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

Product Summary

V_{DS}	650V
$R_{DS(on),typ}$	41mΩ
I_D	55A

Applications

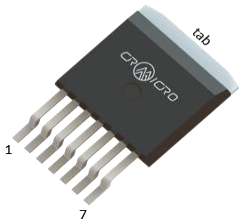
Suitable for PFC and DC-DC stages for:

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

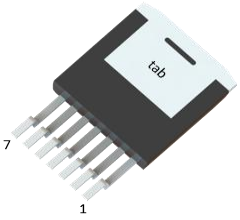
100% DVDS Tested

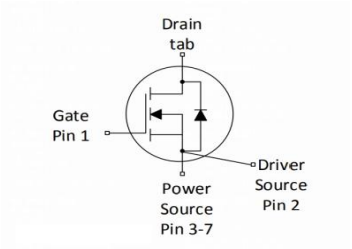
100% Avalanche Tested

Top view



Bottom view





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRJSP50N65G4FQ	CRJSP50N65G4FQ	TO-263-7	Tape&Reel	N/A	N/A	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current [1)] T_C = 25℃ T_C = 100℃	I_D	 55 35	A
Pulsed drain current [2)] (T_C = 25℃, t_p limited by $T_{j,max}$)	$I_{D,pulse}$	145	A
Avalanche energy, single pulse (L=30mH)	E_{AS}	375	mJ
MOSFET dv/dt ruggedness	dv/dt	120	V/ns
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25℃)	P_{tot}	364	W
Continuous diode forward current(T_C = 25℃)	I_S	55	A
Diode pulse current [2)] (T_C = 25℃)	$I_{S,pulse}$	145	A
Recovery diode dv/dt [3)]	dv/dt	70	V/ns
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	℃

1) Limited by $T_{j,max}$. Maximum Duty Cycle D = 0.50

2) Pulse width t_p limited by $T_{j,max}$

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}	-	0.25	0.34	℃/W	
Thermal resistance, junction – ambient	R_{thJA}	-	-	95	℃/W	

Electrical Characteristic (at T_j = 25℃, unless otherwise specified)

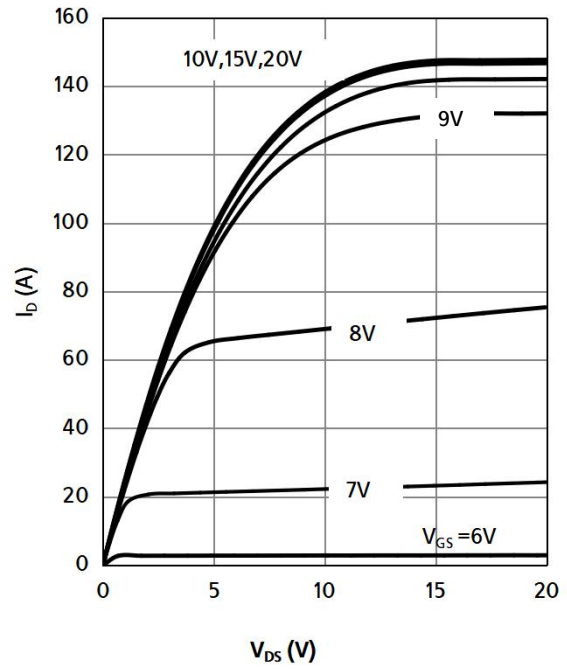
Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	V_{GS}=0V,I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	3	-	5	V	V_{DS}=V_{GS},I_D=2mA
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	V_{DS}=650V,V_{GS}=0V
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±30V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	41 98	50 -	mΩ	V_{GS}=10V,I_D=25A, T_j=25℃ T_j=150℃
Transconductance	g_{fs}	-	40	-	S	V_{DS}=20V,I_D=25A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	4450	-	pF	V_{GS}=0V, V_{DS}=400V, f=250KHz
Output Capacitance	C_{oss}	-	75	-		
Reverse Transfer Capacitance	C_{rss}	-	5	-		
Gate Total Charge	Q_g	-	95	-	nC	V_{GS}=10V, V_{DS}=400V, I_D=25A
Gate-Source charge	Q_{gs}	-	38	-		
Gate-Drain charge	Q_{gd}	-	36	-		
Gate plateau voltage	$V_{plateau}$	-	7.5	-	V	
Turn-on delay time	$t_{d(on)}$	-	36	-	ns	V_{GS}=10V, I_D=25A, V_{DS}=400V, R_g=3.3Ω
Rise time	t_r	-	75	-		
Turn-off delay time	$t_{d(off)}$	-	65	-		
Fall time	t_f	-	40	-		
Gate resistance	$R_{g,int}$	-	2.0	-	Ω	f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.7	0.95	1.2	V	V_{GS}=0V,I_{SD}=25A
Body Diode Reverse Recovery Time	t_{rr}	-	110	-	ns	I_{SD}=25A di_F/dt=100A/μs V_{DS}=400V
Body Diode Reverse Recovery Charge	Q_{rr}	-	0.6	-	μC	
Body Diode Reverse Recovery Peak Current	I_{rrm}	-	11	-	A	

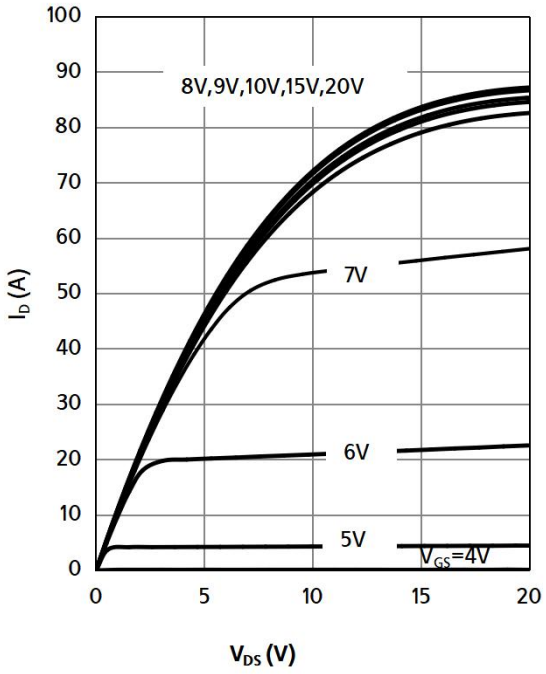
Typical Performance Characteristics

Fig 1. Output Characteristics (T_j=25℃)



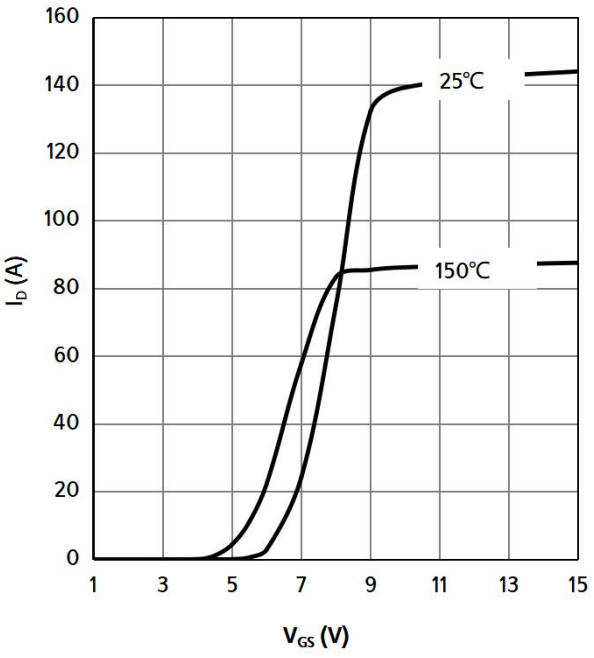
I_D=f(V_{DS});T_j=25℃;parameter: V_{GS}

Fig 2. Output Characteristics (T_j=150℃)



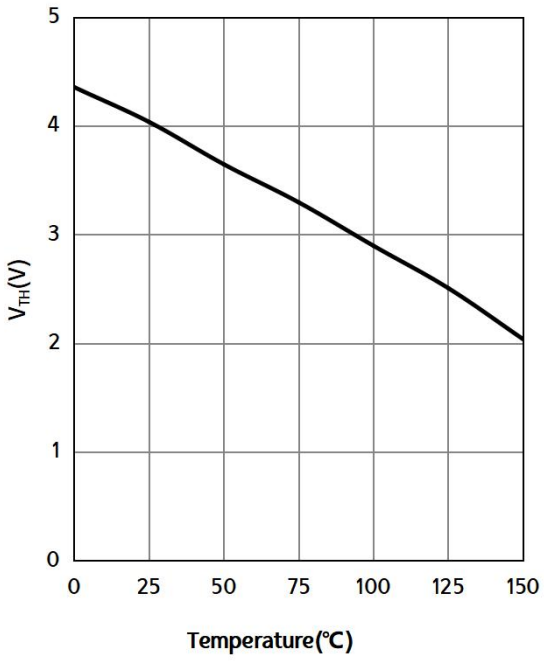
I_D=f(V_{DS});T_j=150℃;parameter: V_{GS}

Fig 3: Transfer Characteristics



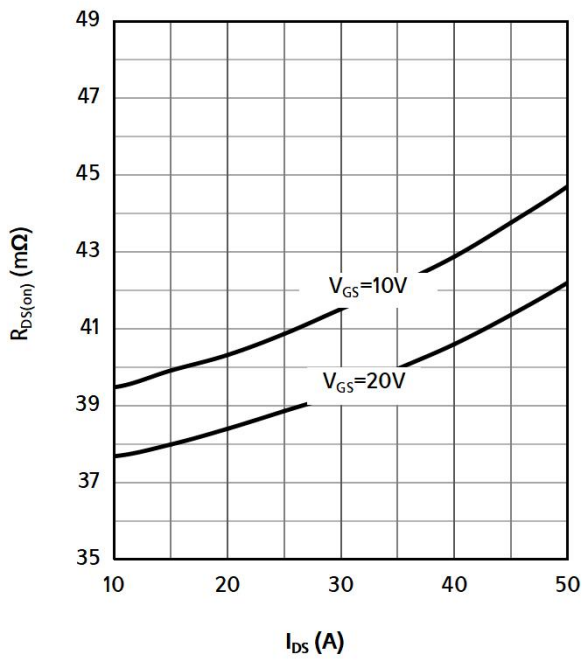
I_D=f(V_{GS});V_{DS}=20V;parameter: T_j

Fig 4: V_{TH} vs. T_j Temperature Characteristics



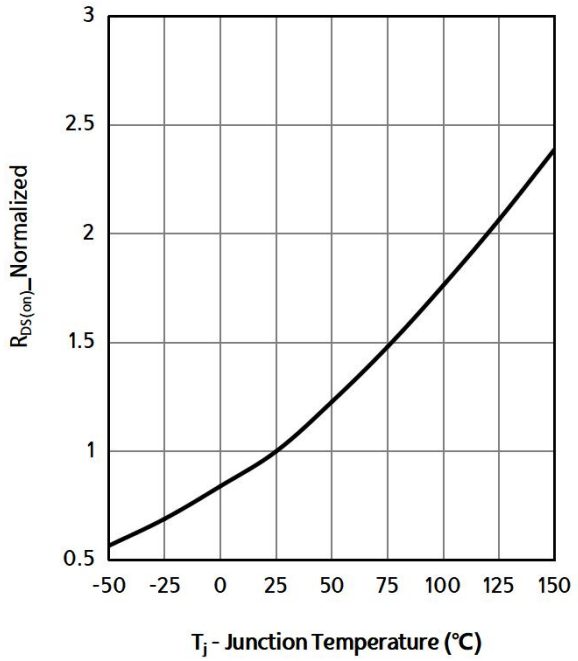
V_{TH}=f(T_j);I_D=2mA

Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics(T_j=25℃)



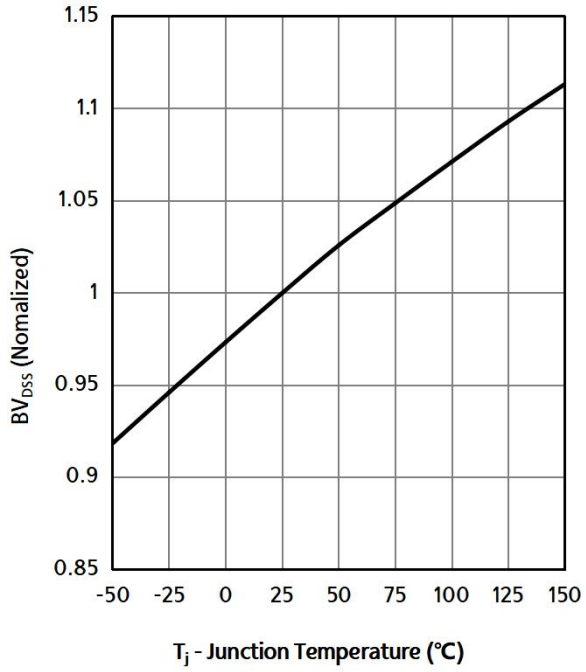
$R_{DS(on)}$=f(I_D);T_j=25℃;parameter: V_{GS}

Fig 6: $R_{DS(on)}$ vs. Temperature



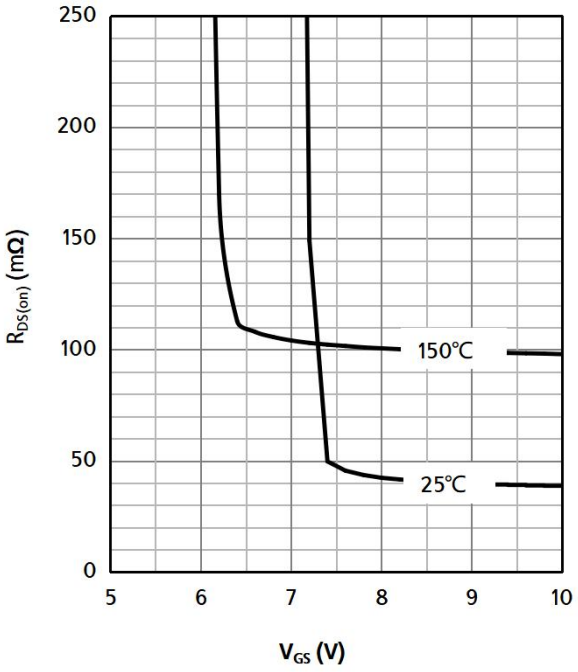
$R_{DS(on)}$=f(T_j);I_D=25A; V_{GS}=10V

Fig 7: BV_{DSS} vs. Temperature



BV_{DSS}=f(T_j)

Fig 8: $R_{DS(on)}$ vs. Gate Voltage



$R_{DS(on)}$=f(V_{GS});I_D=25A;parameter: T_j

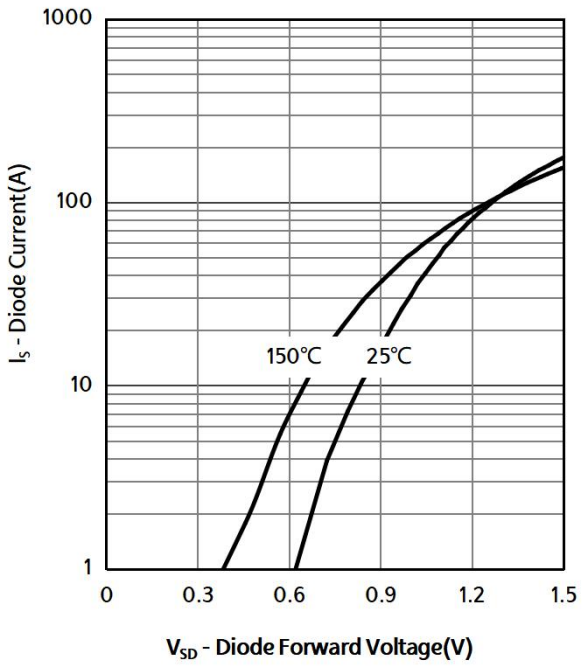
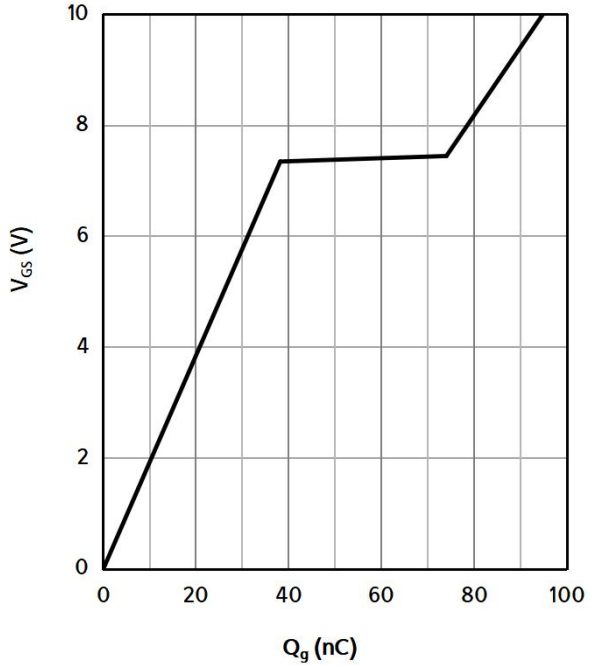
Fig 9: Body-diode Forward Characteristics	Fig 10: Gate Charge Characteristics
	
I_F=f(V_{SD});parameter: T_j	V_{GS}=f(Q_g); V_{DD}=400V; I_D=25A

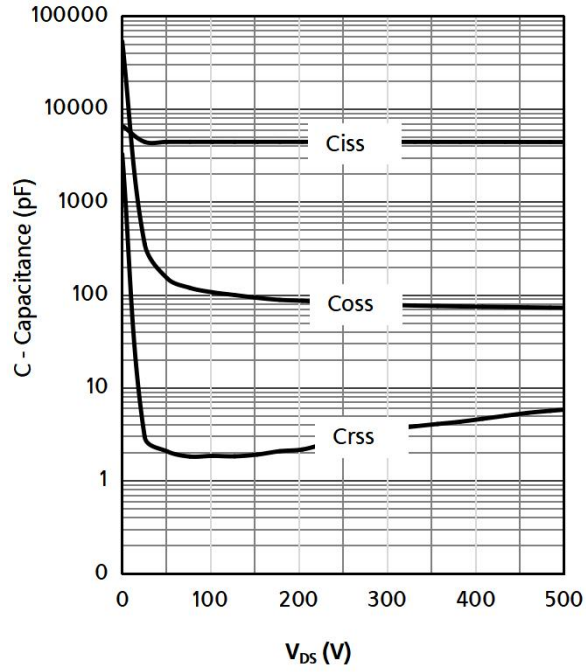
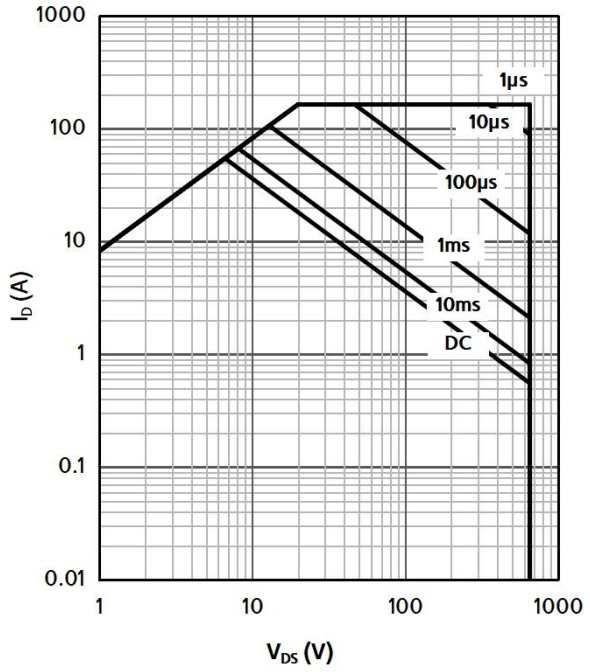
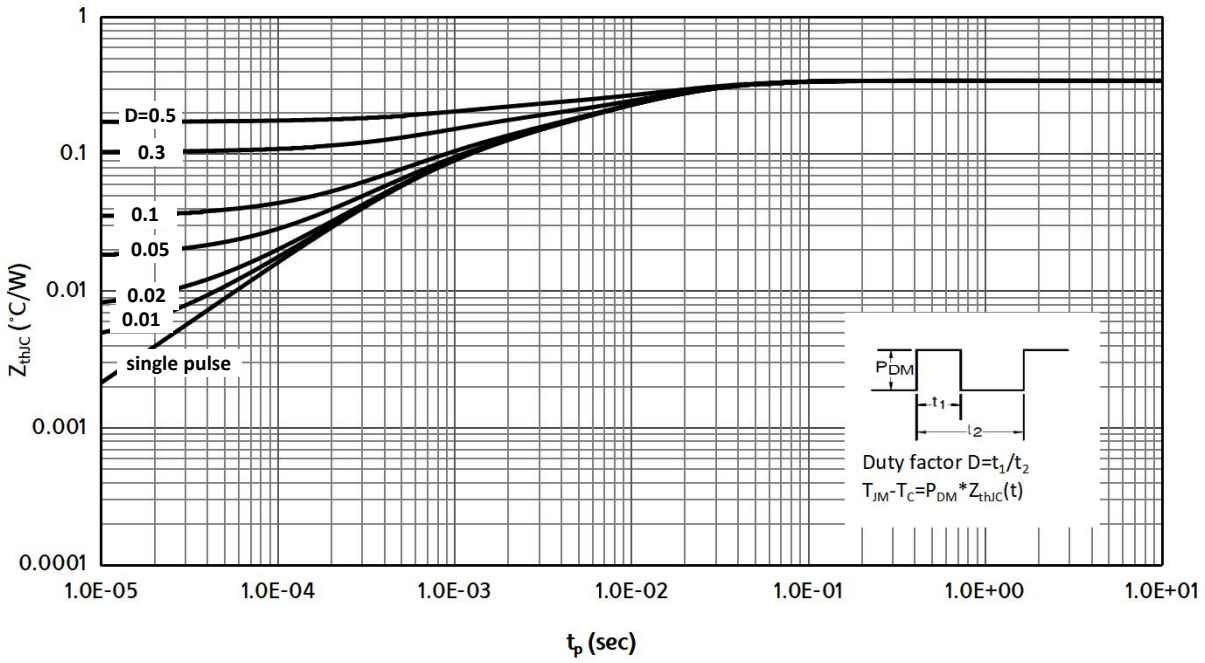
Fig 11: Capacitance Characteristics	Fig 12: Safe Operating Area
	
C=f(V_{DS}); V_{GS}=0V; f=250kHZ	I_D=f(V_{DS}); T_C=25°C;D=0;parameter: t_p

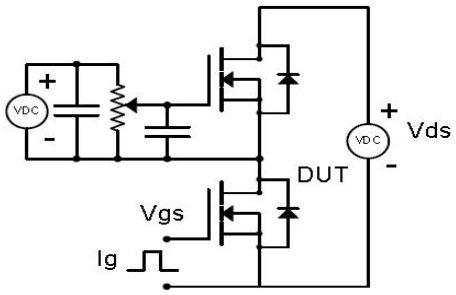
Fig 13: Max. Transient Thermal Impedance

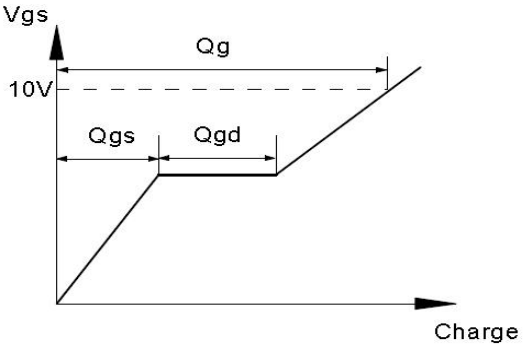


Z_{thJC}=f(t_p);parameter:D=t_1/t_2

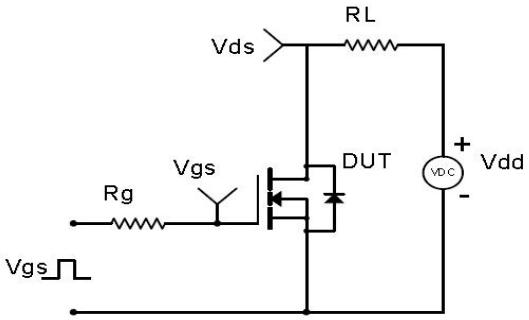
Test Circuit & Waveform

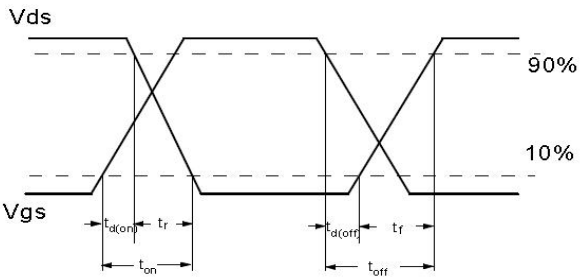
Gate Charge Test Circuit & Waveform



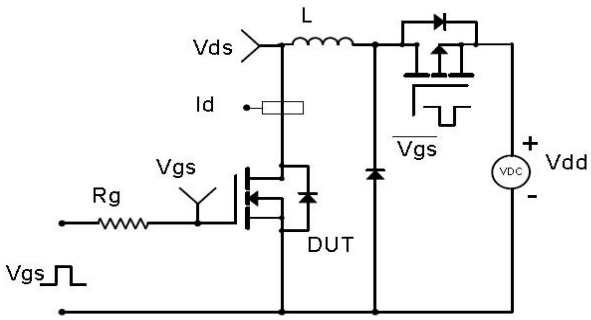


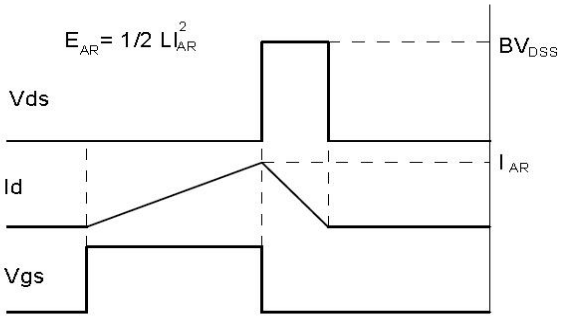
Resistive Switching Test Circuit & Waveforms



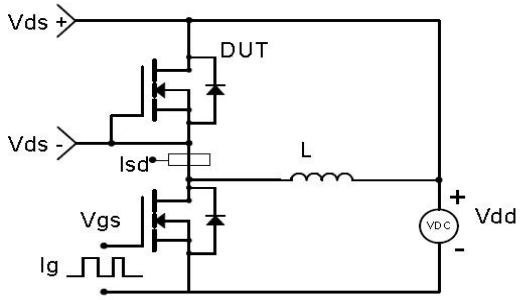


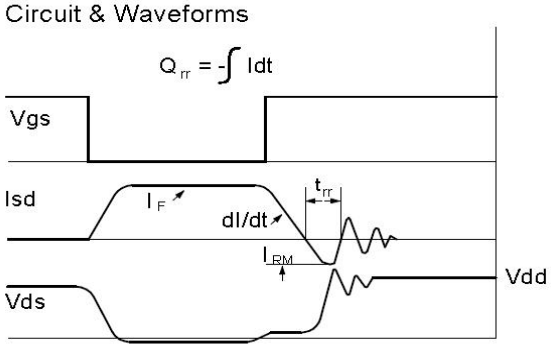
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



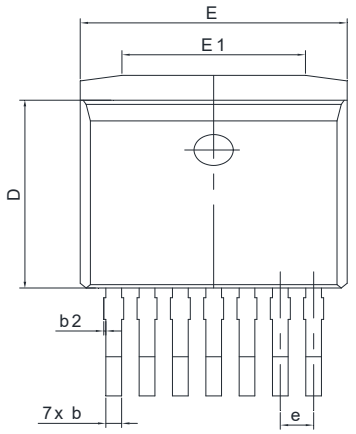


Diode Recovery Test Circuit & Waveforms

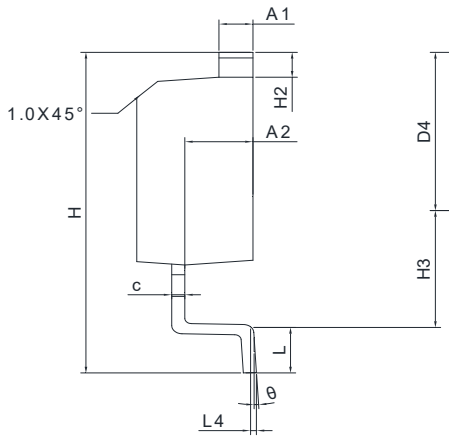




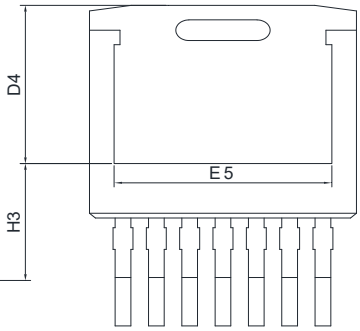
Package Outline: TO-263-7



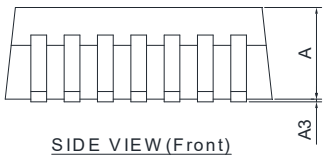
TOP VIEW



SIDE VIEW(Right)



BOTTOM VIEW



SIDE VIEW(Front)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.23	4.63	0.167	0.182
A1	1.20	1.40	0.047	0.055
A2	2.40	2.80	0.094	0.110
A3	0.00	0.25	0.000	0.010
b	0.50	0.74	0.020	0.029
b2	-	0.15	-	0.006
c	0.40	0.64	0.016	0.025
D	8.88	9.28	0.350	0.365
D4	7.35	7.95	0.289	0.313
e	1.270 BSC		0.050 BSC.	
E	9.98	10.38	0.393	0.409
E1	6.50	7.50	0.256	0.295
E5	8.00	8.60	0.315	0.339
H	15.00	16.00	0.591	0.630
H2	0.98	1.42	0.039	0.056
H3	5.650 REF		0.222 REF	
L	1.90	2.50	0.075	0.098
L4	0.250 BSC		0.010 BSC	
θ	0°	8°	0°	8°

Marking



NOTE:
NXBBAAAAY

N	—WB code (Usually omitted)
X	—Assembly location code
BB	—Fab code
AAAA	—Lot code
Y	—Bin code (Usually omitted)

Revision History

Revison	Major changes
1.0	First version
2.0	Final version

Disclaimer

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

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics .The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

The product is not intended for use in applications that require extraordinary levels of quality and reliability, such as 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.