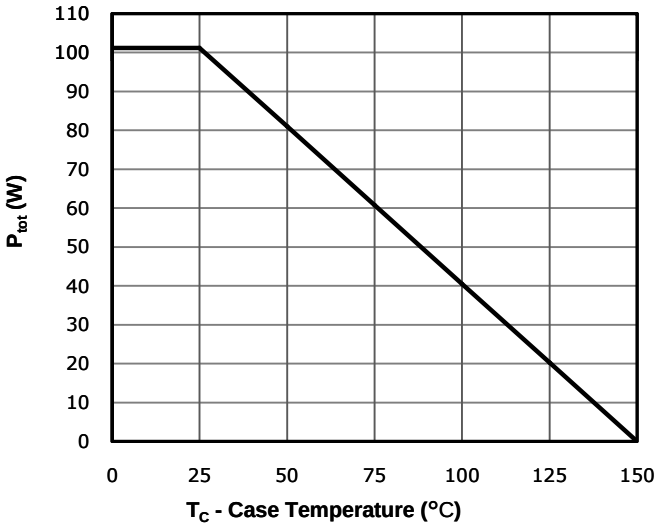


Fig 10: Drain Current Derating

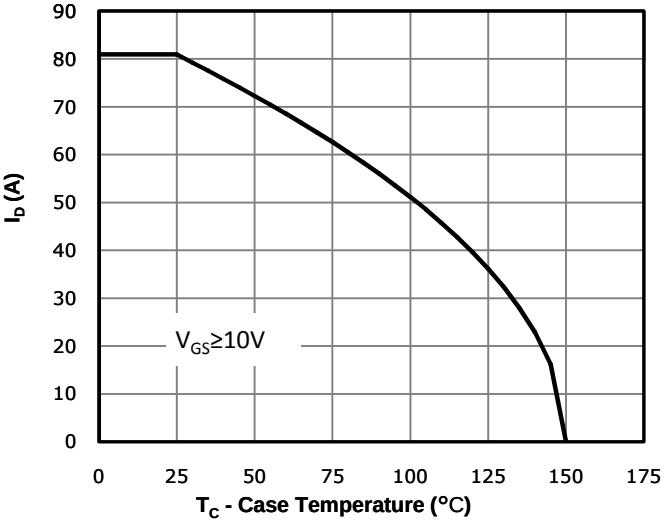


Fig 11: Safe Operating Area

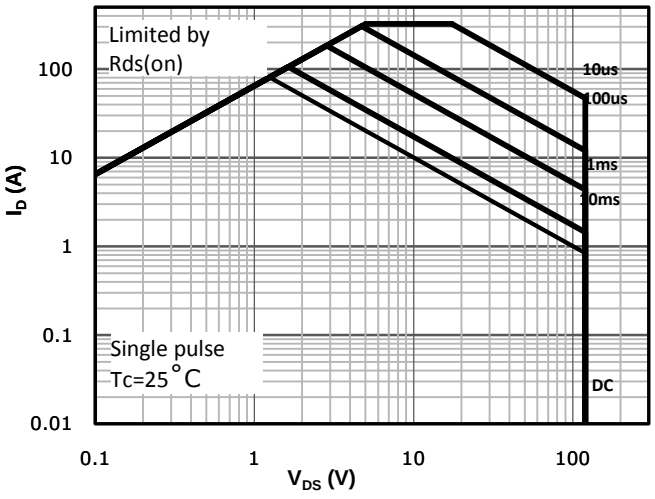
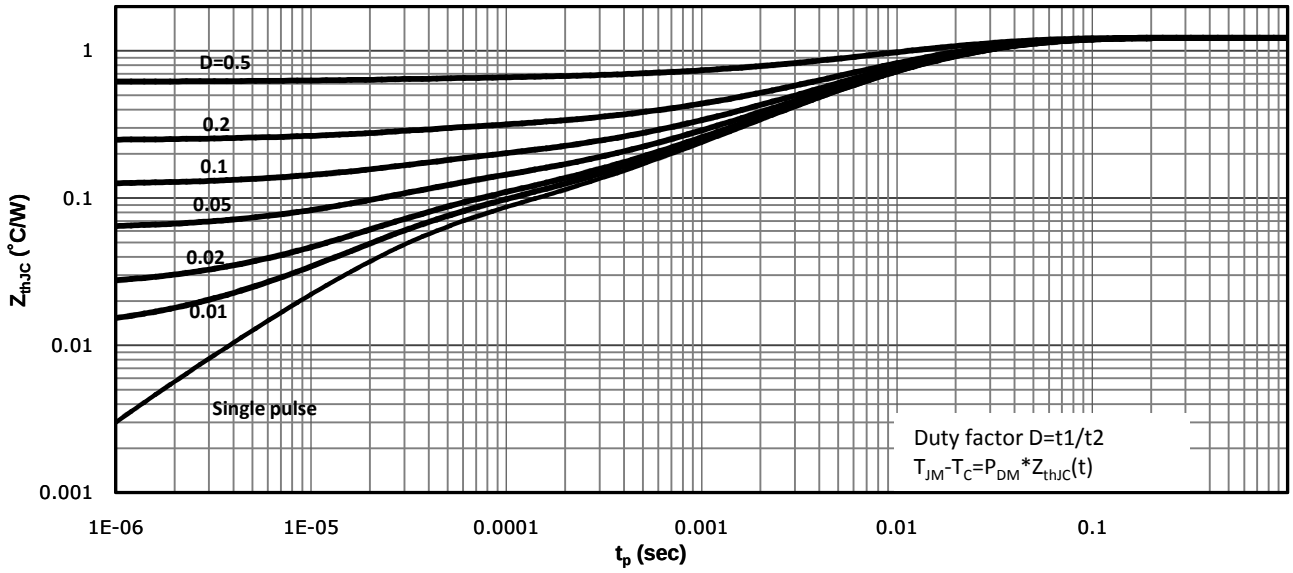
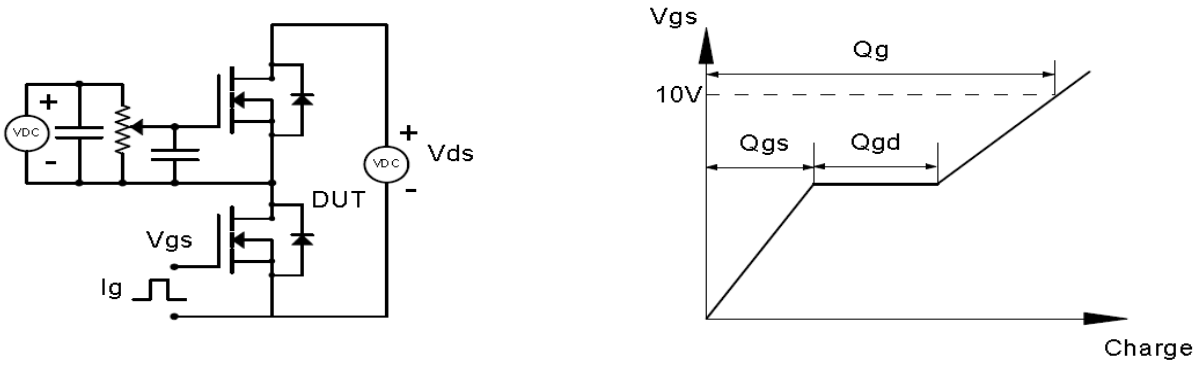


Fig 12: Max. Transient Thermal Impedance

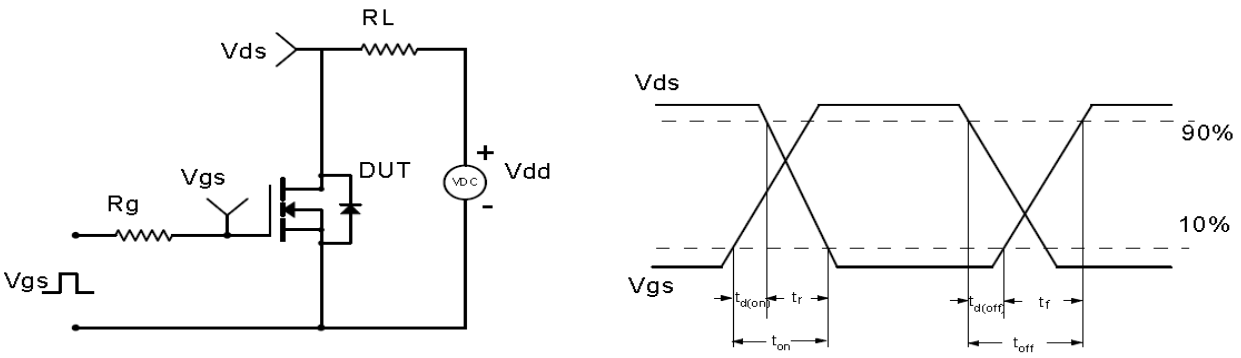


Test Circuit & Waveform

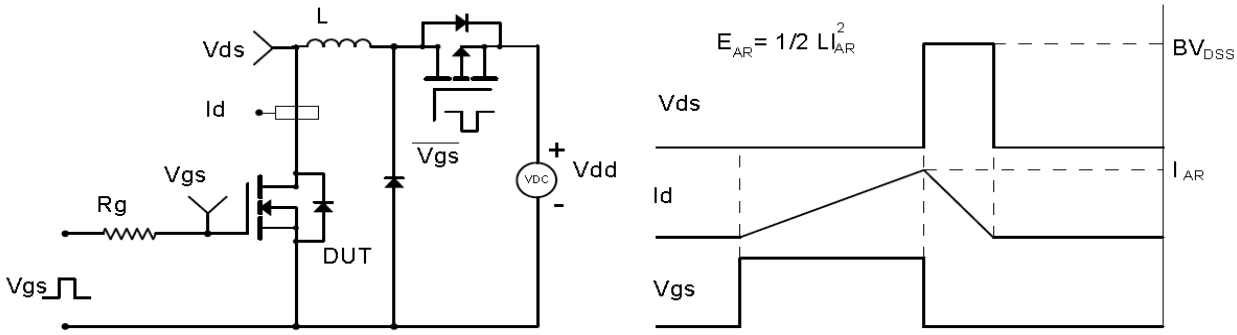
Gate Charge Test Circuit & Waveform



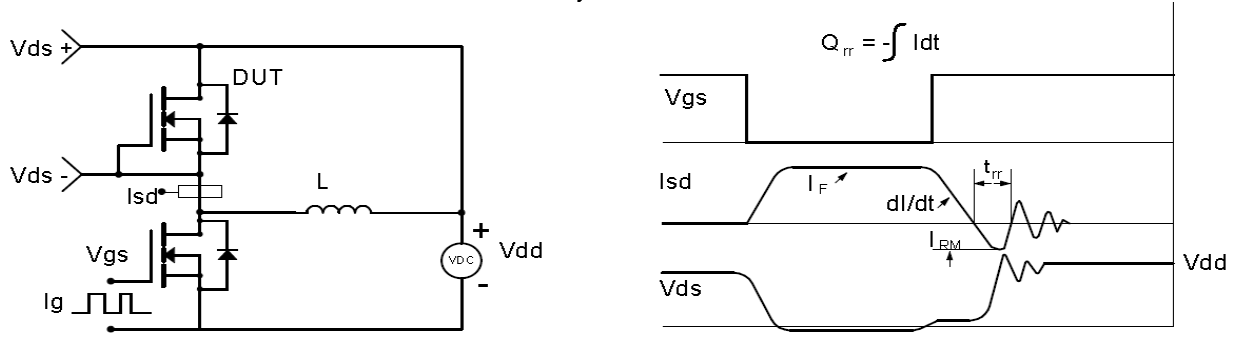
Resistive Switching Test Circuit & Waveforms



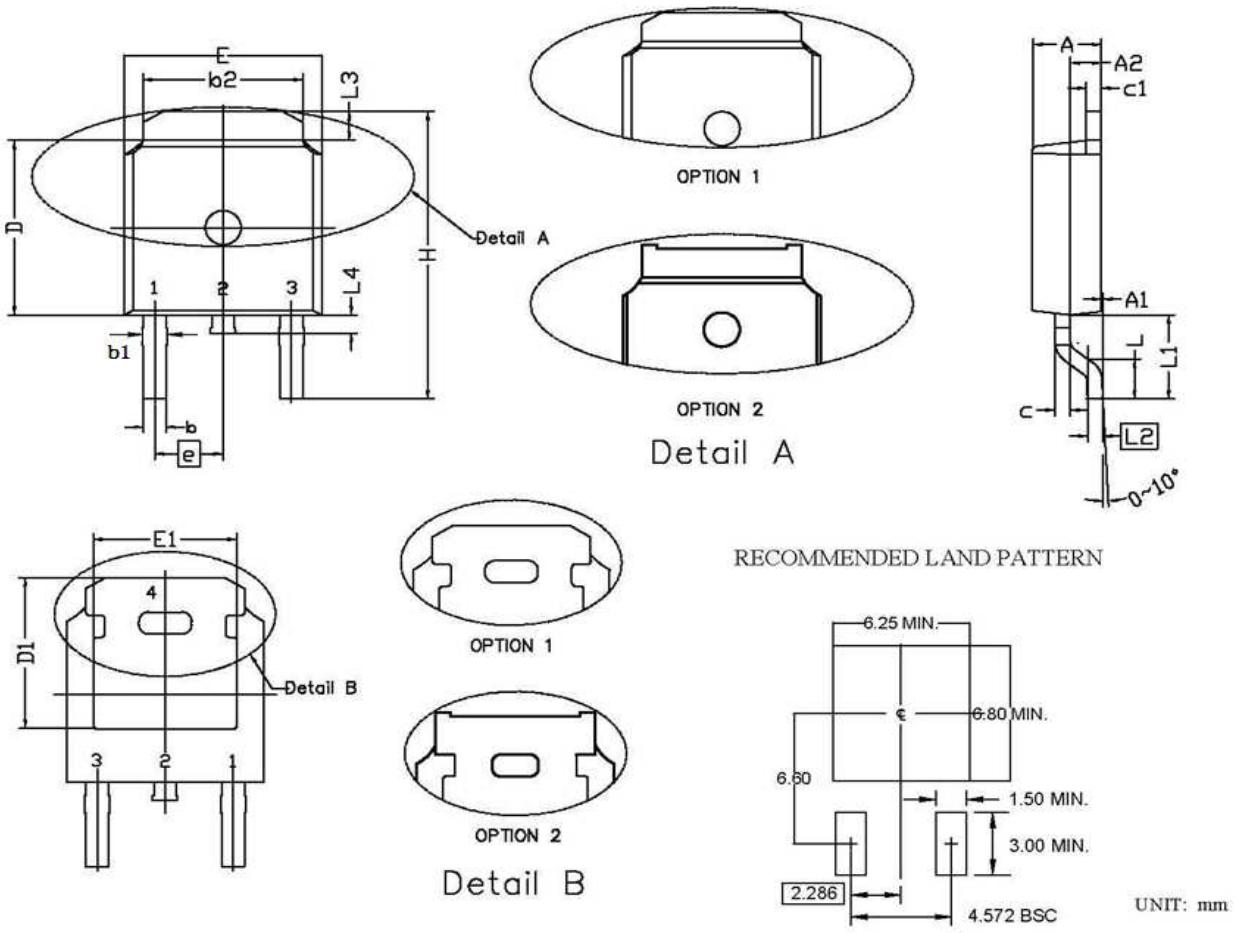
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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	2019-07-23	priliminary 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.