Features

- Uses CRM(CQ) advanced Trench technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified
- MSL1 up to 260°C peak reflow

Product Summary

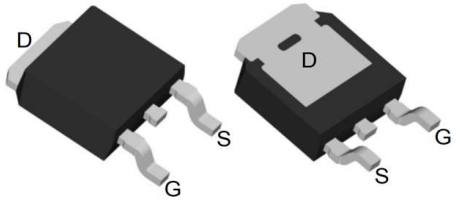
V_{DS}	-100V
$R_{DS(on)@10V\ typ}$	72mΩ
I_D	-18A

Applications

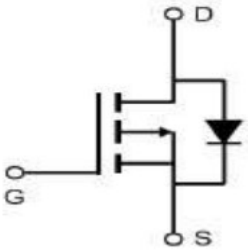
- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)

100% DVDS Tested

100% Avalanche Tested



CRTD680P10LQ



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD680P10LQ	680P10LQ	TO-252	Tape&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	 -18 -80 -11	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	-73	A
Avalanche energy, single pulse (ID=-17A, Rg=25Ω)[1]	E_{AS}	72	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	60	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 was tested at Tj = 25℃, L = 0.5mH, IAS = -17A, Vgs=-10V.

Thermal Resistance

Parameter	**Symbol**	**Max**	**Unit**
Thermal resistance, junction – case (junction-heat-spreader)	R_{thJC}	2.1	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	
Thermal resistance, junction – plastic case	$R_{thJ\text{-}pc}$	36	

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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
		-100	-	-	V	V_{GS}=0V, I_D=-1mA
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}=-100V,V_{GS}=0V T_j=25°C
		-	-	-100		T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	72	90	mΩ	V_{GS}=-10V, I_D=-10A
			80	120		VGS=-4.5V, ID=-5A
Transconductance	g_{fs}	11	22	44	S	V_{DS}=-5V,I_D=-10A
Dynamic Characteristic						
Input Capacitance	C_{iss}	1246	2491	4982	pF	V_{GS}=0V, V_{DS}=-50V, f=1MHz
Output Capacitance	C_{oss}	17	86	431		
Reverse Transfer Capacitance	C_{rss}	13	63	315		
Gate Total Charge	Q_G	27	40	61	nC	V_{GS}=-10V, V_{DS}=-50V, I_D=-10A, f=1MHz
Gate-Source charge	Q_{gs}	2	7	21		
Gate-Drain charge	Q_{gd}	3	9	18		
Turn-on delay time	$t_{d(on)}$	4	8	16	ns	V_{GS}=-10V, V_{DD}=-50V, R_{G_ext}=2.7Ω, Id=-10A
Rise time	t_r	10	20	40		
Turn-off delay time	$t_{d(off)}$	65	97	145		
Fall time	t_f	28	43	64		
Gate resistance	R_G	-	11	25	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode continous forward current	Is	-	-	-18	A	Tc = 25°C
Diode pulse current	Is pulse	-	-	-72	A	Tc = 25°C
Body Diode Forward Voltage	V_{SD}	-	-0.9	-1.3	V	V_{GS}=0V,I_{SD}=-10A
Body Diode Reverse Recovery Time	t_{rr}	18	35	70	ns	I_F=-10A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	31	61	123	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics

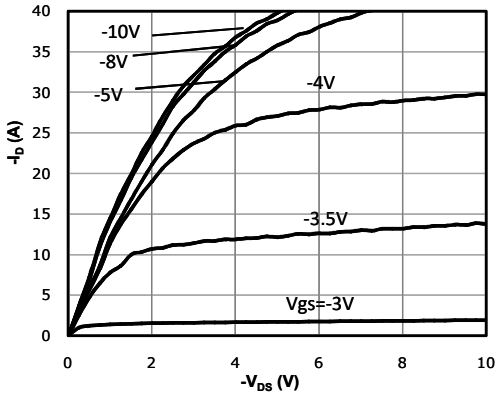

Fig 2: Transfer Characteristics

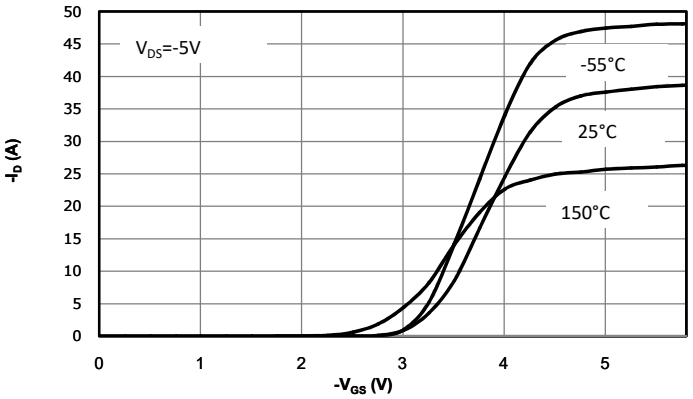

Fig 3: Rds(on) vs Drain Current and Gate Voltage

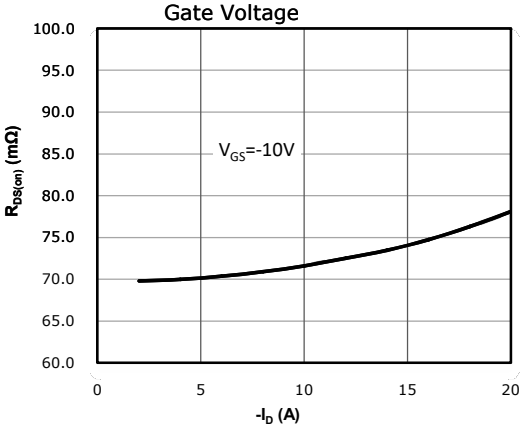

Fig 4: Rds(on) vs Gate Voltage

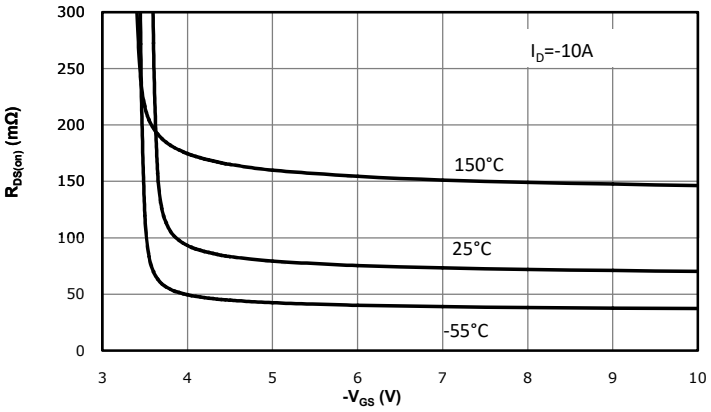

Fig 5: Rds(on) vs. Temperature

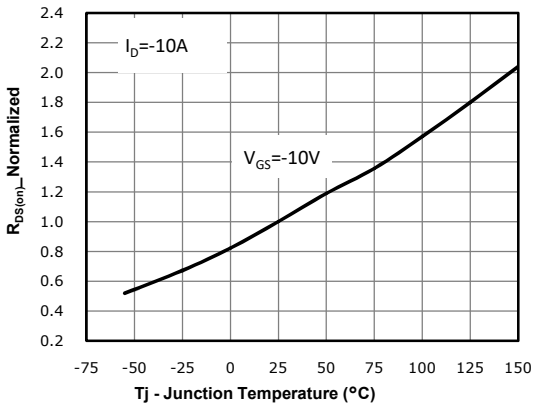

Fig 6: Vgs(th) vs. Temperature

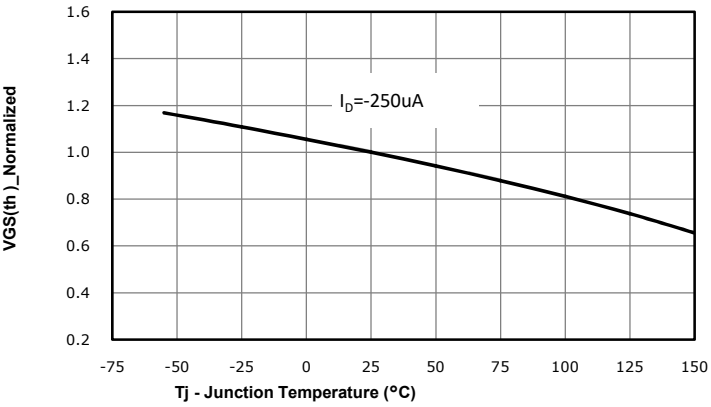

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Fig 7: BVds vs. Temperature

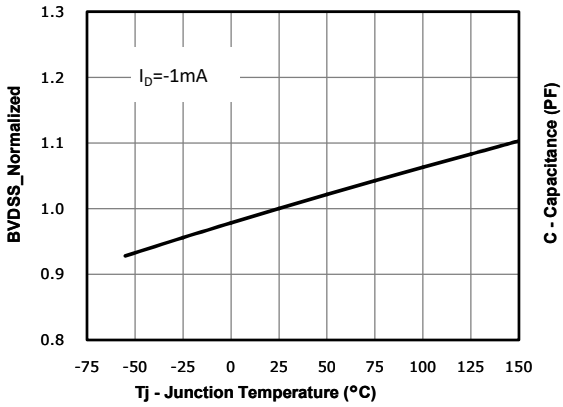

Fig 8: Capacitance Characteristics

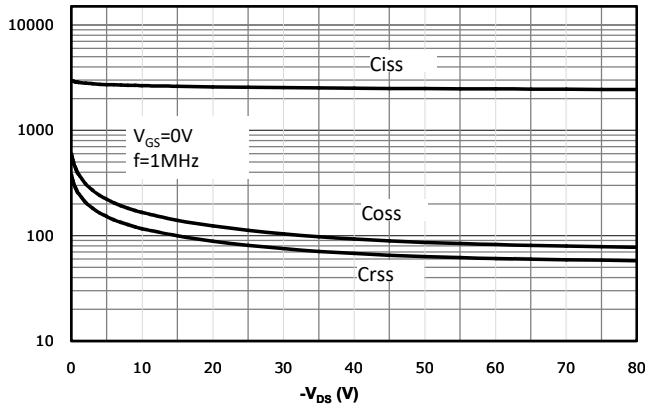

Fig 9: Gate Charge Characteristics

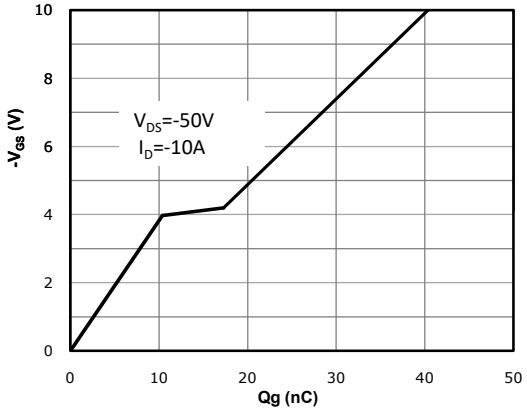

Fig 10: Body-diode Forward Characteristics

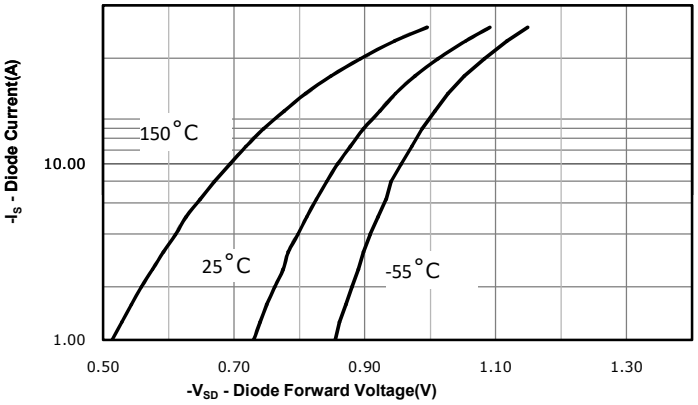

Fig 11: Power Dissipation

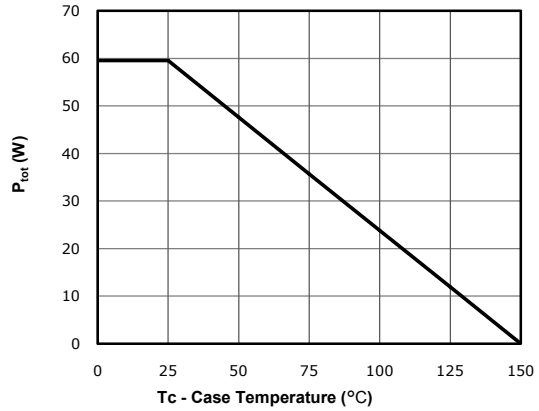

Fig 12: Drain Current Derating

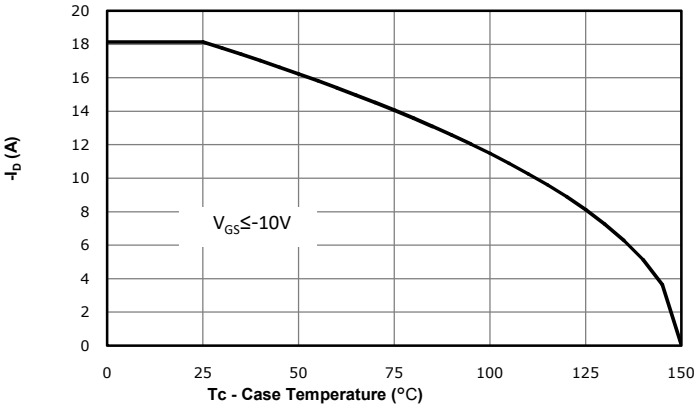

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Fig 13: Safe Operating Area

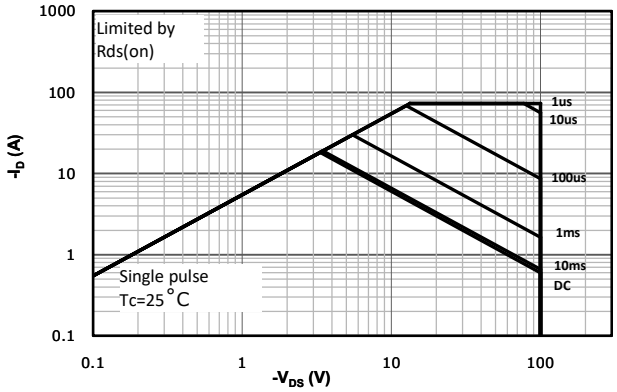
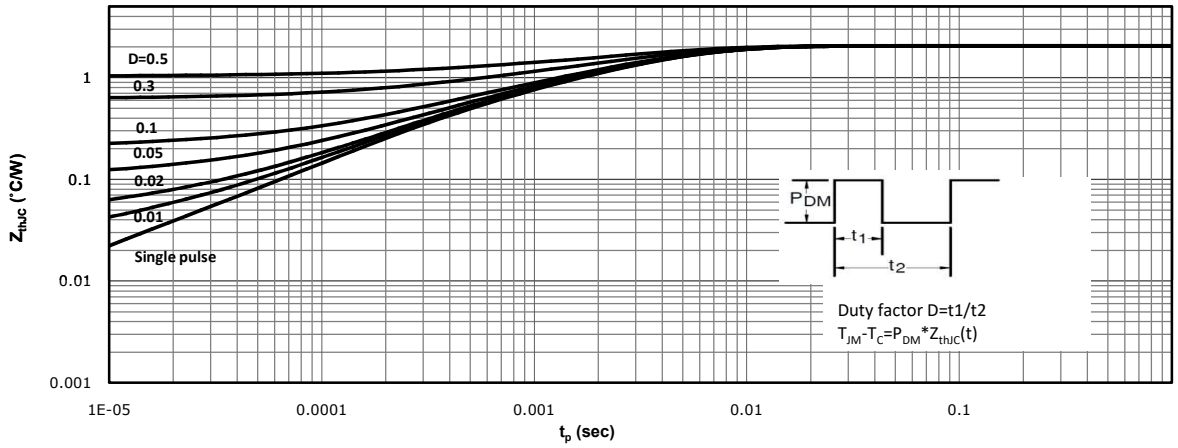


Fig 14: Max. Transient Thermal Impedance



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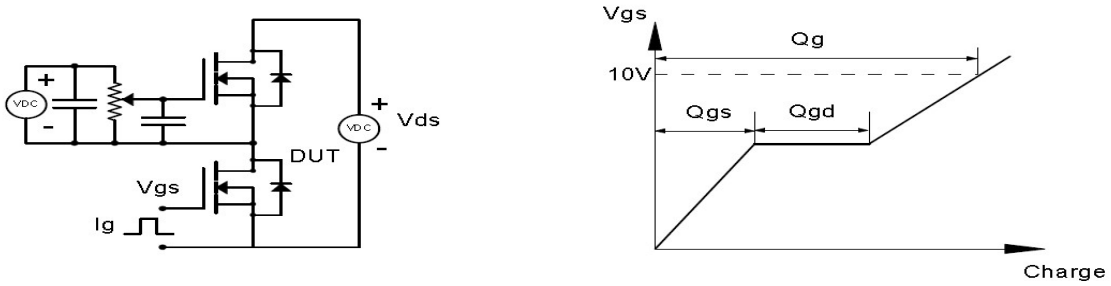
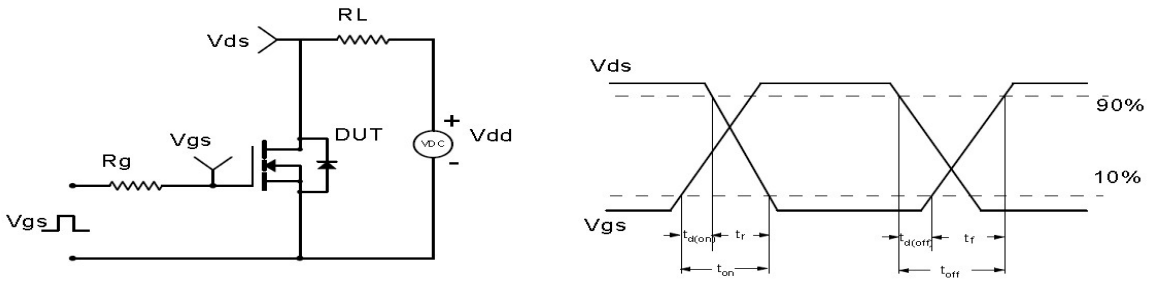
Test Circuit & Waveform

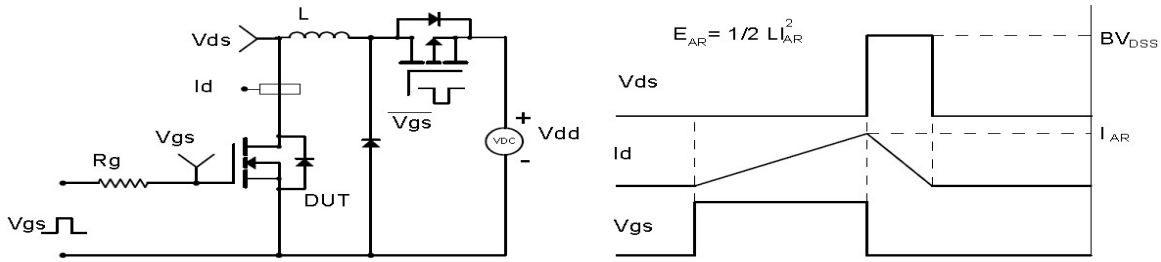
Gate Charge Test Circuit & Waveform



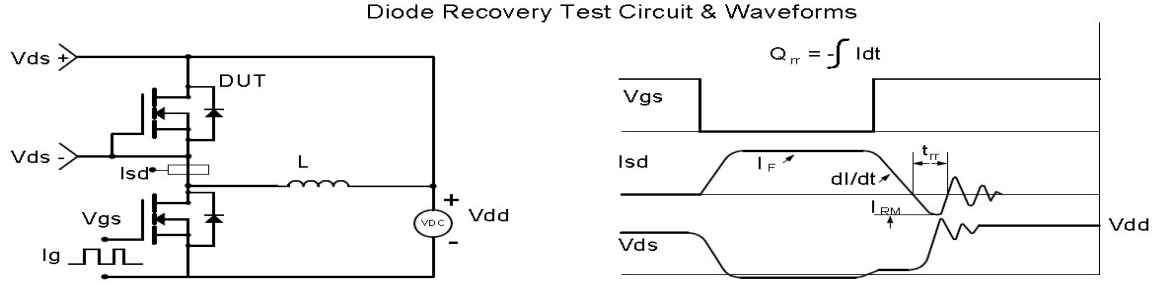
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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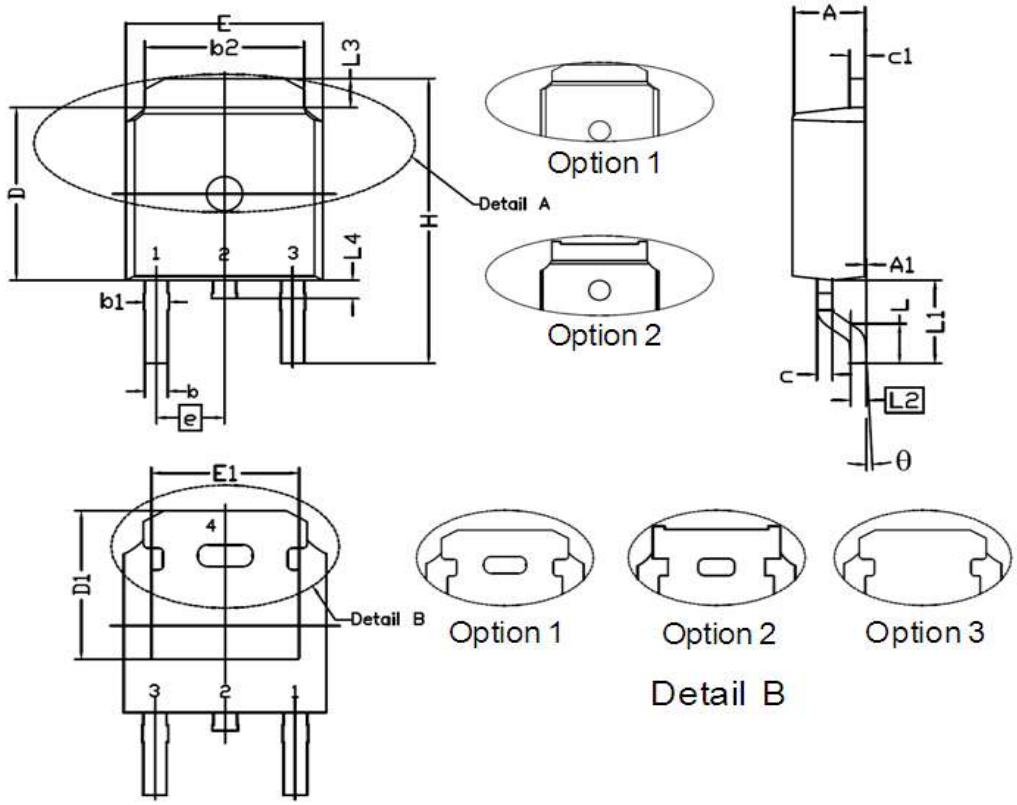
Package Outline: TO-252



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	2.15	2.30	2.45
A1	0.00	0.07	0.15
b	0.60	0.76	0.91
b1	0.65	--	1.15
b2	5.00	5.33	5.50
c	0.45	0.50	0.61
c1	0.36	0.50	0.66
D	5.80	6.10	6.22
D1	5.21	5.572	5.922
e		2.29 BSC.	
E	6.30	6.50	6.73
E1	4.75	5.10	5.45
H	9.40	9.90	10.48
L	1.38	1.52	1.78
L1		2.92 REF	
L2		0.508 BSC.	
L3	0.72	1.01	1.35
L4	0.60	0.75	1.20
θ	0°	--	8°

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Marking

NOTE:
XAAAAAAA
X —Assembly location code
AAAAAAA —Assembly lot NO. last 7digits
Y —Bin code

Revision History

Revision	Date	Major changes
1.0	2023/5/22	Release of preliminary 1.0 version
1.1	2023/6/25	Update Ciss/Coss/Crss spec
1.1	2023/7/25	Update POD 尺寸
2.0	2023/8/25	Update Marking
2.1	2023/9/21	Update Marking
2.2	2024/4/23	Update POD D1尺寸
2.3	2024/4/24	Add Is /Is pulse

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