

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

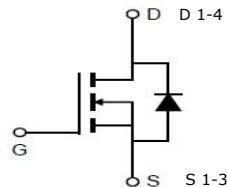
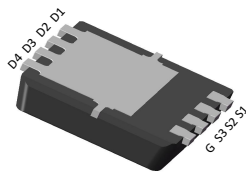
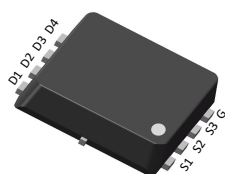
Applications

- Motor control and drive
- Battery management System

Product Summary

V_{DS}	40V
$R_{DS(on),typ}$	5m Ω
I_D	40A

100% DVDS Tested
100% Avalanche Tested



CRSK060N04N2Z

Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRSK060N04N2Z	06004N	PDFN3.3x3.3	Tape&reel	N/A	N/A	5000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Continuous drain current	I_D		
$T_C = 25^\circ\text{C}$ (Silicon limit)		80	A
$T_C = 100^\circ\text{C}$ (Silicon limit)		53	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D,pulse}$	160	A
Avalanche energy, single pulse ($I_D = 22\text{A}$, $R_g = 25\Omega$) ^[1]	E_{AS}	66	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	61	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:

1.EAS is tested at starting $T_j = 25^\circ\text{C}$, $L = 0.3\text{mH}$, $I_{AS} = 22\text{A}$, $V_{ds} = 40\text{V}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	2.5	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

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}	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$
		40	-	-	V	$V_{GS}=0V, I_D=1mA$
Gate threshold voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1 100	μA	$V_{DS}=40V, V_{GS}=0V$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state	$R_{DS(on)}$		5	6	mΩ	$V_{GS}=10V, I_D=25A$
Transconductance	g_{fs}	-	79	-	S	$V_{DS}=5V, I_D=25A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1280	-	pF	$V_{GS}=0V, V_{DS}=20V, f=1MHz$
Output Capacitance	C_{oss}	-	420	-		
Reverse Transfer Capacitance	C_{rss}	-	16	-		
Gate Total Charge	Q_G	-	20	-	nC	$V_{GS}=10V, V_{DS}=20V, I_D=25A, f=1MHz$
Gate-Source charge	Q_{gs}	-	7	-		
Gate-Drain charge	Q_{gd}	-	4.0	-		
Turn-on delay time	$t_{d(on)}$	-	8	-	ns	$V_{DS}=20V, I_D=25A$ $R_g=3\Omega, V_{GS}=10V$
Rise time	t_r	-	26	-		
Turn-off delay time	$t_{d(off)}$	-	14	-		
Fall time	t_f	-	7	-		
Gate resistance	R_G	-	1.6	-	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°C
Diode pulse current	I _S pulse	-	-	160	A	T _C = 25°C
Body Diode Forward Voltage	V _{SD}	-	0.85	1.4	V	V _{GS} =0V, I _{SD} =25A
Body Diode Reverse Recovery Time	t _{rr}	-	25	-	ns	I _F =25A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	8	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

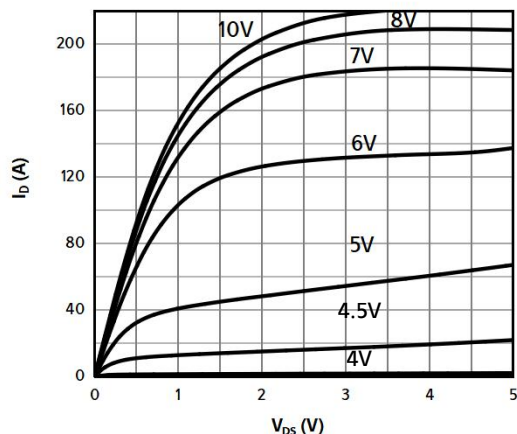


Fig 2: Transfer Characteristics

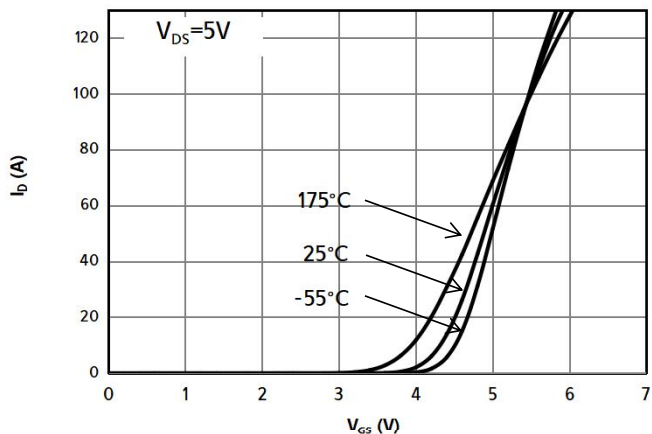


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

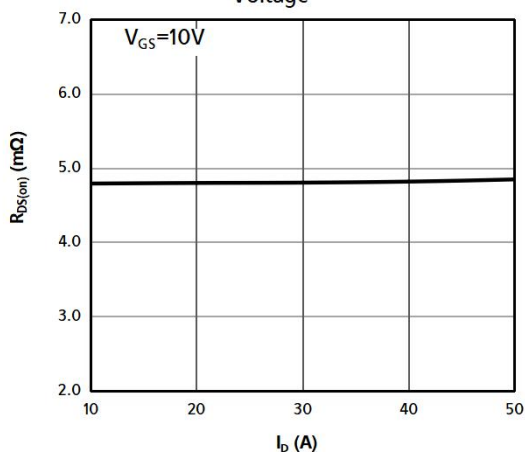


Fig 4: $R_{DS(on)}$ vs Gate Voltage

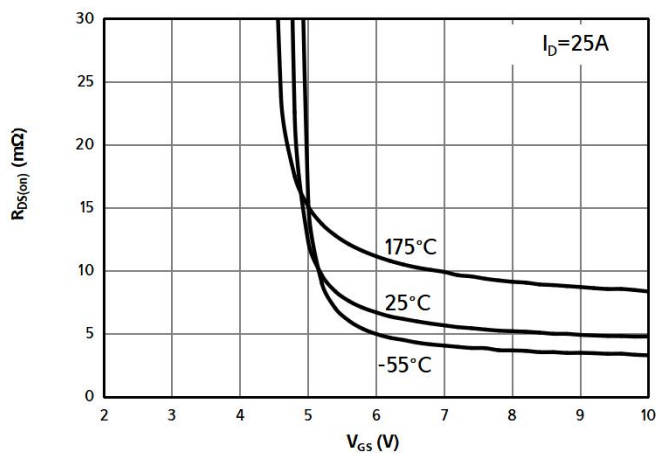


Fig 5: $R_{DS(on)}$ vs. Temperature

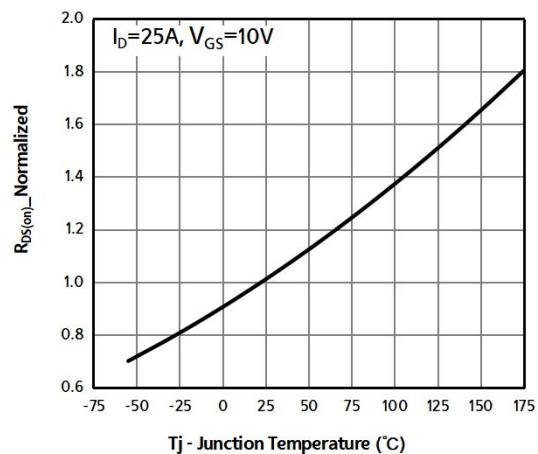


Fig 6: $V_{GS(th)}$ vs. Temperature

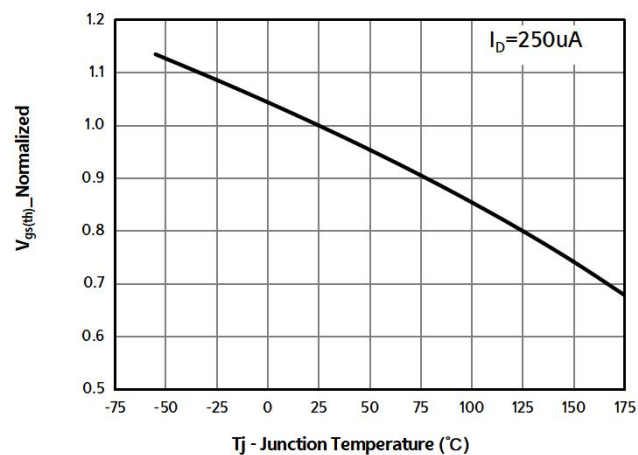


Fig 7: BVdss vs. Temperature

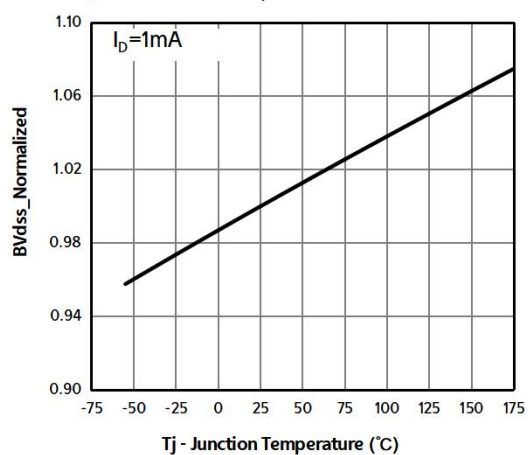


Fig 8: Capacitance Characteristics

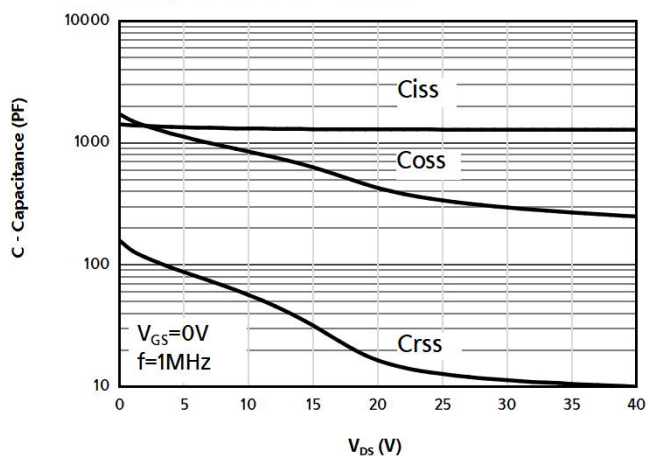


Fig 9: Gate Charge Characteristics

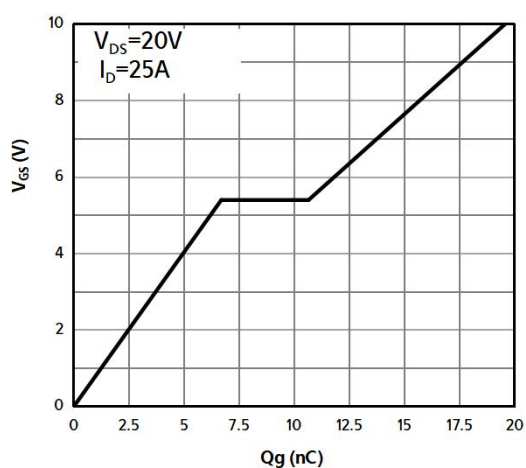


Fig 10: Body-diode Forward Characteristics

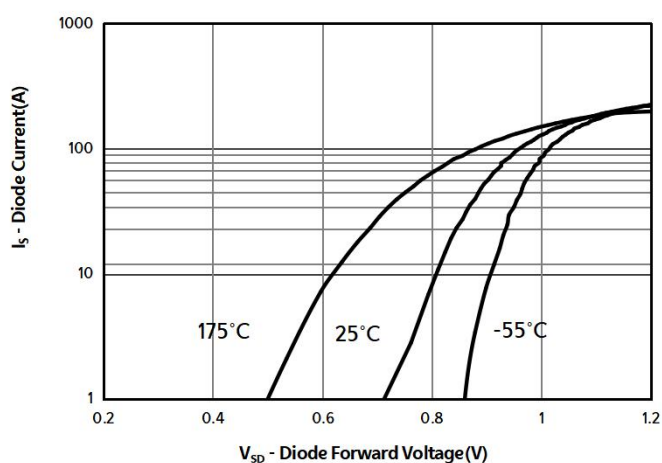


Fig 11: Power Dissipation

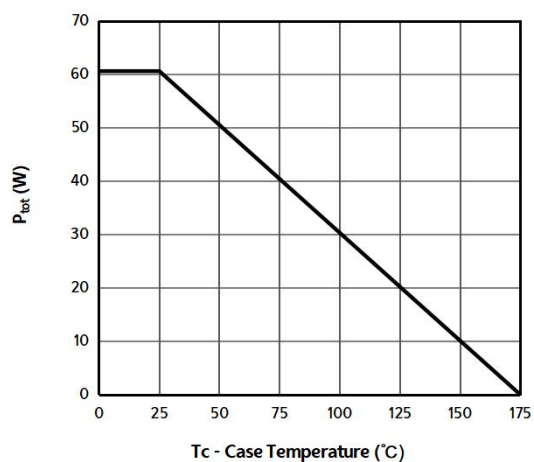


Fig 12: Drain Current Derating

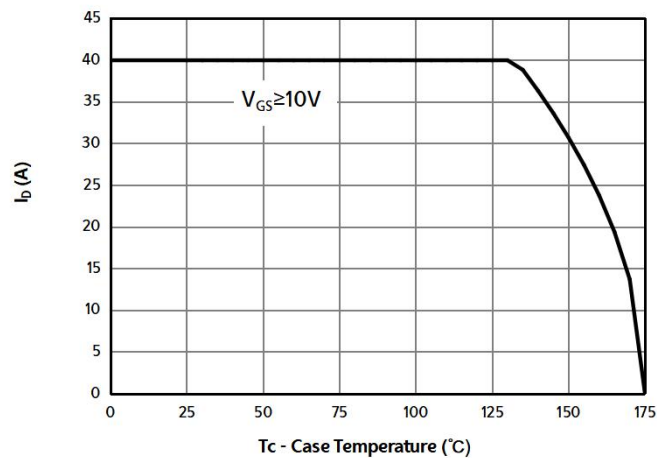


Fig 13: Safe Operating Area

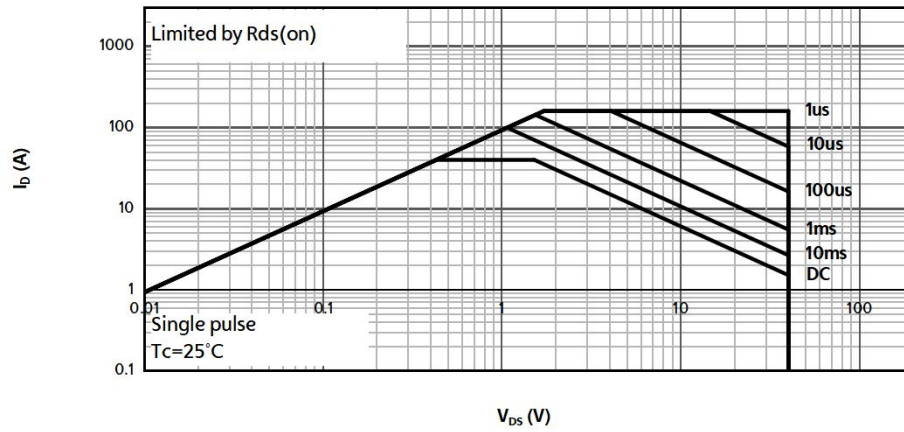
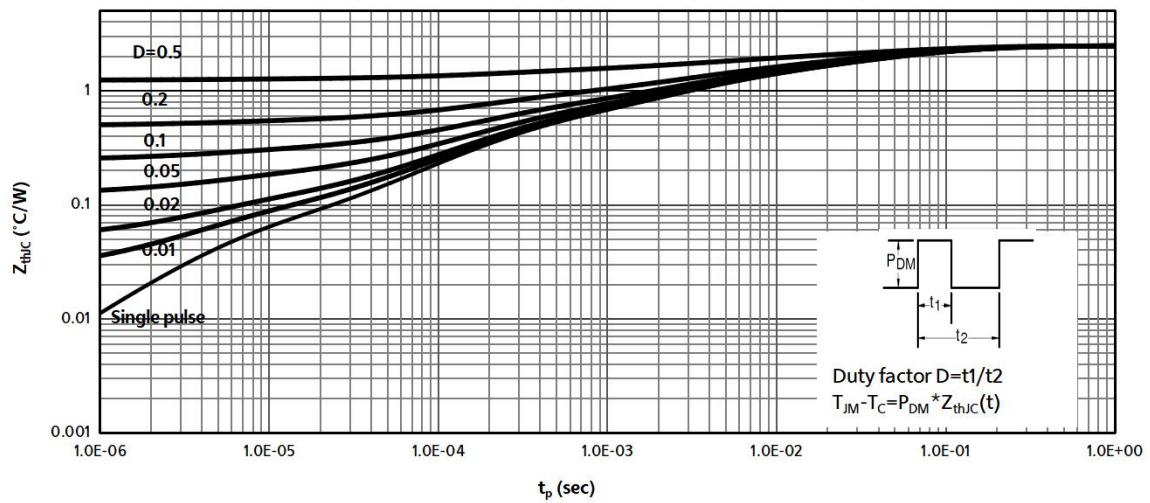
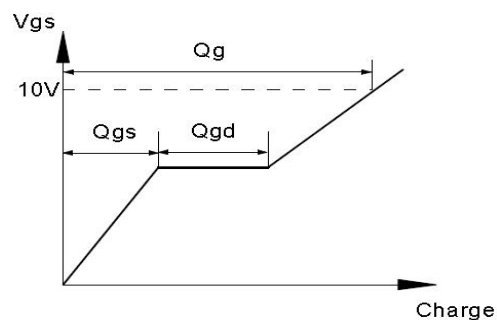
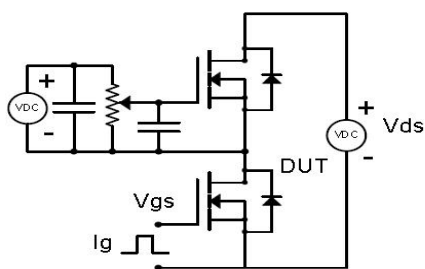


Fig 14: Max. Transient Thermal Impedance

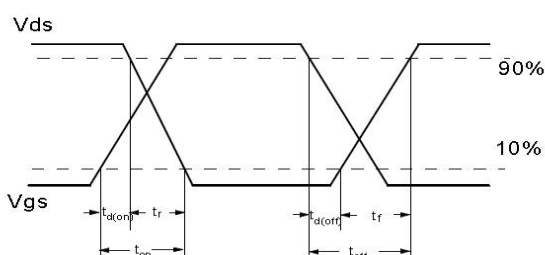
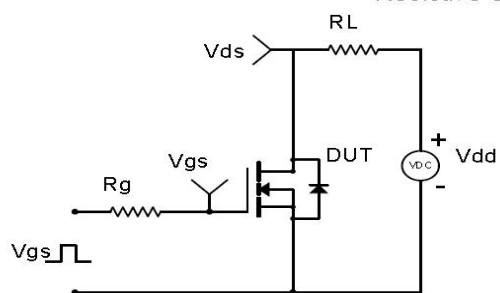


Test Circuit & Waveform

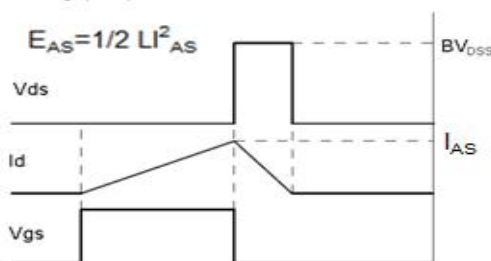
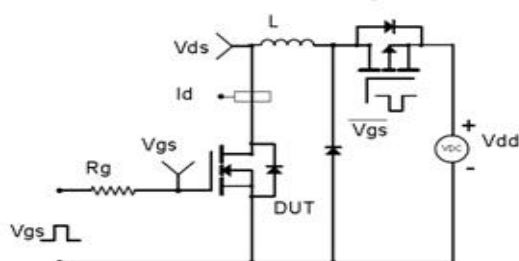
Gate Charge Test Circuit & Waveform



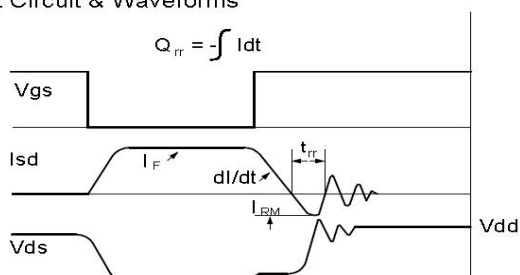
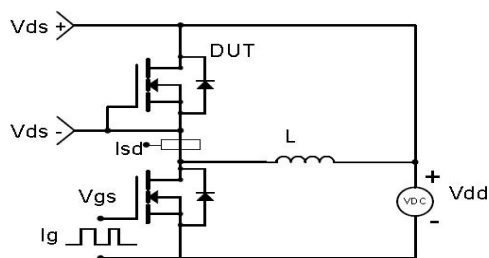
Resistive Switching Test Circuit & Waveforms

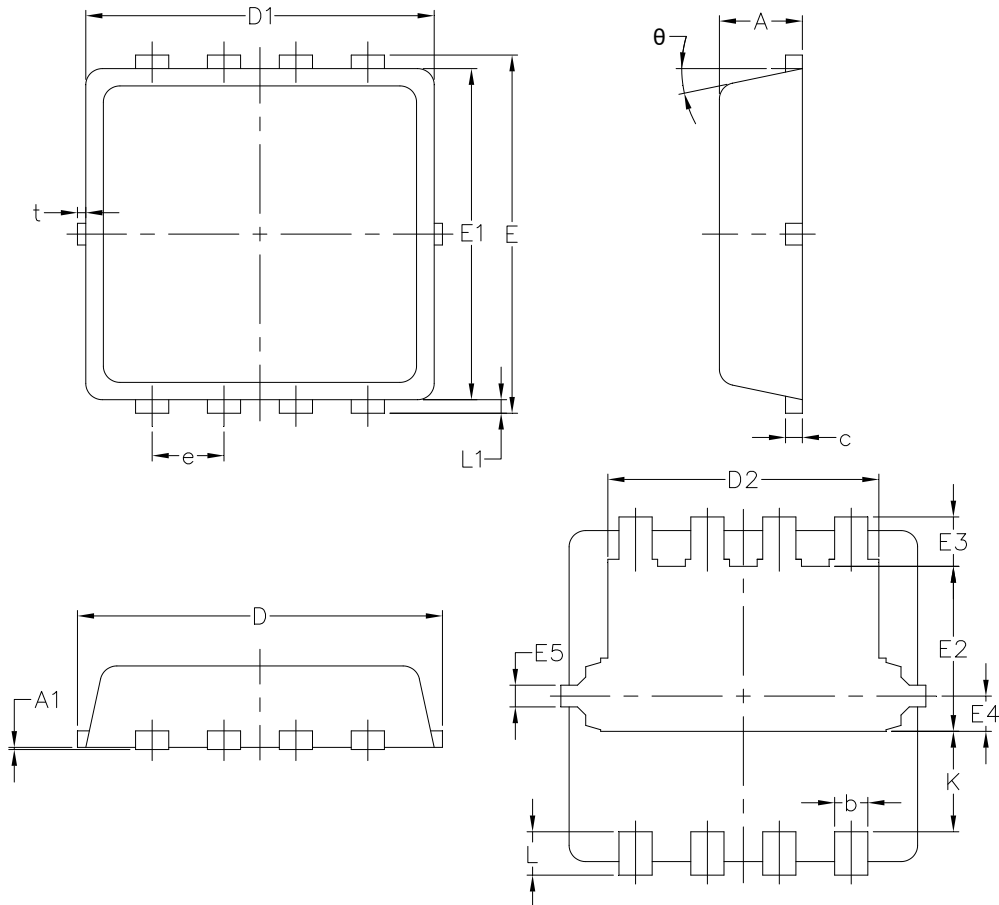


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

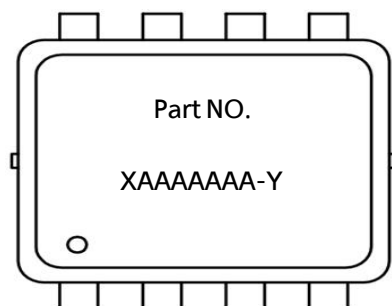


Diode Recovery Test Circuit & Waveforms



Package Outline: PDFN3.3x3.3


Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.90
A1	-	-	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.300	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.32	1.52	1.72
E3	0.28	0.46	0.65
E4	0.18	0.33	0.48
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.78	0.93	1.13
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0.00	0.075	0.13
θ	--	12°	14°

Marking

NOTE:

XAAAAAAAA-Y

X — Assembly location code

AAAAAAA — Assembly lot NO. last 7 digits

Y — Bin code

Revision History

Revision	Date	Major changes
1.0	2023/8/24	Release of Preliminary version.
1.1	2024/5/20	Update IAS, Is and Is pulse.
1.2	2024/9/27	Pin mark modify.
2.0	2025/3/9	Update package name. Update Fig5. Update 25°C Silicon limit.

Disclaimer

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

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