

Features

- Uses CRM(CQ) advanced SkyMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified

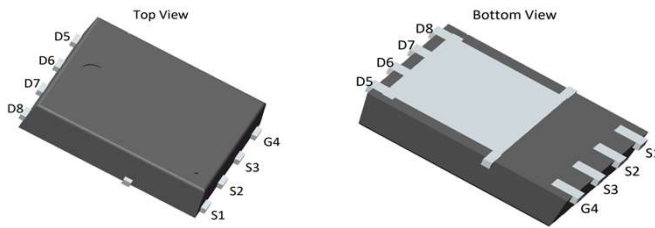
Product Summary

V_{DS}	60V
$R_{DS(on).typ}$	10mΩ
I_D	40A

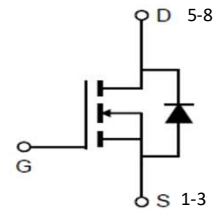
Applications

- DCDC Converter
- Switching applications
- UPS (Uninterruptible Power Supplies)

100% DVDS Tested
100% Avalanche Tested



CRSM120N06L2Q



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSM120N06L2Q	120N06L2Q	PDFN5x6	Tape&reel	N/A	N/A	4000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	60	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	40 29	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	160	A
Avalanche energy, single pulse ($I_{AS} = 20\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	60	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	37	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sold}	260	$^\circ\text{C}$

※. Notes:

EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.3\text{mH}$, $I_{AS} = 20\text{A}$, $V_{GS} = 10\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case (junction-heat spreader)	R_{thJC}	4.0	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	52	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	60	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		60	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=60V, V_{GS}=0V$
		-	-	100		$T_j=25^\circ C$ $T_j=125^\circ C$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	10	13.0	mΩ	$V_{GS}=10V, I_D=20A$
		-	15.0	20.0		$V_{GS}=4.5V, I_D=16A$
Transconductance	g_{fs}	-	50	-	S	$V_{DS}=5V, I_D=20A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	960	-	pF	$V_{GS}=0V, V_{DS}=30V, f=1MHz$
Output Capacitance	C_{oss}	-	270	-		
Reverse Transfer Capacitance	C_{rss}	-	14	-		
Gate Total Charge	Q_G	-	16	-	nC	$V_{GS}=10V, V_{DS}=30V, I_D=20A, f=1MHz$
Gate-Source charge	Q_{gs}	-	5	-		
Gate-Drain charge	Q_{gd}	-	2.5	-		
Turn-on delay time	$t_{d(on)}$	-	7	-	ns	$V_{GS}=10V, V_{DD}=30V, R_{G_ext}=2.7\Omega$
Rise time	t_r	-	30	-		
Turn-off delay time	$t_{d(off)}$	-	16	-		
Fall time	t_f	-	7	-		
Gate resistance	R_G	-	1.8	-	Ω	$V_{GS}=0V, V_{DS}=0V, f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode continuous forward current	I_S	-	-	40	A	$T_C = 25^{\circ}\text{C}$
Diode pulse current	I_S pulse	-	-	160	A	$T_C = 25^{\circ}\text{C}$
Body Diode Forward Voltage	V_{SD}	-	0.9	1.4	V	$V_{GS}=0\text{V}, I_{SD}=20\text{A}$
Body Diode Reverse Recovery Time	t_{rr}	-	57	-	ns	$I_F=20\text{A}, dI/dt=300\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{rr}	-	45	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

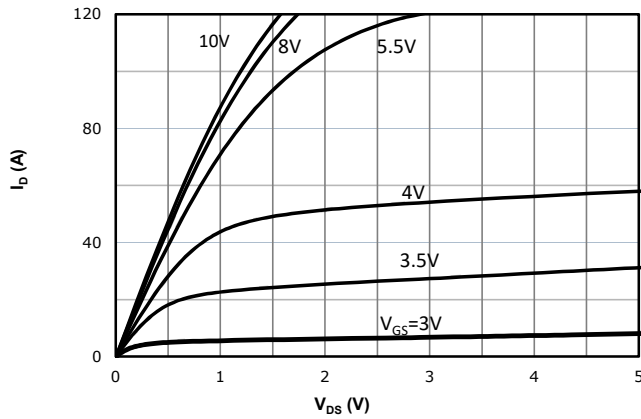


Fig 2: Transfer Characteristics

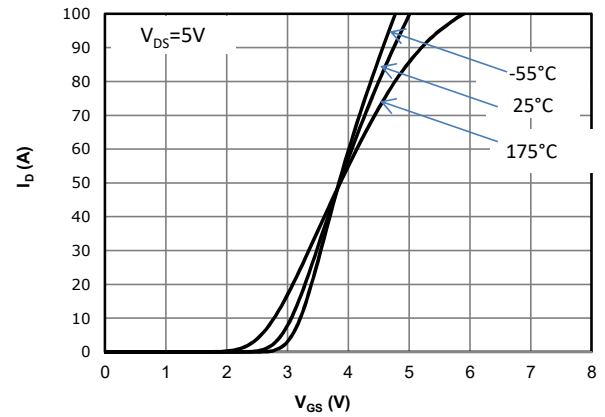


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

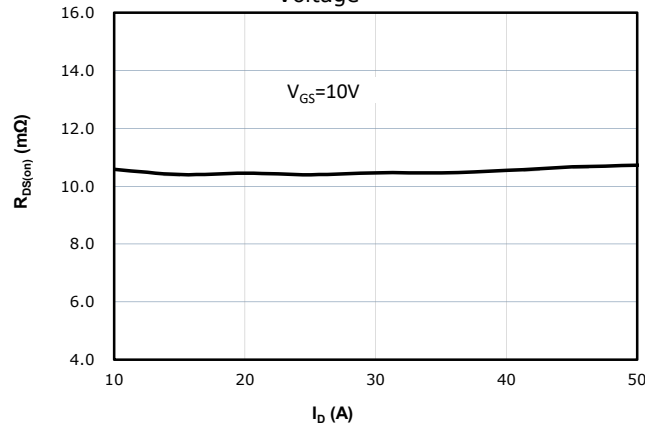


Fig 4: $R_{DS(on)}$ vs Gate Voltage

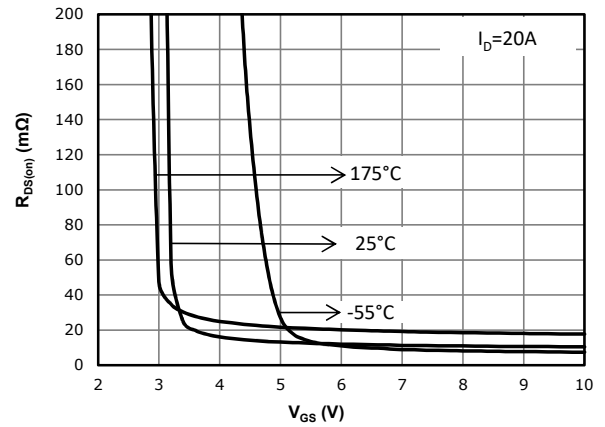


Fig 5: $R_{DS(on)}$ vs. Temperature

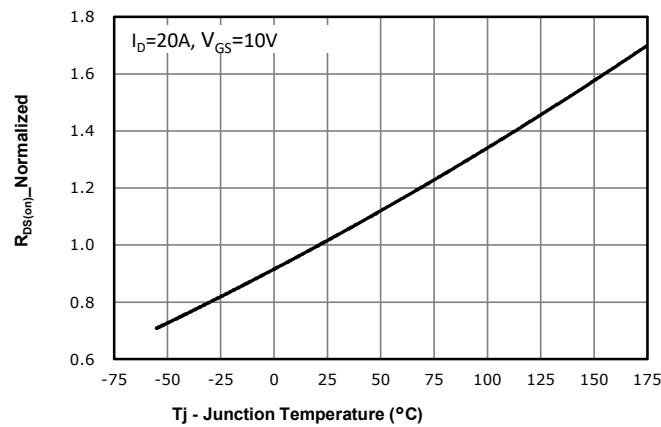


Fig 6: $V_{GS(th)}$ vs. Temperature

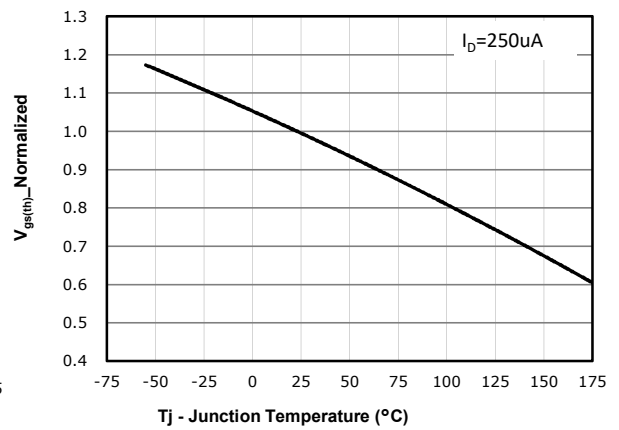


Fig 7: BVdss vs. Temperature

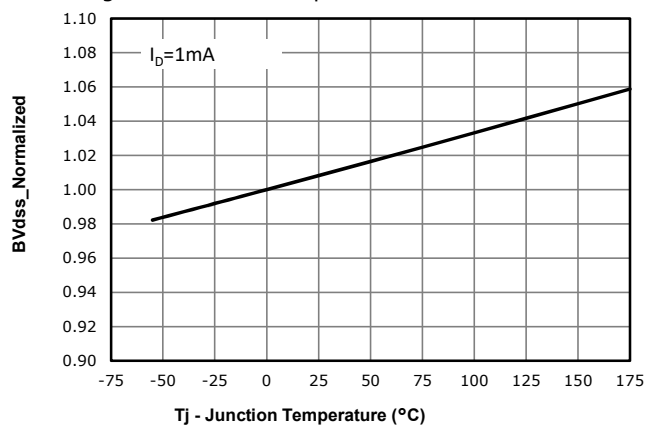


Fig 8: Capacitance Characteristics

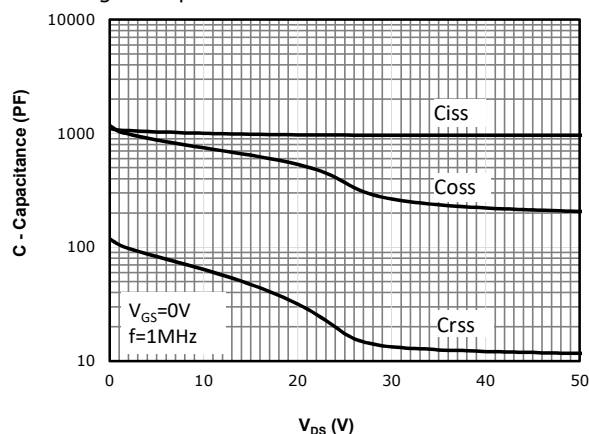


Fig 9: Gate Charge Characteristics

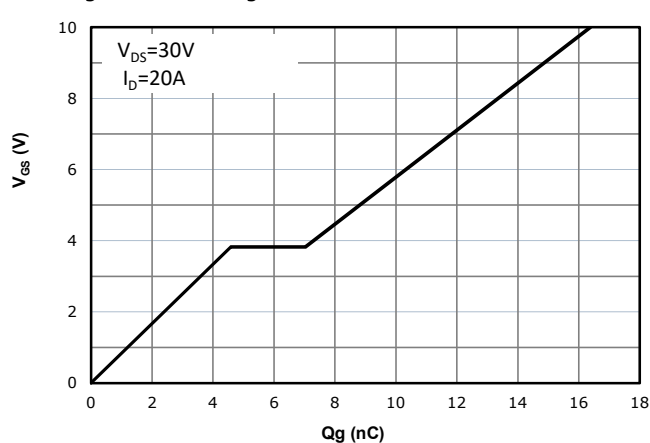


Fig 10: Body-diode Forward Characteristics

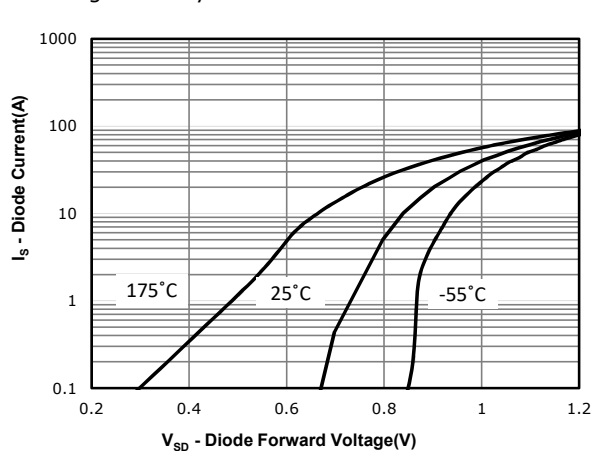


Fig 11: Power Dissipation

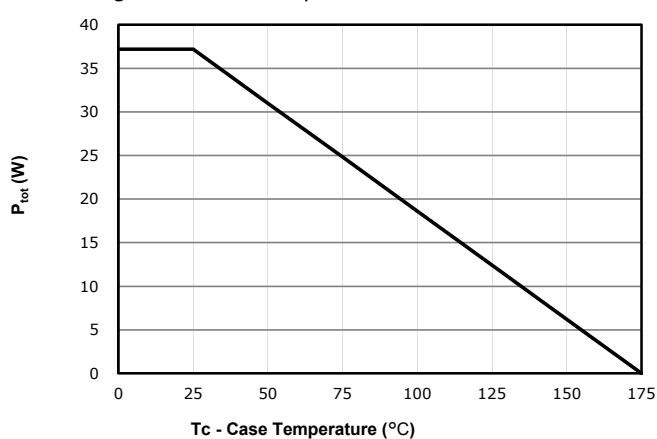


Fig 12: Drain Current Derating

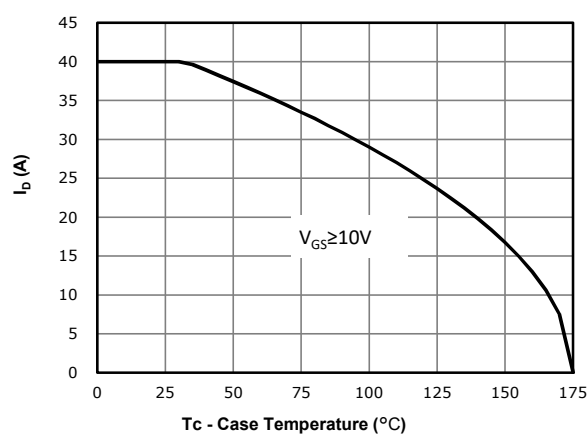


Fig 13: Safe Operating Area

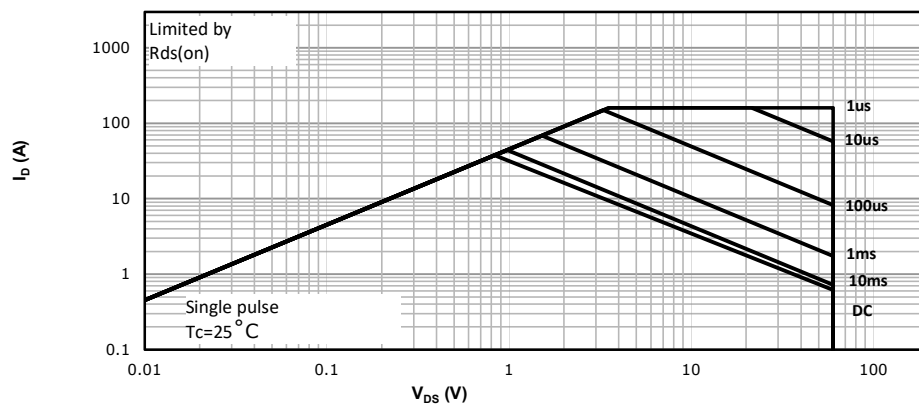
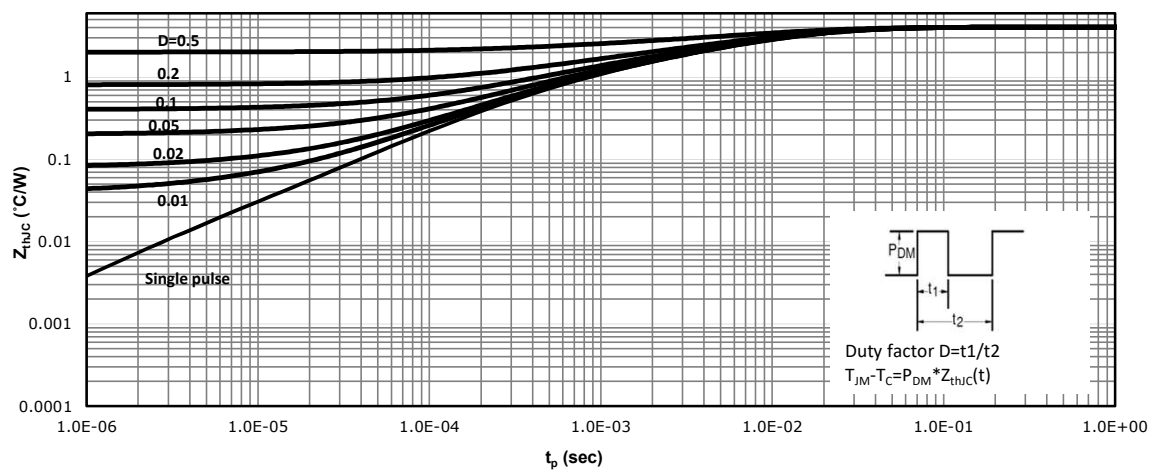
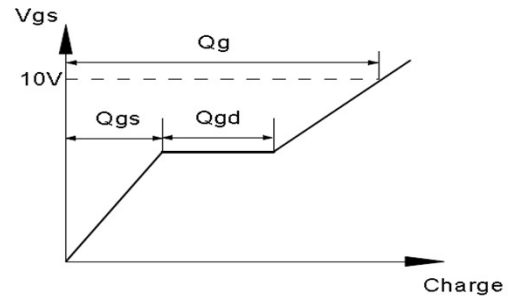
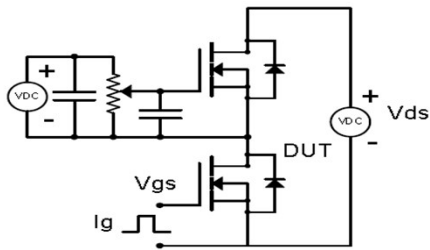


Fig 14: Max. Transient Thermal Impedance

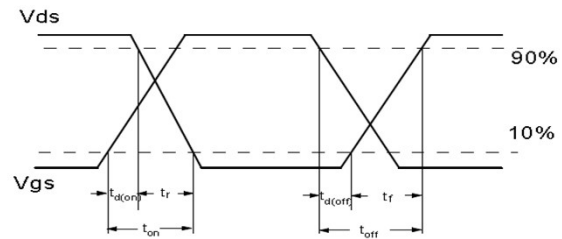
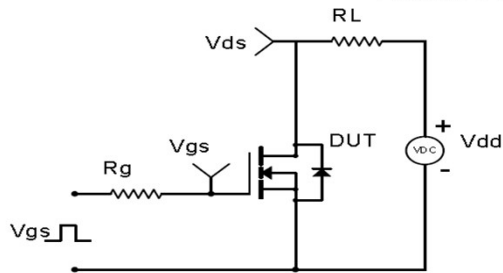


Test Circuit & Waveform

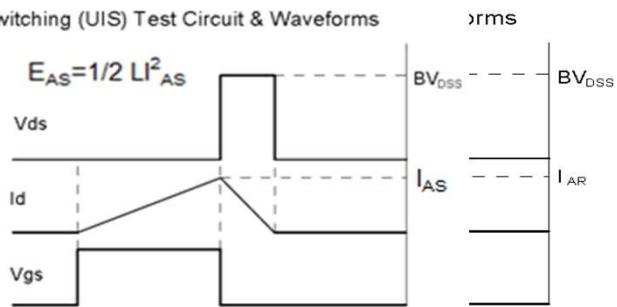
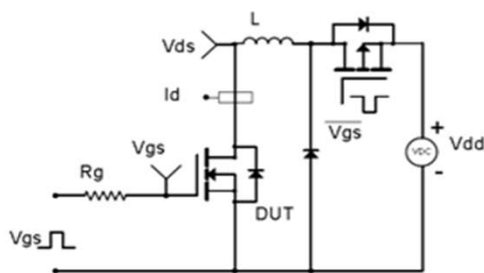
Gate Charge Test Circuit & Waveform



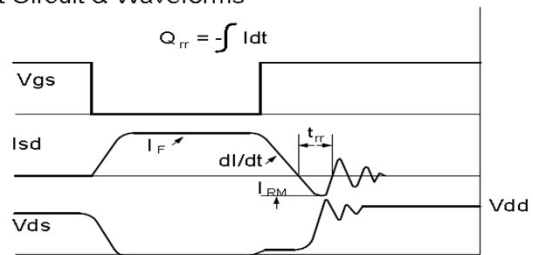
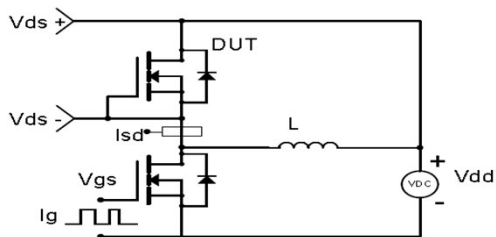
Resistive Switching Test Circuit & Waveforms



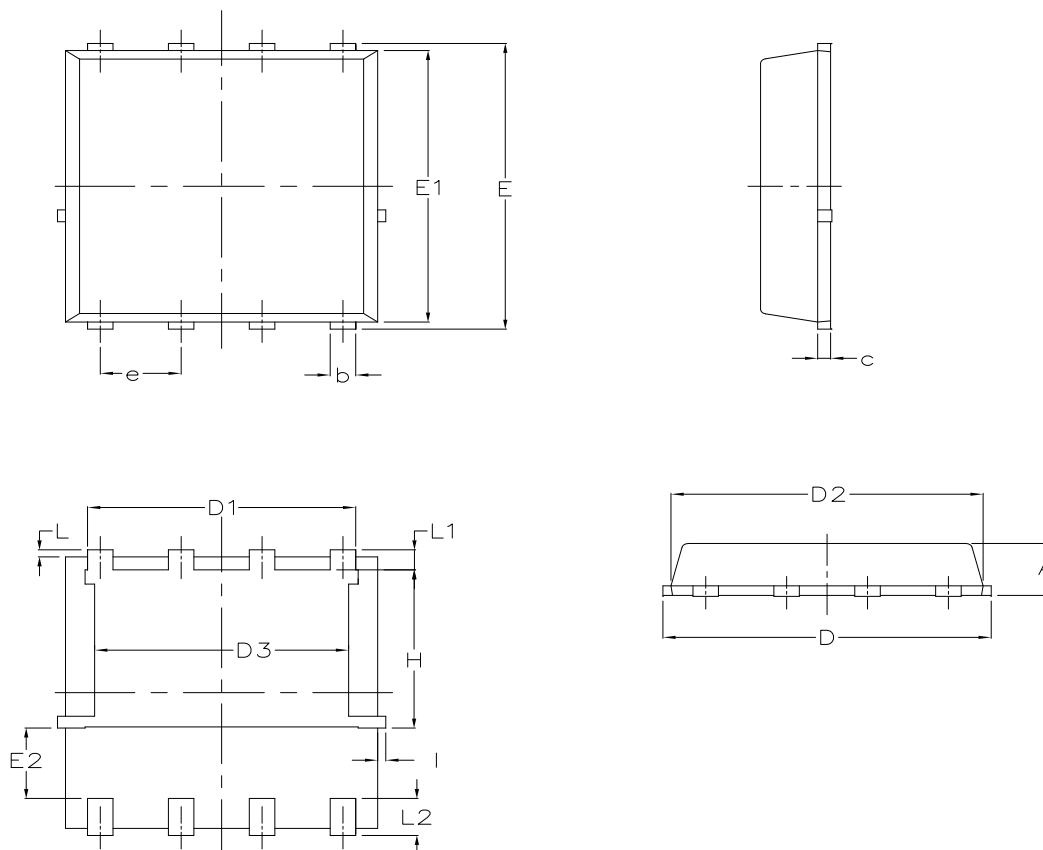
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: PDFN5x6 Type P



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	NOM.	Max.	Min.	NOM.	Max.
A	0.90	1.10	1.20	0.035	0.043	0.047
b	0.31	0.41	0.51	0.012	0.016	0.020
c	0.15	0.20	0.30	0.006	0.008	0.012
D	4.80	4.98	5.15	0.189	0.196	0.203
D1	3.91	4.22	4.36	0.154	0.166	0.172
D2	4.80	4.90	5.00	0.189	0.193	0.197
D3	3.85	4.00	4.15	0.152	0.157	0.163
E	5.90	6.05	6.15	0.232	0.238	0.242
E1	5.65	5.76	5.85	0.222	0.227	0.230
E2	1.10	-	-	0.043	-	-
e	1.27 BSC			0.050 BSC		
L	0.05	0.15	0.25	0.002	0.006	0.010
L1	0.38	0.43	0.50	0.015	0.017	0.020
L2	0.51	0.79	0.86	0.020	0.031	0.034
H	3.25	3.35	3.58	0.128	0.132	0.141
I	0.00	-	0.18	0.000	-	0.007

Marking**NOTE:**

XAAAAAAAA-Y

X

—Assembly location code

AAAAAAA

—Assembly lot NO. last 7digits

Y

—Bin code

Revision History

Revision	Date	Major changes
1.0	2024/12/10	Release of preliminary version.
1.1	2025/3/9	1.Add pin number; 2.Delete Dynamic Characteristic parameters spec. 3.Update Fig5/Fig6.

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 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.