华润微电子(重庆)有限公司

CRSD046N06N2

SkyMOS2 N-MOSFET 60V, 3.3mΩ,

Features

- Uses CRM(CQ) advanced SkyMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Product Summary

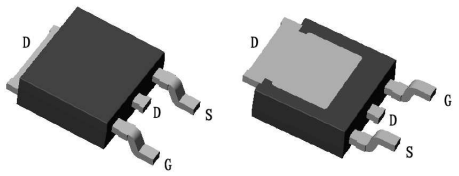
V_{DS}	60V
$R_{DS(on)@10V\ typ}$	3.3mΩ
I_D	80A

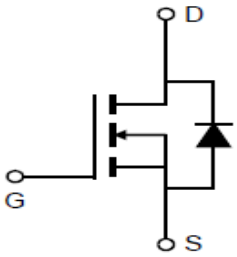
Applications

- Synchronous Rectification for AC/DC Quick Charger
- 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
CRSD046N06N2	SD046N06N2	TO-252	Tape&Reel	N/A	N/A	4000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	60	V
Continuous drain current T_C = 25°C (Package limit) T_C = 25°C (Silicon limit) T_C = 100°C (Silicon limit)	I_D	 80 122 77	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	320	A
Avalanche energy, single pulse (L=0.3mH, Rg=25Ω)[1]	E_{AS}	144	mJ
Repeative avalanche Current (L=0.3mH)[2]	I_{AR}	14	A
Repeative avalanche (L=0.3mH)[2]	E_{AR}	27	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	101.2	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

Notes:1.EAS was tested at Tj = 25℃, ID = 31A.

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_{thJL}	1.24	°C/W
Thermal resistance, junction – ambient[3]	R_{thJA}	94	

Notes:3. 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}	60	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.2	3	3.8	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	0.02 -	1 10	μA	V_{DS}=60V,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	$R_{DS(on)}$	-	3.3	4.1	mΩ	V_{GS}=10V, I_D=30A
Transconductance	g_{fs}	-	70	-	S	V_{DS}=5V,I_D=30A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2583	3874.5	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Output Capacitance	C_{oss}	-	1000	1500		
Reverse Transfer Capacitance	C_{rss}	-	45	67.5		
Gate Total Charge	Q_G	-	39.5	59.3	nC	V_{GS}=10V, V_{DS}=30V, I_D=30A, f=1MHz
Gate-Source charge	Q_{gs}	-	14	35		
Gate-Drain charge	Q_{gd}	-	8.5	21.3		
Turn-on delay time	$t_{d(on)}$	-	17	34	ns	V_{GS}=10V, V_{DD}=30V, R_{G_ext}=2.7Ω
Rise time	t_r	-	96	192		
Turn-off delay time	$t_{d(off)}$	-	30	60		
Fall time	t_f	-	109	218		

Gate resistance	R_G	-	2.1	4	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}	-	0.83	1.3	V	V_{GS}=0V,I_{SD}=3A
Body Diode Reverse Recovery Time	t_{rr}	-	60	120	ns	I_F=30A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	72	144	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

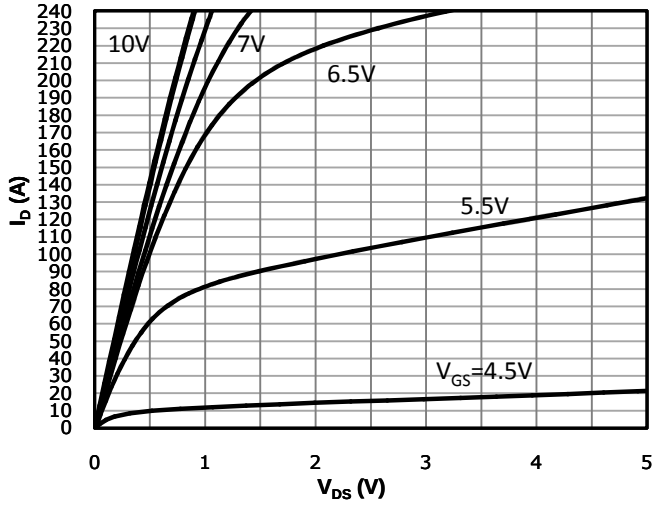


Fig 2: Transfer Characteristics

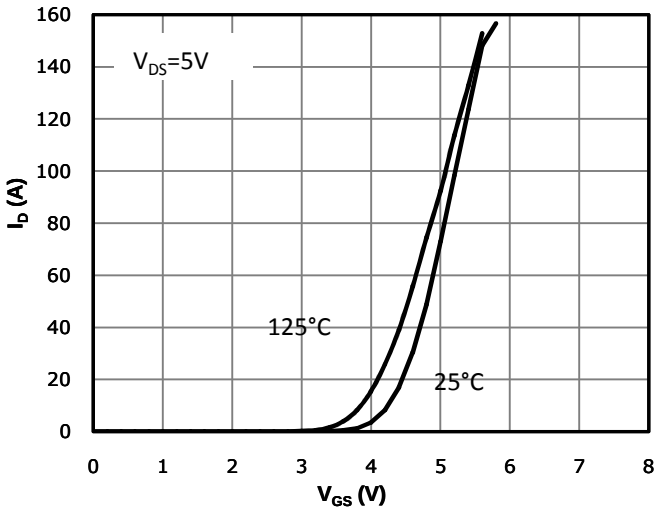


Fig 3: Rds(on) vs Drain Current and Gate Voltage

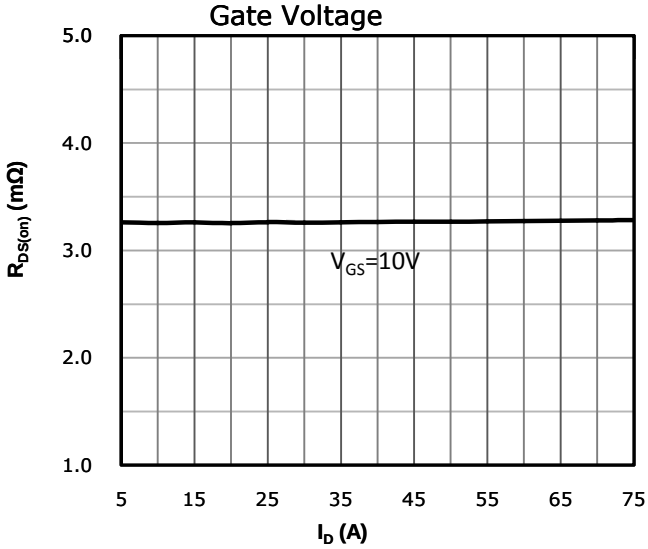


Fig 4: Rds(on) vs Gate Voltage

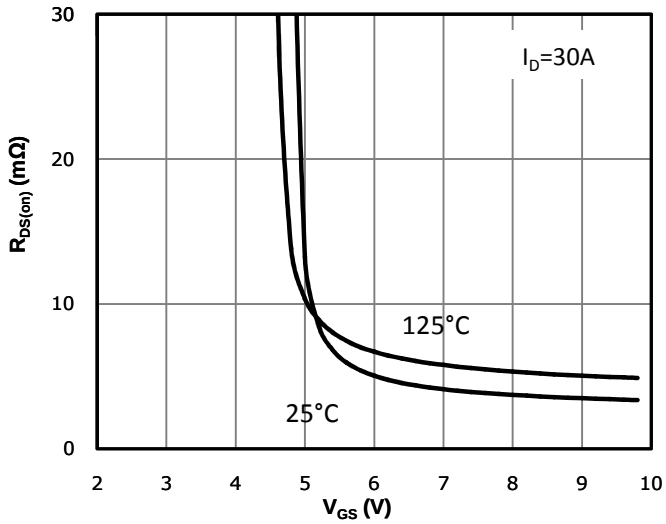


Fig 5: Rds(on) vs. Temperature

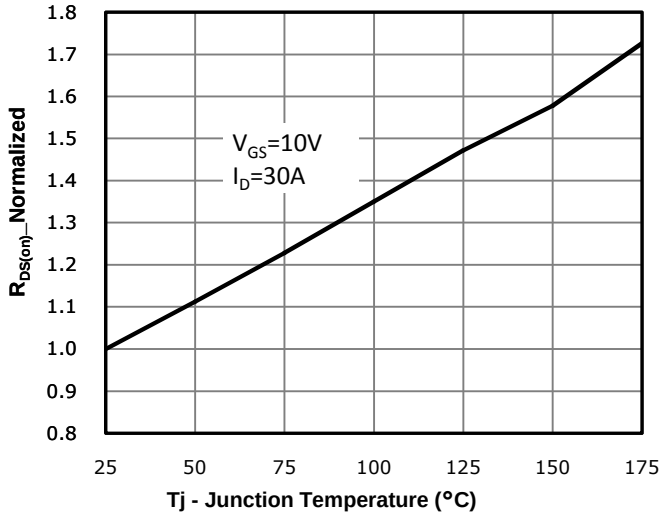


Fig 6: Capacitance Characteristics

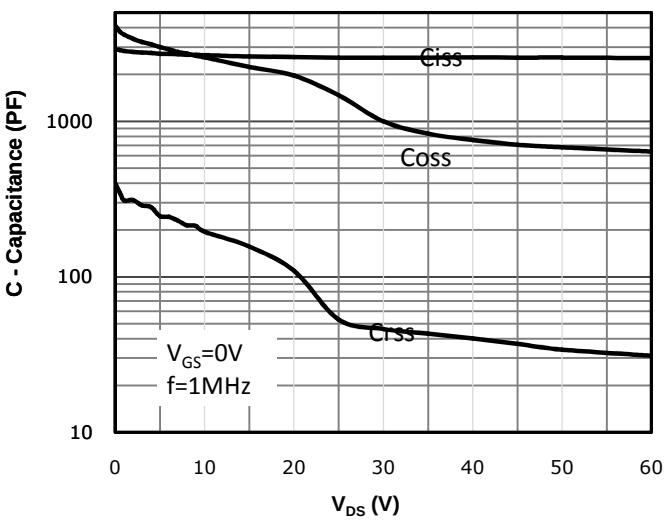


Fig 7: Gate Charge Characteristics

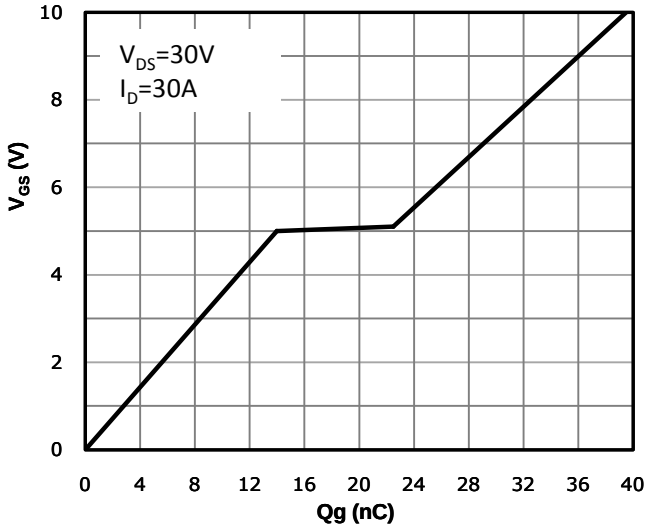


Fig 8: Body-diode Forward Characteristics

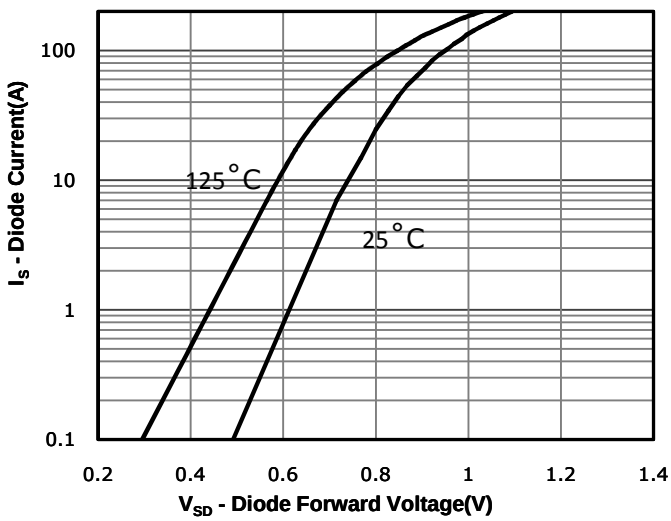


Fig 9: Power Dissipation

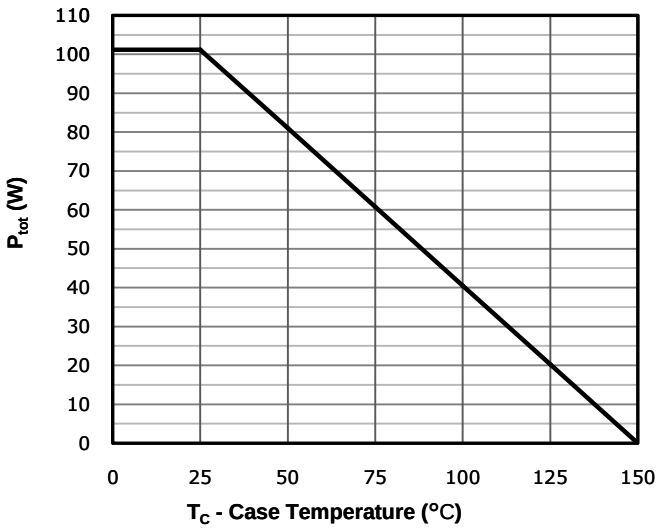


Fig 10: Drain Current Derating

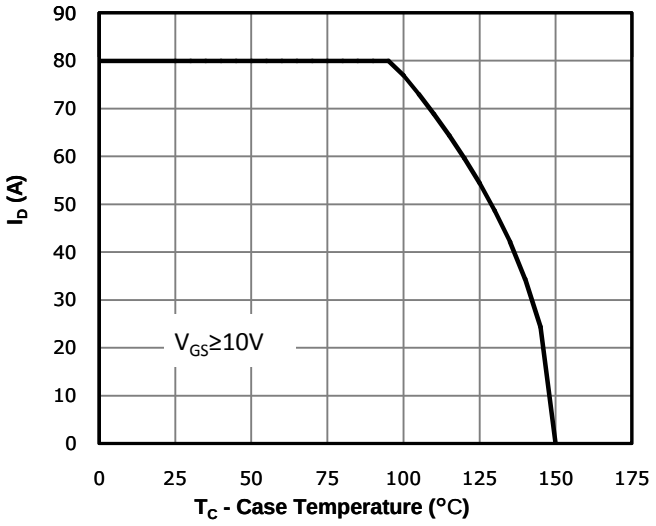


Fig 11: Safe Operating Area

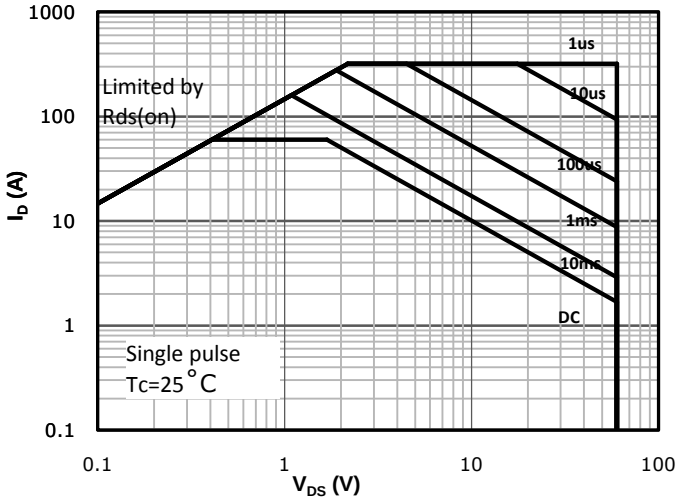
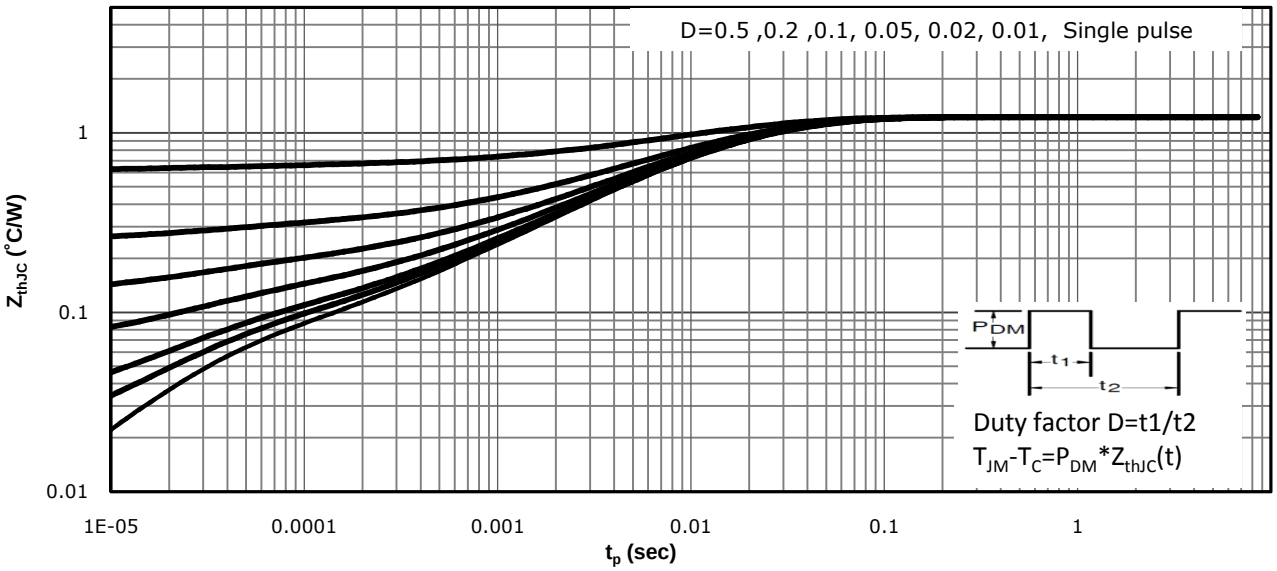
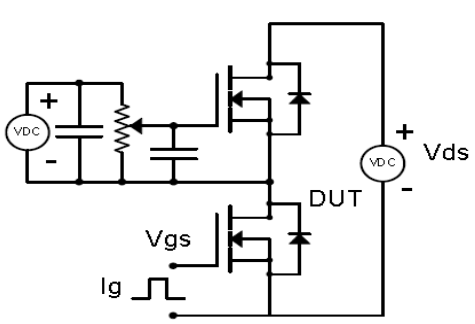


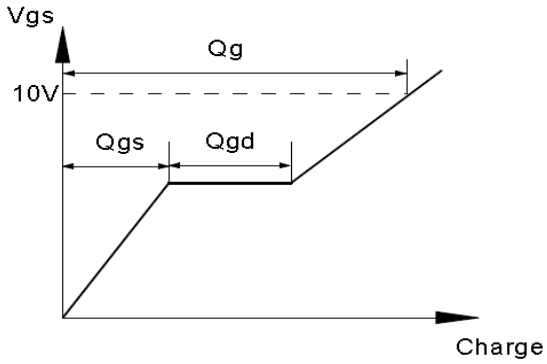
Fig 12: Max. Transient Thermal Impedance



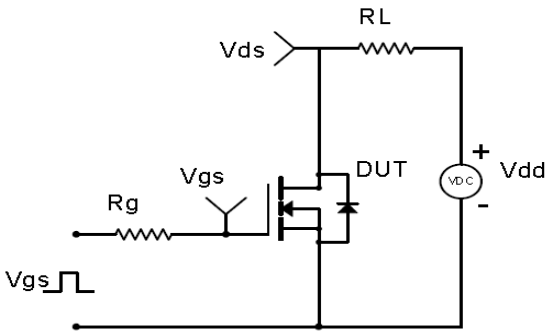
Test Circuit & Waveform

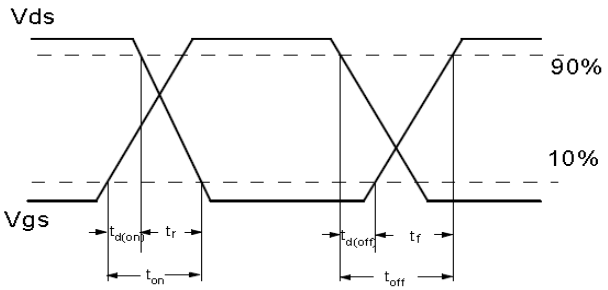
Gate Charge Test Circuit & Waveform



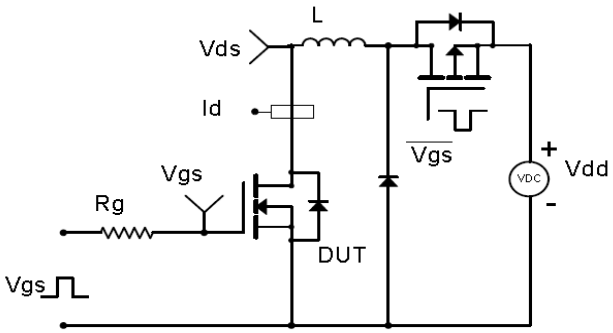


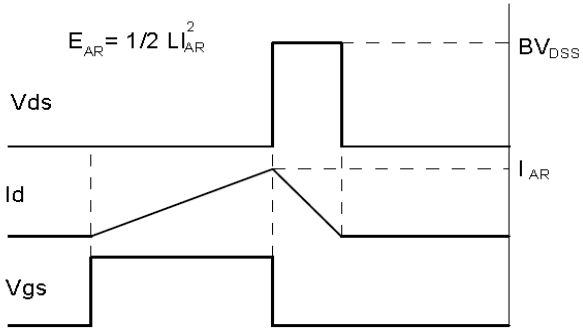
Resistive Switching Test Circuit & Waveforms



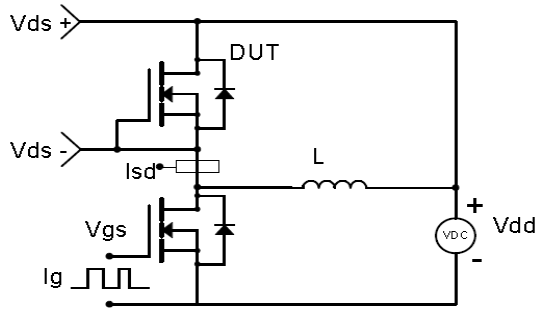


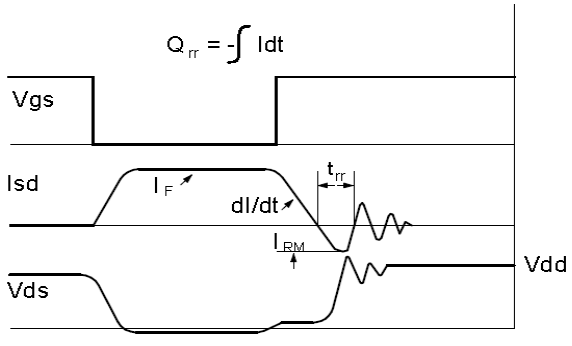
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



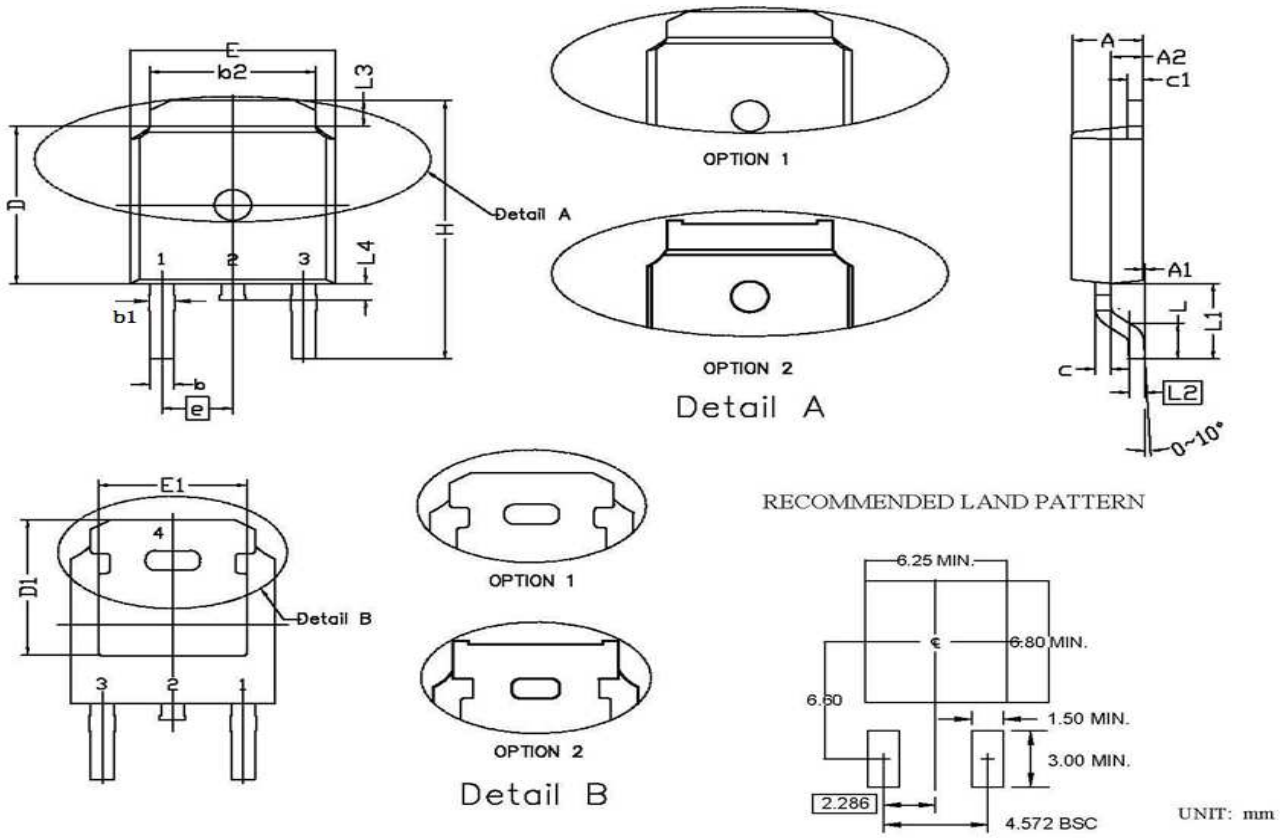


Diode Recovery Test Circuit & Waveforms





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	2019-1-18	Release of formal version.
2.0	2019-6-25	Supplement package outline info.

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.