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

Applications

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

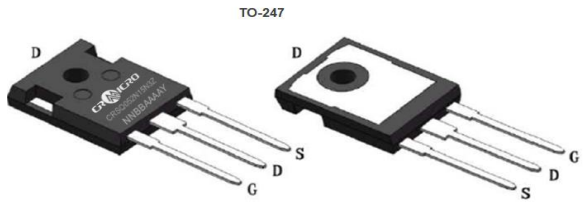
Product Summary

V_{DS}	150V
$R_{DS(on).typ}$	4.2mΩ
I_D	160A

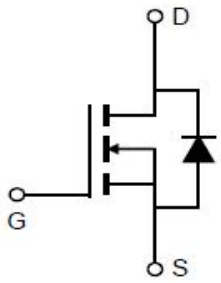
100% DVDS Tested
100% Avalanche Tested

RoHS HF

TO-247



CRSQ052N15N3Z



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSQ052N15N3Z	CRSQ052N15N3Z	TO-247	Tube	N/A	N/A	25pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	150	V
Continuous drain current	I_D		A
T_C = 25° C (Silicon limit)		190	
T_C = 25° C (Package limit)		160	
T_C = 100° C (Silicon limit)		119	
Pulsed drain current (T_C = 25° C, t_p limited by T_{jmax})	$I_{D\,pulse}$	640	A
Avalanche energy, single pulse (I_D = 70A, Rg=25Ω)[1]	E_{AS}	1225	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25° C)	P_{tot}	310	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 is tested at starting Tj = 25℃, L = 0.5mH, IAS =70A, VGS = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.40	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

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}	150	-	-	V	V_{GS}=0V, I_D=250uA
		150	-	-	V	V_{GS}=0V, I_D=1mA
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}=150V,V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$		4.2	5.2	mΩ	VGS=10V, ID=60A
Transconductance	g_{fs}	53.0	106.0	212.0	S	V_{DS}=5V, I_D=60A
Dynamic Characteristic						
Input Capacitance	C_{iss}	3762	5643	8464	pF	V_{GS}=0V, V_{DS}=75V, f=1MHz
Output Capacitance	C_{oss}	534	802	1203		
Reverse Transfer Capacitance	C_{rss}	15	29	58		
Gate Total Charge	Q_G	51.9	77.9	116.8	nC	V_{GS}=10V, V_{DS}=75V, I_D=60A
Gate-Source charge	Q_{gs}	22.8	34.2	51.2		
Gate-Drain charge	Q_{gd}	7.7	15.3	30.6		
Turn-on delay time	$t_{d(on)}$	11.3	22.5	45.1	ns	V_{GS}=10V, V_{DD}=75V, R_{G_ext}=2.7Ω
Rise time	t_r	71.9	107.8	161.7		
Turn-off delay time	$t_{d(off)}$	36.6	54.9	82.3		
Fall time	t_f	70.4	105.7	158.5		
Gate resistance	R_G	2.0	3.7	6.0	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}	-	0.89	1.4	V	V_{GS}=0V,I_{SD}=60A
Body Diode Reverse Recovery Time	t_{rr}	51.3	102.6	205.2	ns	I_F=60A,dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	146.7	293.4	586.7	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

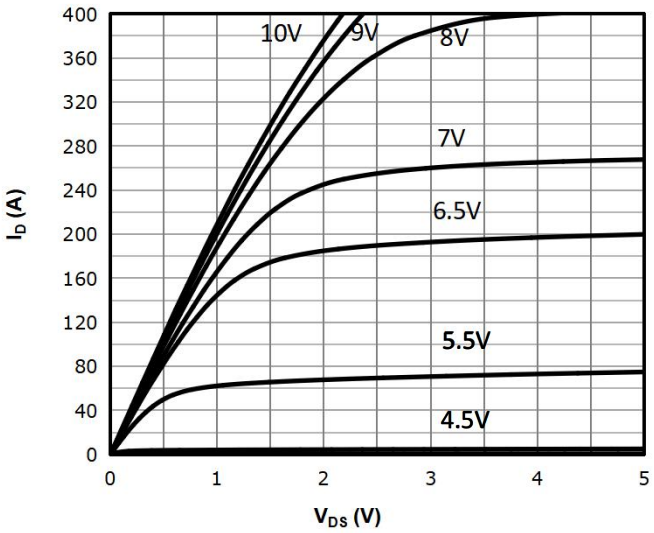


Fig 2: Transfer Characteristics

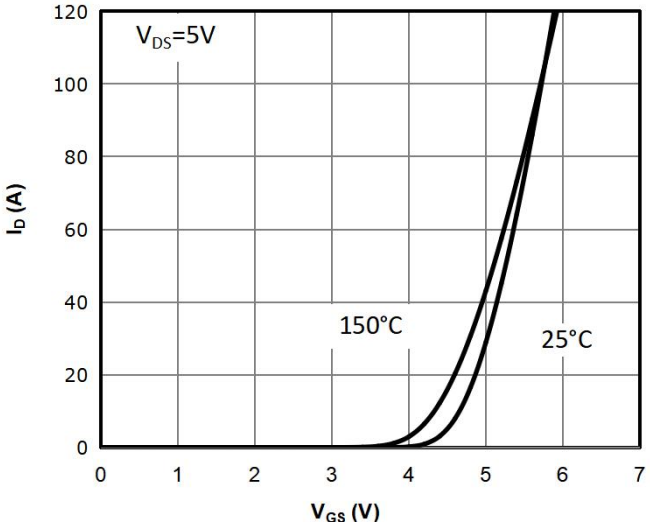


Fig 3: Rds(on) vs Drain Current and Gate Voltage

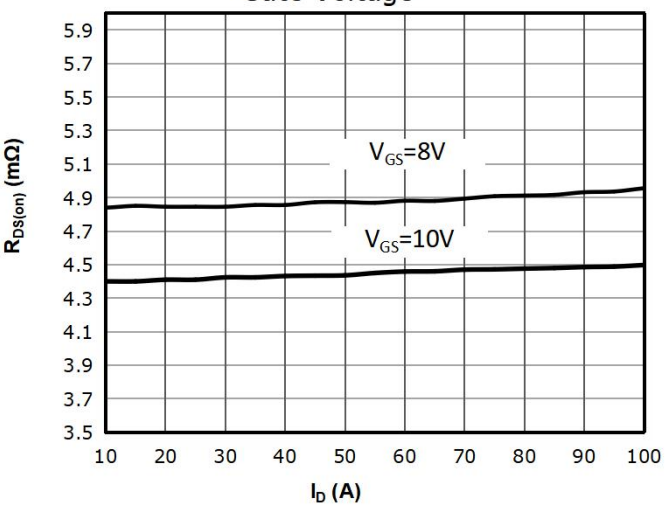


Fig 4: Rds(on) vs Gate Voltage

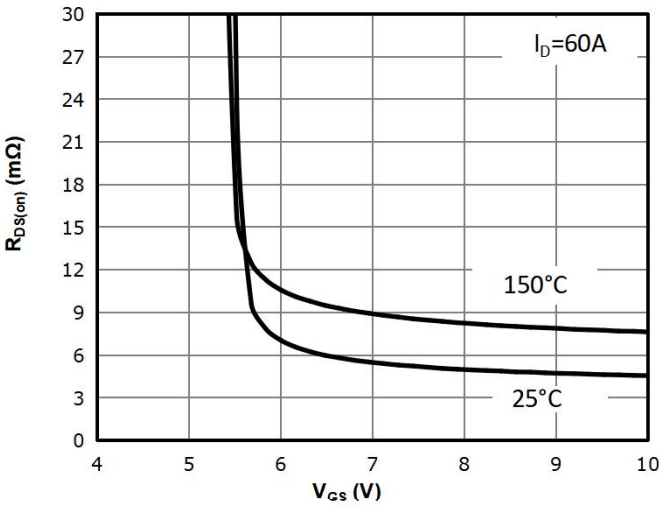


Fig 5: Rds(on) vs. Temperature

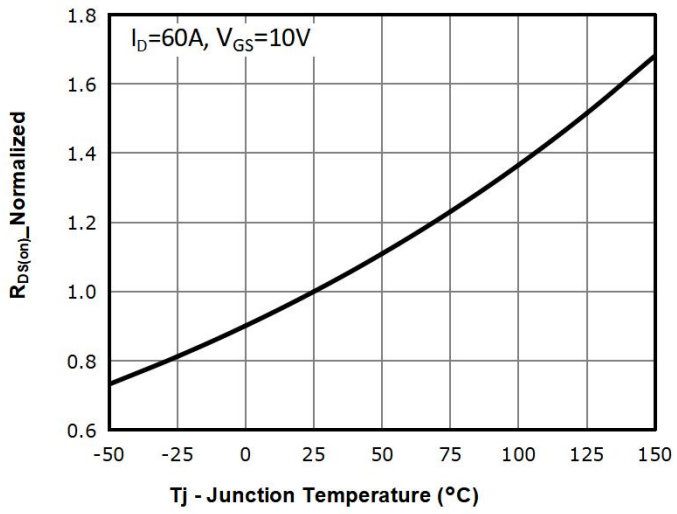


Fig 6: Vgs(th) vs. Temperature

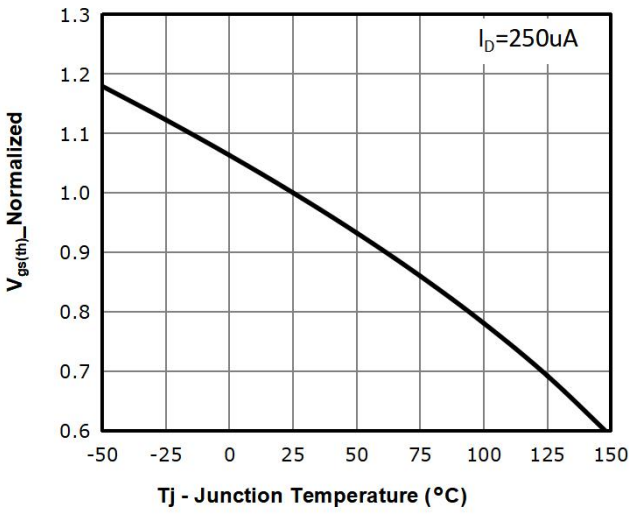


Fig 7: BVdss vs. Temperature

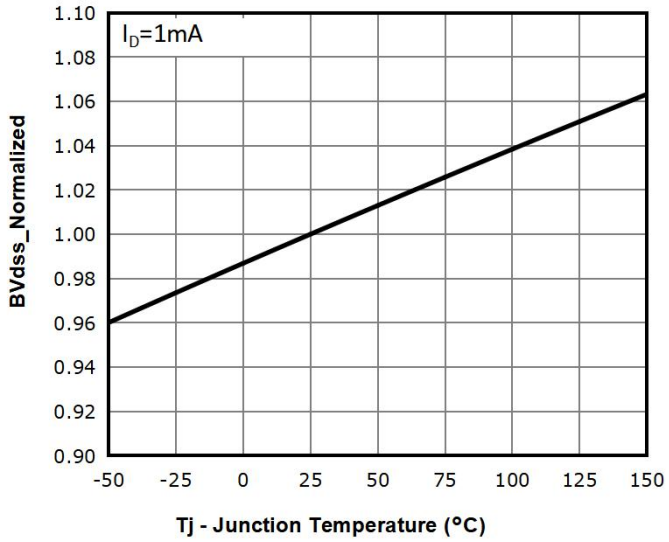


Fig 8: Capacitance Characteristics

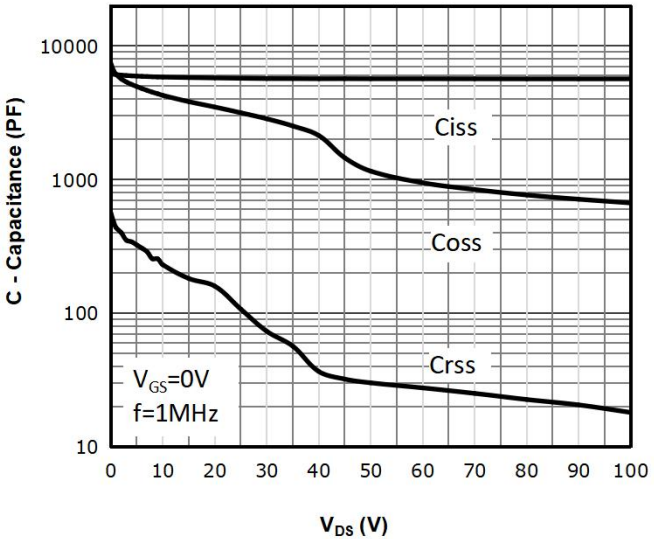


Fig 9: Gate Charge Characteristics

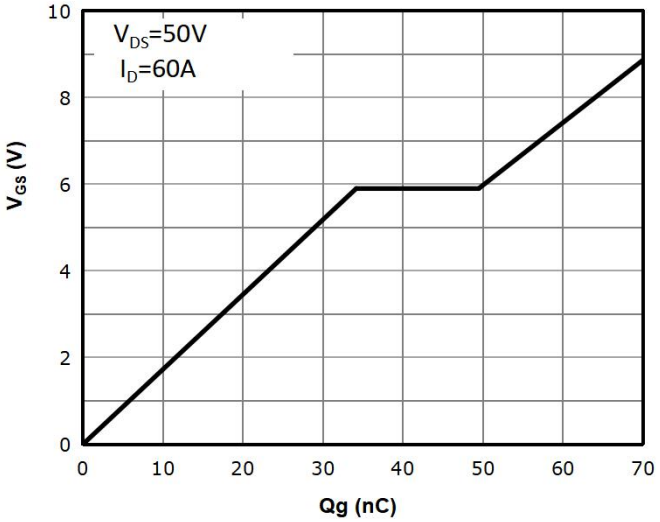


Fig 10: Body-diode Forward Characteristics

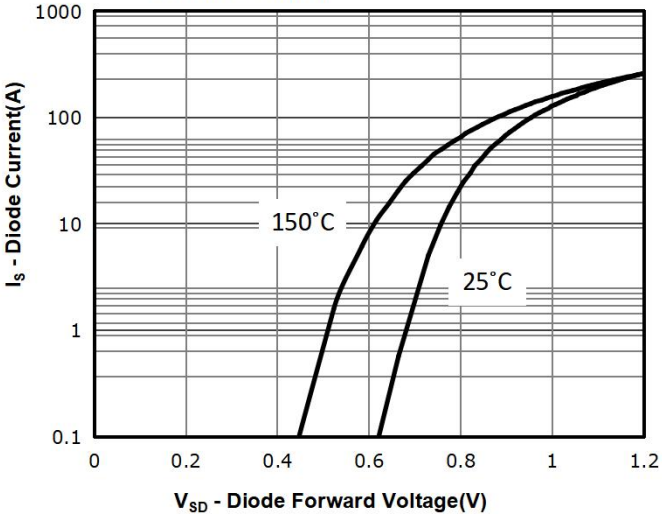


Fig 11: Power Dissipation

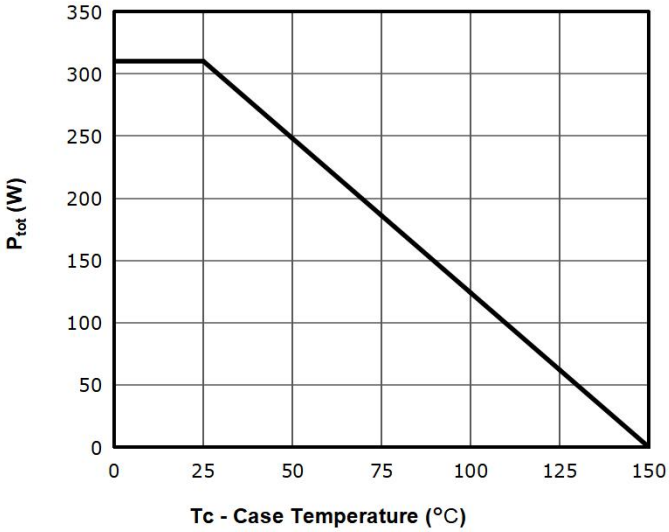


Fig 12: Drain Current Derating

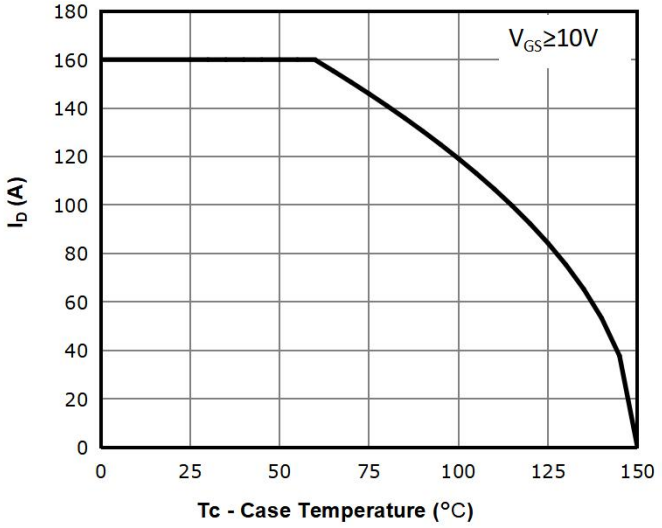


Fig 13: Safe Operating Area

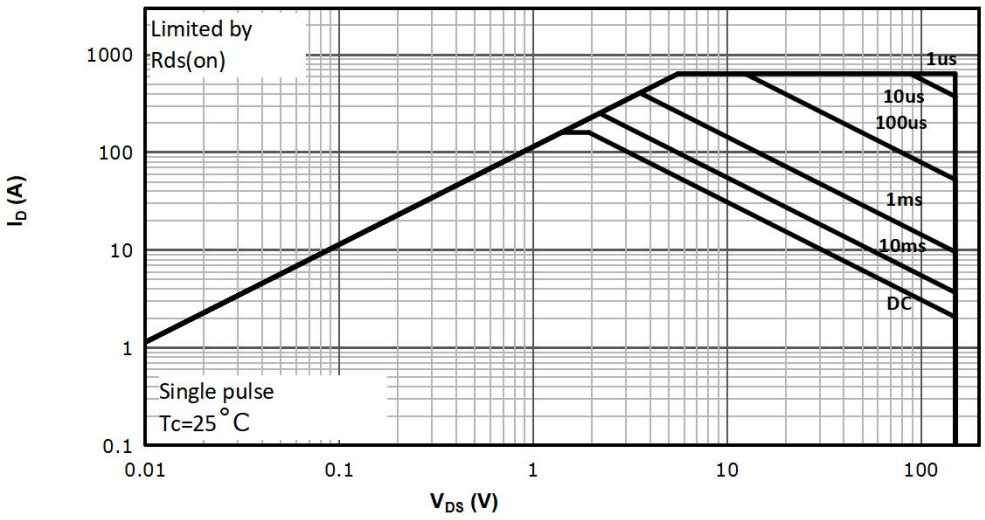
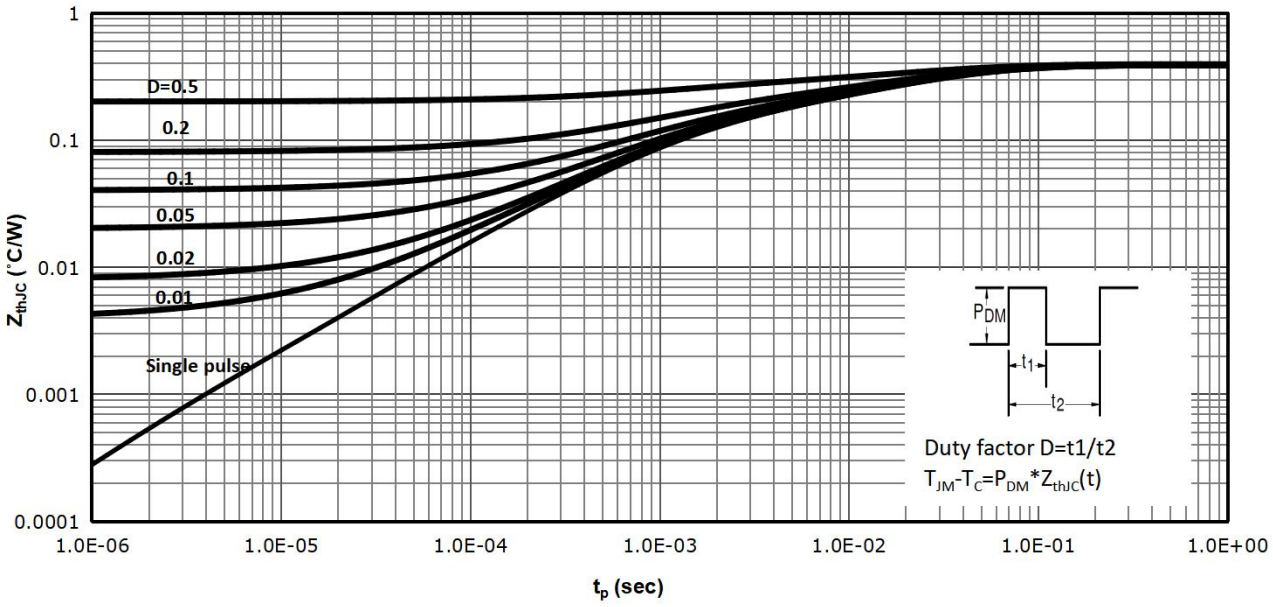
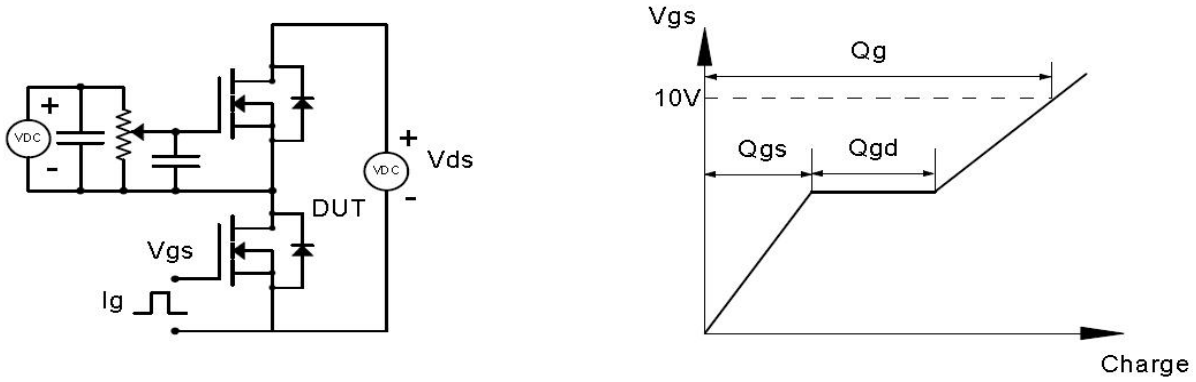


Fig 14: Max. Transient Thermal Impedance

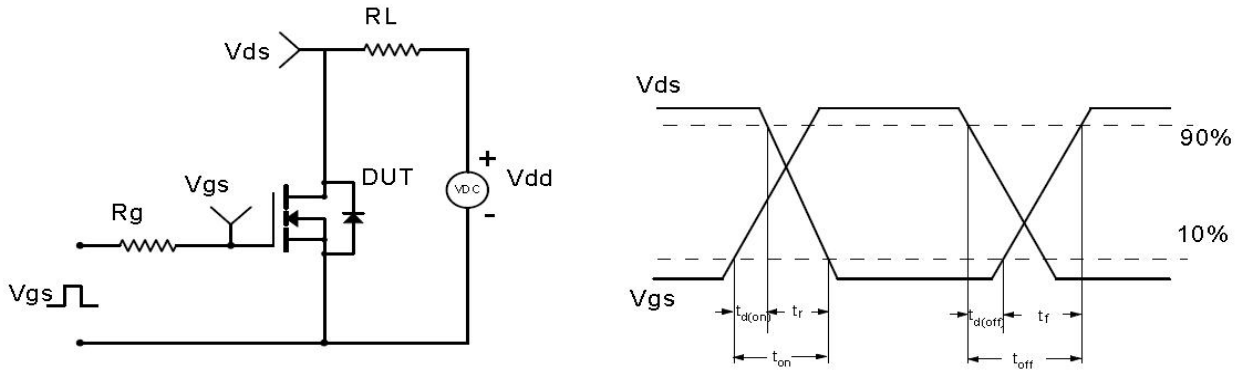


Test Circuit & Waveform

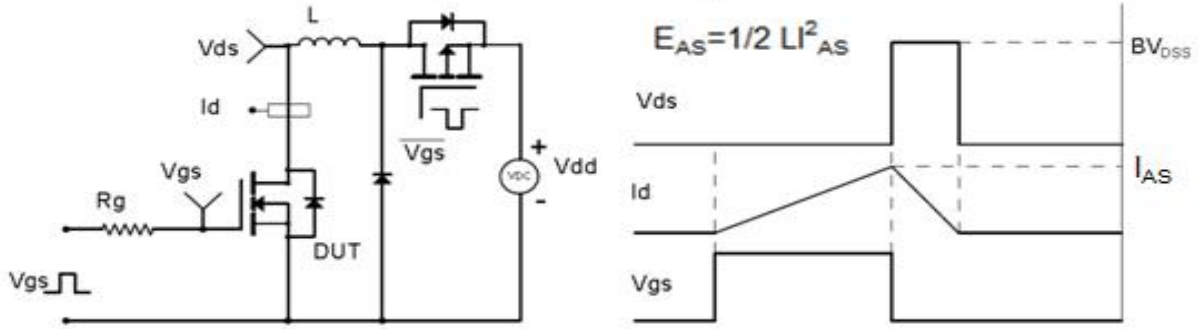
Gate Charge Test Circuit & Waveform



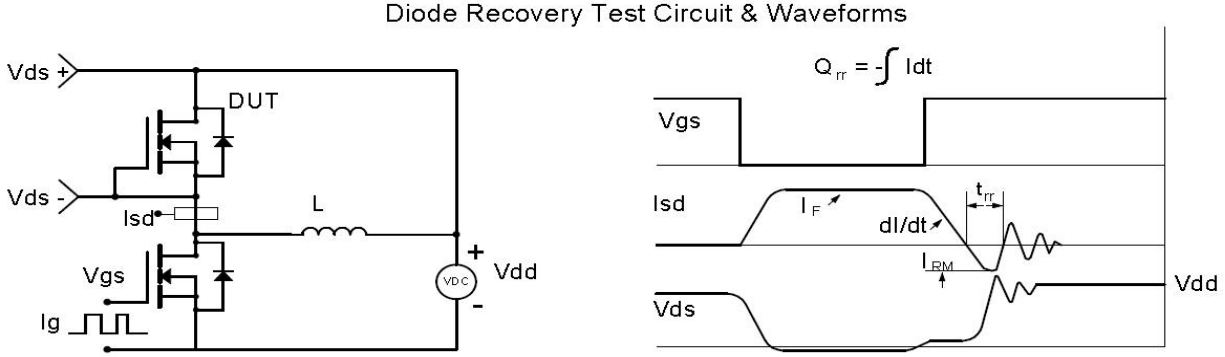
Resistive Switching Test Circuit & Waveforms



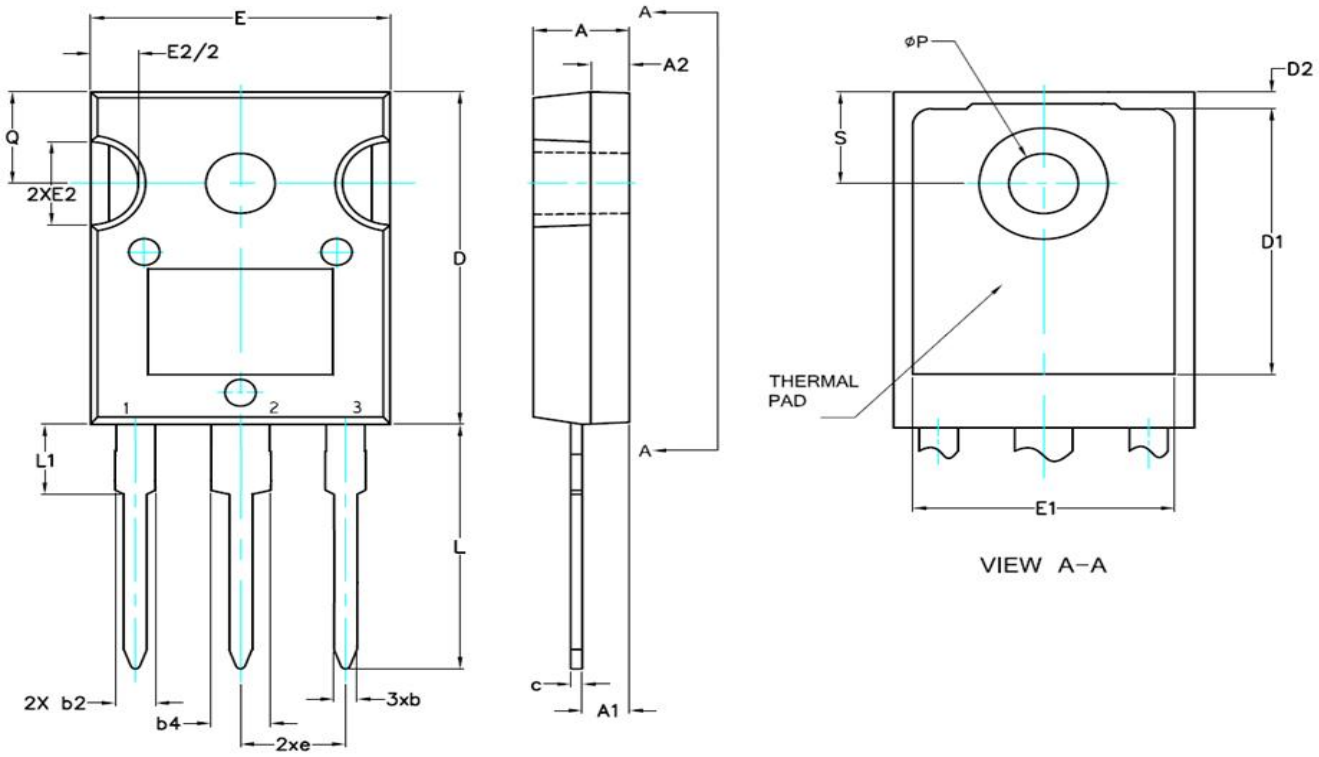
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

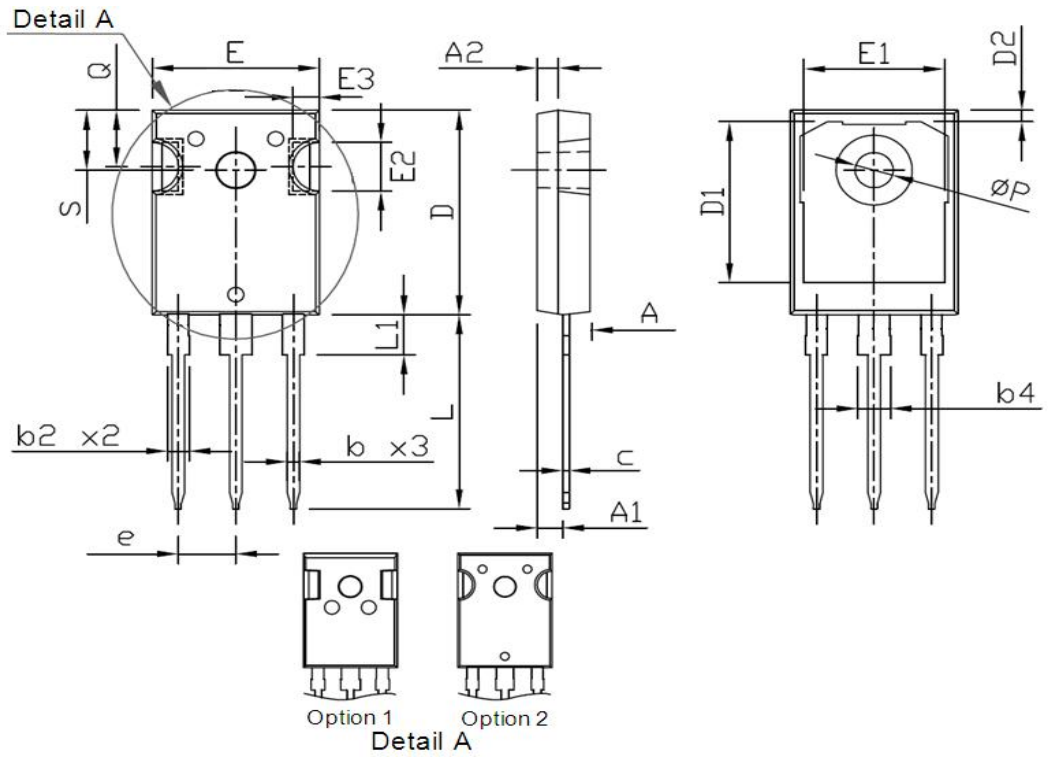


Package Outline: TO-247 Type T (杰群)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.70	5.30	0.185	0.209
A1	2.20	2.60	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.41	0.065	0.095
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	19.70	20.70	0.776	0.815
D1	13.08	--	0.515	--
D2	0.51	1.40	0.020	0.055
e	5.45 BSC		0.215 BSC	
E	15.29	16.00	0.602	0.630
E1	13.40	--	0.528	--
E2	4.50	5.49	0.177	0.216
L	14.20	16.10	0.559	0.634
L1	3.70	4.50	0.146	0.177
Q	5.25	6.25	0.207	0.246
P	3.50	3.70	0.138	0.146
S	5.51 BSC		0.217 BSC	

Package Outline: TO-247 (其他)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.70	5.30	0.185	0.209
A1	2.20	2.60	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	1.04	1.33	0.041	0.052
b2	1.90	2.41	0.075	0.095
b4	2.87	3.43	0.113	0.135
c	0.55	0.70	0.022	0.028
D	20.70	21.30	0.815	0.839
D1	16.25	17.65	0.640	0.695
D2	0.51	1.40	0.020	0.055
e	5.44 BSC.		0.214 BSC.	
E	15.50	16.30	0.610	0.642
E1	13.08	14.16	0.515	0.557
E2	3.80	5.49	0.150	0.216
E3	1.00	2.75	0.039	0.108
L	19.72	20.32	0.776	0.800
L1	3.85	4.50	0.152	0.177
Q	5.25	6.25	0.207	0.246
P	3.50	3.70	0.138	0.146
S	6.04	6.30	0.238	0.248

Revision History

Revision	Date	Major changes
1.0	2023/6/25	Release formal version.
2.0	2025/11/12	Update Package Outline.

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified 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 semiconductor 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.