华润微电子(重庆)有限公司

CRJQ41N65GCFQ

SJMOS N-MOSFET 650V, 42mΩ, 70A

Features

- Qualified according to AEC Q101
- Much lower Ron*A performance for On-state efficiency
- Better efficiency due to very low FOM
- Ultra-fast body diode
- Easy to use/drive

Applications

Suitable for PFC and DC-DC stages for:

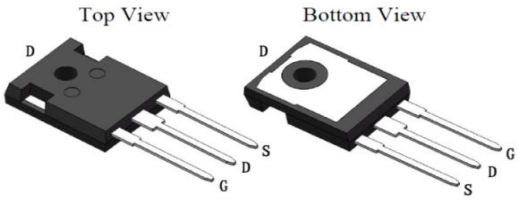
- Unidirectional and bidirectional DC-DC converters
- On-Board battery Chargers

Product Summary

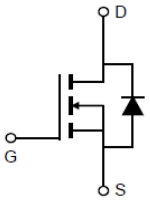
VDS	650V
$R_{DS(on)\_typ}$	42mΩ
I_D	70A

100% DVDS Tested

100% Avalanche Tested



CRJQ41N65GCFQ



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJQ41N65GCFQ	CRJQ41N65GCFQ	TO-247-3L	Tube	N/A	N/A	25pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current [1)] T_C = 25°C T_C = 100°C	I_D	 70 44	A
Pulsed drain current [2)] (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	210	A
Avalanche energy, single pulse (L=30mH, Rg=30Ω)	E_{AS}	1500	mJ
MOSFET dv/dt ruggedness	dv/dt	50	V/ns
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_{tot}	687	W
Continuous diode forward current(T_C = 25°C)	I_S	70	A
Diode pulse current [2)] (T_C = 25°C)	$I_{S\ pulse}$	210	A
Recovery diode dv/dt [3)]	dv/dt	50	V/ns
Maximum diode commutation speed	di_F/dt	900	A/μs
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

1) Limited by Tj,max. Maximum Duty Cycle D = 0.50;
2) Pulse width tp limited by Tj,max
3) Identical low side and high side switch with identical R_g

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case	R_{thJC}	-	0.13	0.18	°C/W	
Thermal resistance, junction – ambient	R_{thJA}	-	-	45	°C/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}	650	-	-	V	V_{GS}=0V, I_D=250μA
Gate threshold voltage	$V_{GS(th)}$	3.3	-	5.3	V	V_{DS}=V_{GS},I_D=2mA
Zero gate voltage drain current	I_{DSS}	- -	- 1000	5 -	μA	V_{DS}=650V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±30V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	42 110	48 -	mΩ	V_{GS}=10V, I_D=35A, T_j=25°C T_j=150°C
Transconductance	g_{fs}	-	44	-	S	V_{DS}=20V,I_D=35A
Dynamic Characteristic						
Input Capacitance	C_{iss}		6470		pF	V_{GS}=0V, V_{DS}=100V, f=1MHz
Output Capacitance	C_{oss}		240			
Reverse Transfer Capacitance	C_{rss}		2.4			
Gate Total Charge	Q_G		176		nC	V_{GS}=10V, V_{DS}=480V, I_D=35A
Gate-Source charge	Q_{gs}		57			
Gate plateau voltage	Q_{gd}		91			
Gate-Drain charge	$V_{plateau}$	-	8	-	V	
Turn-on delay time	$t_{d(on)}$	-	31	-	ns	V_{GS}=10V, I_D=35A, V_{DS}=400V, R_g=1.8Ω
Rise time	t_r	-	14	-		
Turn-off delay time	$t_{d(off)}$	-	63	-		
Fall time	t_f	-	9	-		
Gate resistance	$R_{g,int}$		1		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}	0.7	0.9	1.2	V	V_{GS}=0V,I_{SD}=35A
Body Diode Reverse Recovery Time	t_{rr}		195		ns	I_{SD}=35A di/dt=100A/μs, V_{DS}=400V
Body Diode Reverse Recovery Charge	Q_{rr}		1.5		μC	
Body Diode Reverse Recovery Peak Current	I_{rrm}		15		A	

Typical Performance Characteristics

Fig 1. Output Characteristics (Tj=25℃)

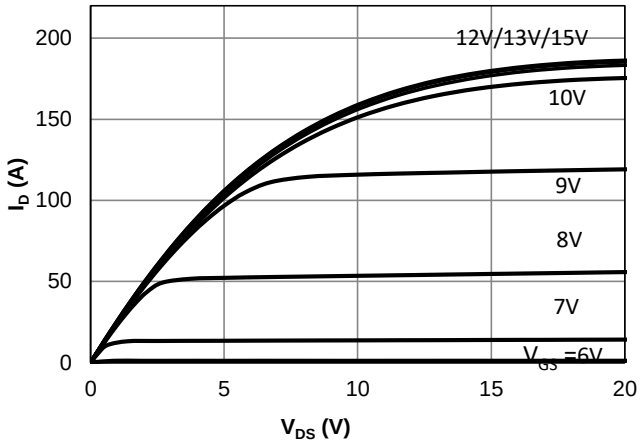


Fig 2. Output Characteristics (Tj=150℃)

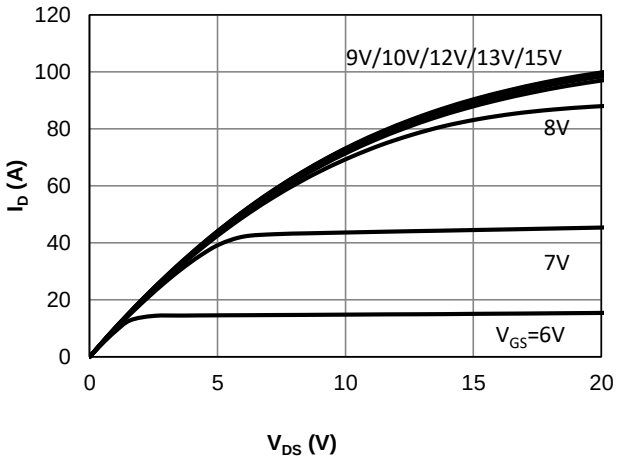


Fig 3: Transfer Characteristics

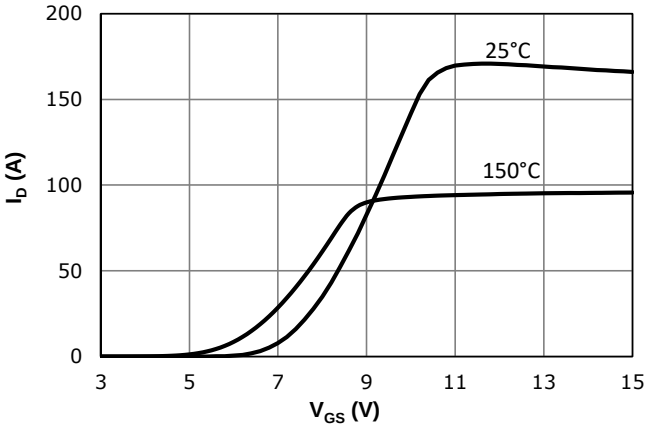


Fig 4: VGS(TH) Vs Tj Temperature Characteristics

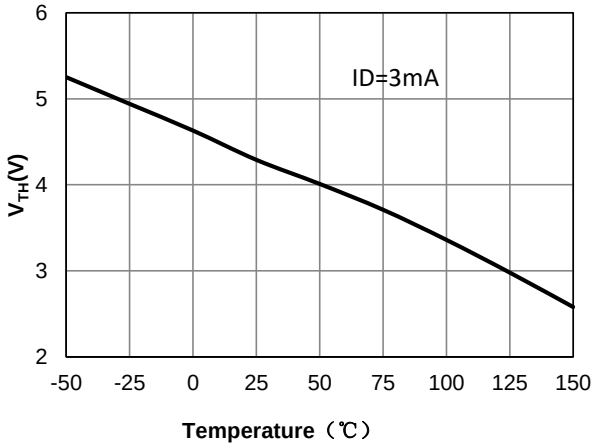


Fig 5: Rdson Vs Ids Characteristics(Tj=25℃)

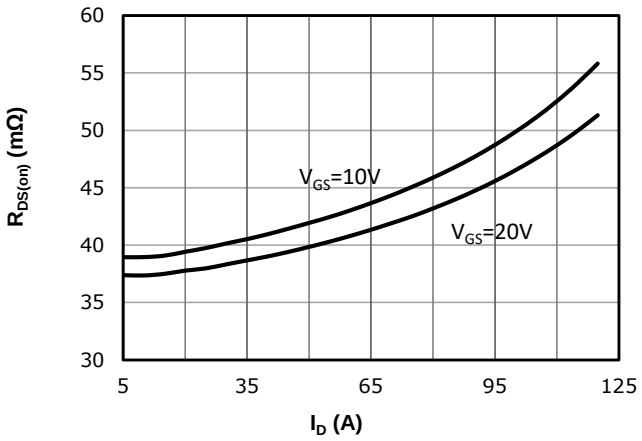


Fig 6: Rds(on) vs. Temperature

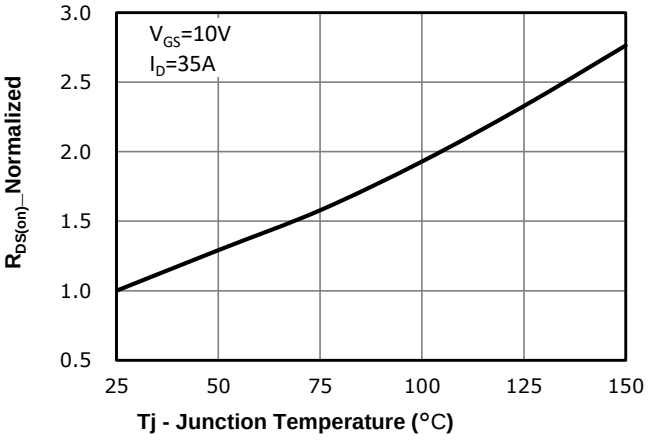


Fig 7: BVDSS vs. Temperature

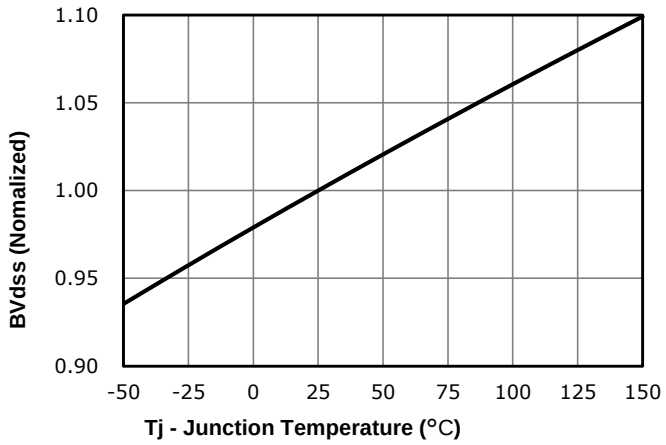


Fig 8: Rds(on) vs Gate Voltage

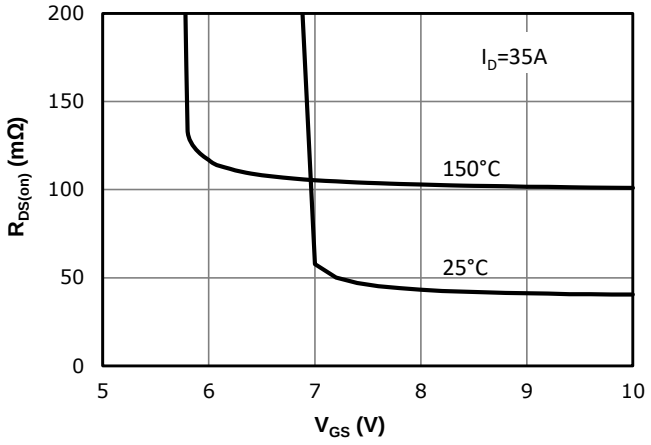


Fig 9: Body-diode Forward Characteristics

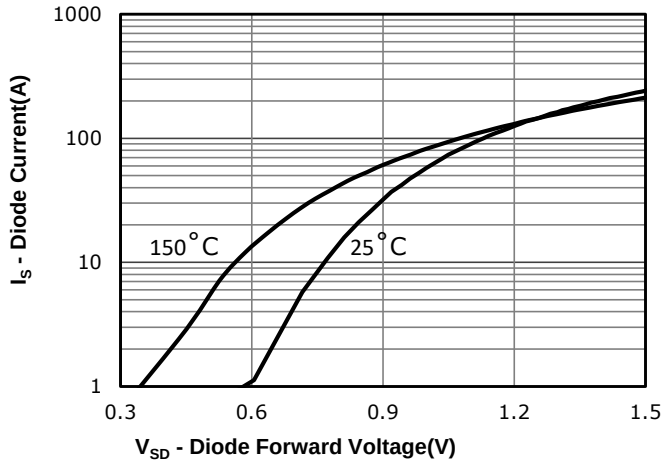


Fig 10: Gate Charge Characteristics

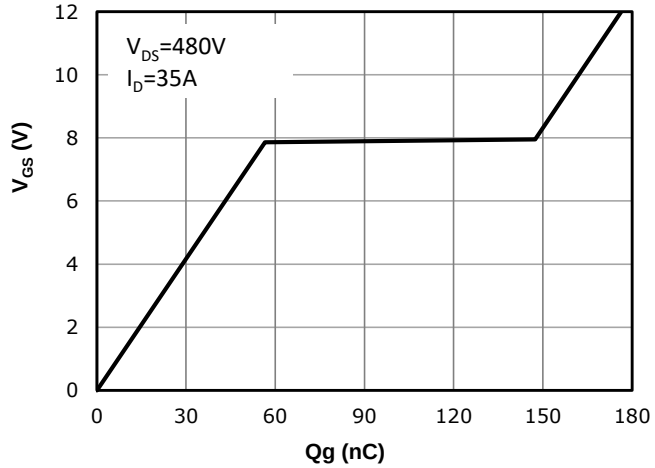


Fig 11: Capacitance Characteristics

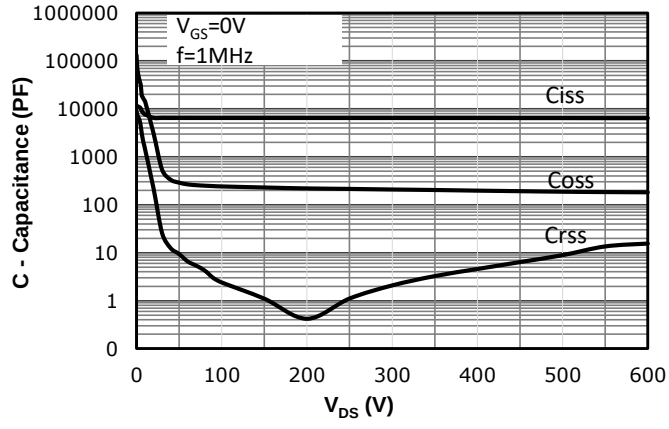


Fig 12: Safe Operating Area

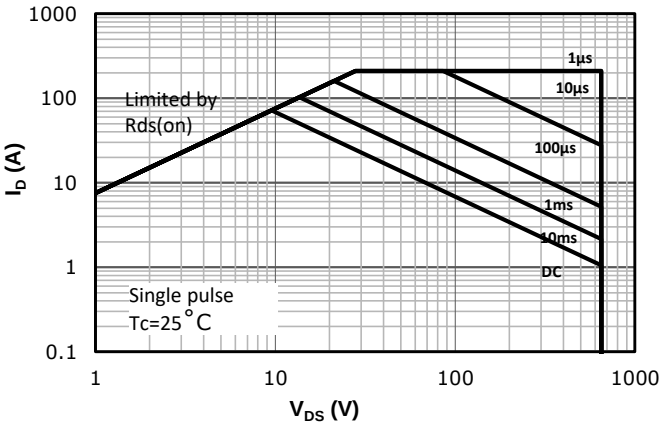
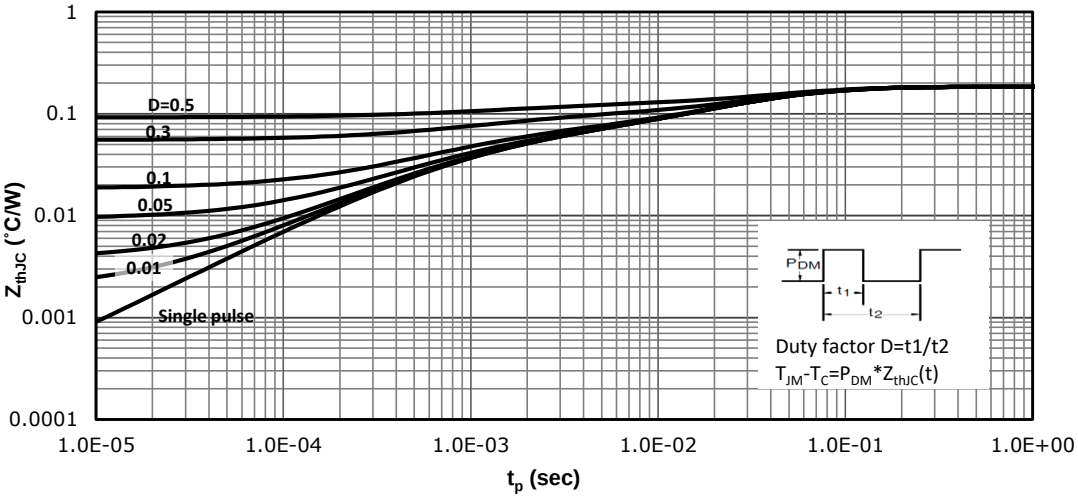
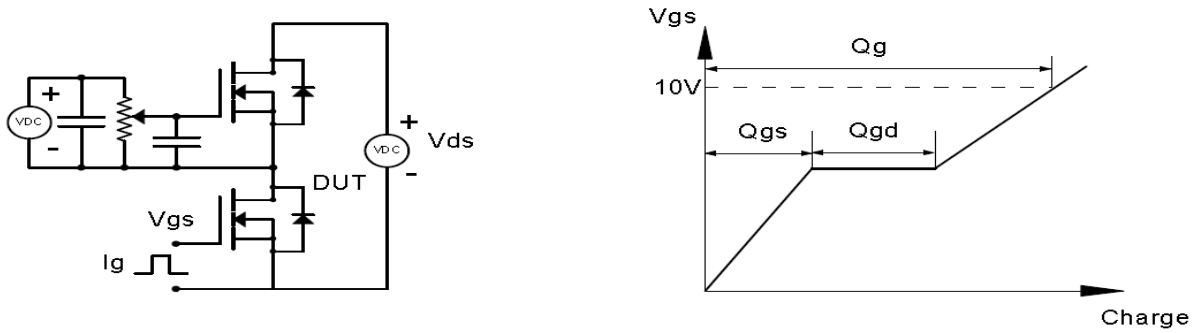


Fig 13: Max. Transient Thermal Impedance

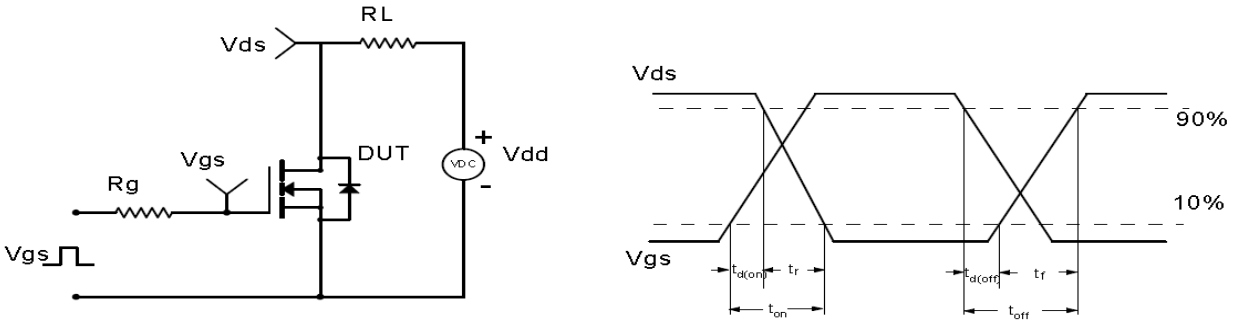


Test Circuit & Waveform

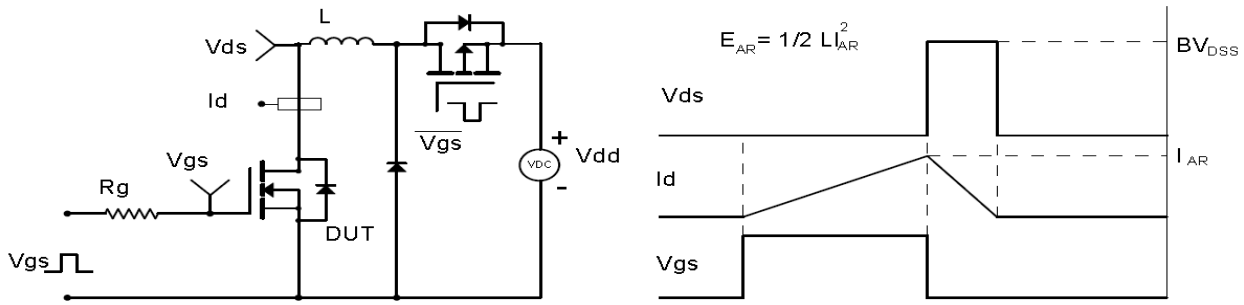
Gate Charge Test Circuit & Waveform



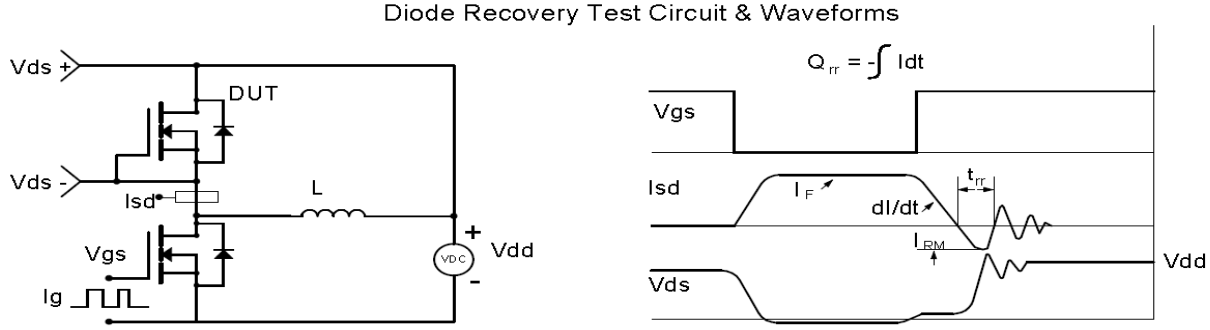
Resistive Switching Test Circuit & Waveforms



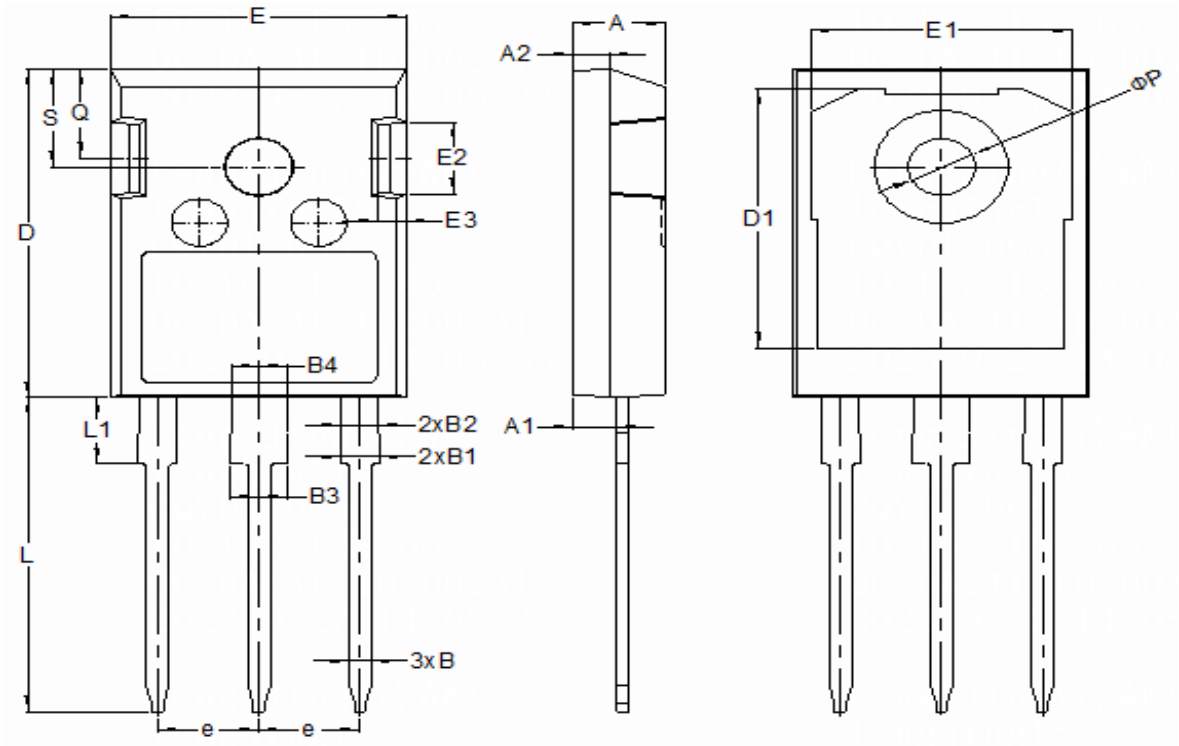
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-247-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	**Max.**	**Min.**	**Max.**
A	4.6	5.2	0.181	0.205
A1	2.2	2.6	0.087	0.102
A2	1.9	2.1	0.075	0.083
B	0.9	1.4	0.035	0.055
B1	1.75	2.35	0.069	0.093
B2	1.75	2.15	0.069	0.085
B3	2.8	3.35	0.110	0.132
B4	2.8	3.15	0.110	0.124
C	0.5	0.7	0.020	0.028
D	20.6	21.3	0.811	0.839
D1	16	18	0.630	0.709
E	15.5	16.1	0.610	0.634
E1	13	14.7	0.512	0.579
E2	3.8	5.3	0.150	0.209
E3	0.8	2.6	0.031	0.102
e	5.2	5.7	0.205	0.224
L	19	20.5	0.748	0.807
L1	3.9	4.6	0.154	0.181
ΦP	3.3	3.7	0.130	0.146
Q	5.2	6	0.205	0.236
S	5.8	6.6	0.228	0.260

Marking

NOTE:
NXBBAAAAY
X —Assembly location code
BB —Fab code
AAAA —Lot code
Y —Bin code

Revision History

Revison	Date	Major changes
1.0	2023/3/3	First version
1.1	2023/9/1	Update Ron_max, Reverse Recovery data,Vth Vs Tj test condition
1.2	2023/9/27	Update POD,tighten DC spec

Disclaimer

CRM reserves the right to change any product or information in this Specification at any time without prior notice.

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