CRMQGL0405A

N-Channel 40V, 4.1mΩ Typ. Power MOSFET

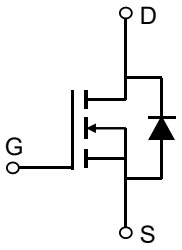
Description

Features

- 40V, 55A

  $R_{DS(ON)}$ Typ = 4.1mΩ @ V_{GS} = 10V

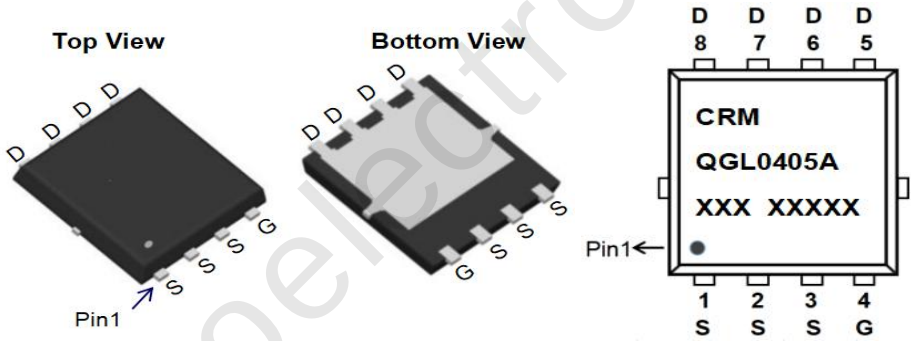
  $R_{DS(ON)}$ Typ = 7.5mΩ @ V_{GS} = 4.5V
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free
- 100% UIS TESTED!
- 100% ΔVds TESTED!



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	Reel Size	Reel (pcs)	Per Carton (pcs)
CRMQGL0405A	CRMQGL0405A	PDFN3.3x3.3-8L	TAPING	13"	5000	50000

Absolute Maximum Ratings (@ T_J = 25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		40	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25°C	55	A
		T_C = 100°C	33	A
I_{DM}	Pulsed Drain Current (1)		220	A
E_{AS}	Single Pulsed Avalanche Energy (2)		49	mJ
P_D	Power Dissipation	T_C = 25°C	28	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		4.5	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

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Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	2	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 20A	-	4.1	5.3	mΩ
		V_{GS} = 4.5V, I_D = 15A	-	7.5	9.7	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	1050	-	pF
C_{oss}	Output Capacitance		-	450	-	pF
C_{rss}	Reverse Transfer Capacitance		-	15	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 20A	-	20	-	nC
Q_{gs}	Gate Source Charge		-	3.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 20A, R_{GEN} = 6Ω	-	5	-	ns
t_r	Turn-On Rise Time		-	8.8	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	24	-	ns
t_f	Turn-Off Fall Time		-	15.5	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	55	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	220	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	40	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	42	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25°C, V_{DD}=30V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=14A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

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Typical Performance Characteristics

Figure 1: Output Characteristics

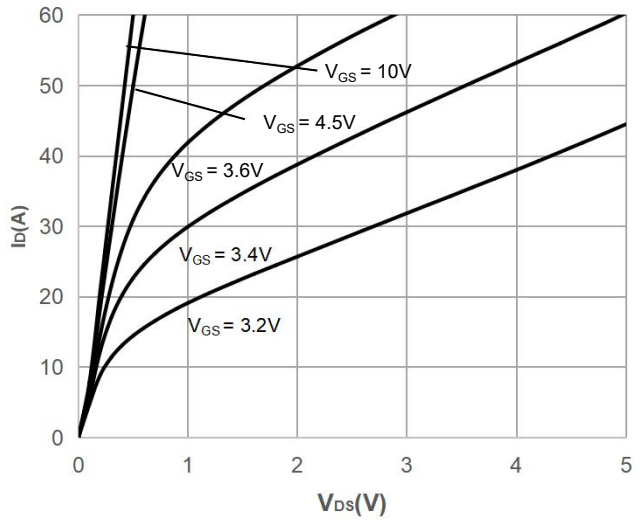


Figure 2: Typical Transfer Characteristics

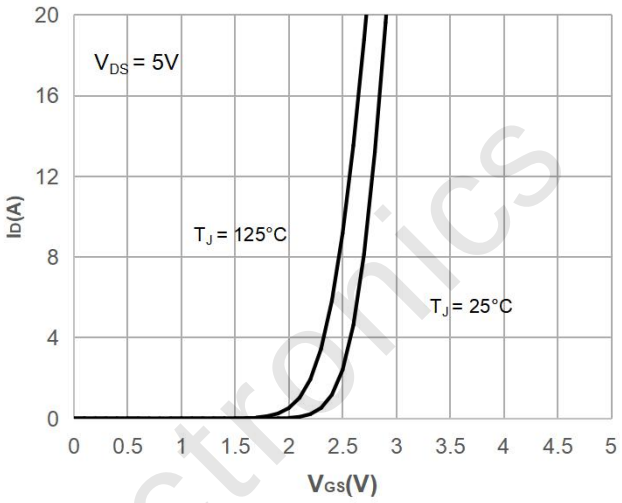


Figure 3: On-resistance vs. Drain Current

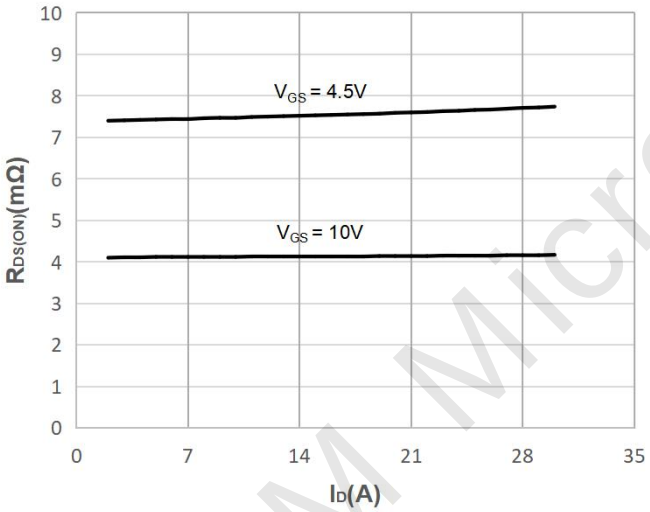


Figure 4: Body Diode Characteristics

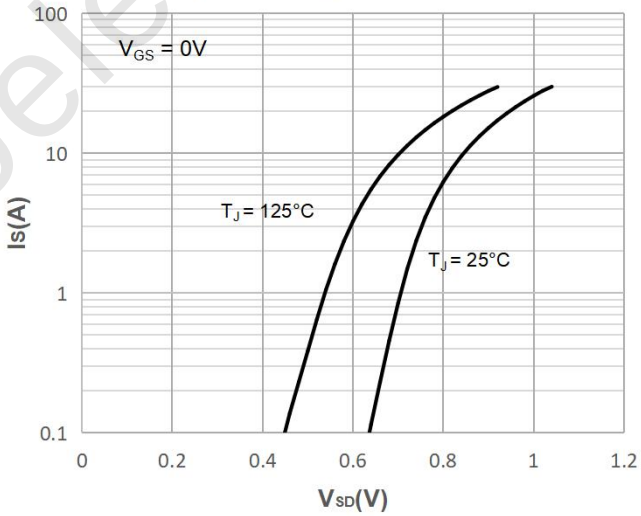


Figure 5: Gate Charge Characteristics

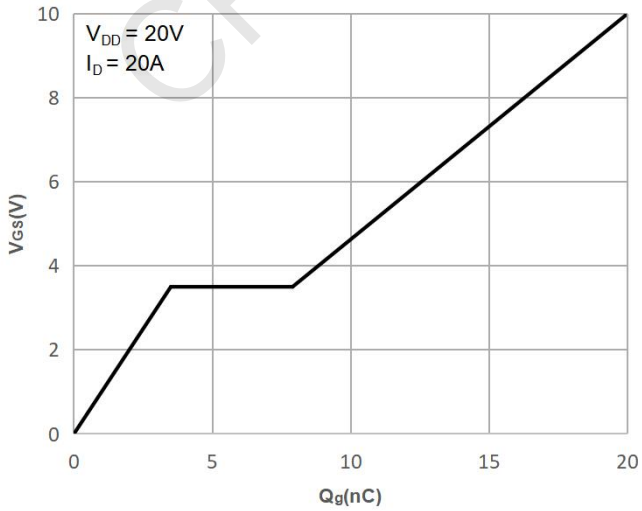
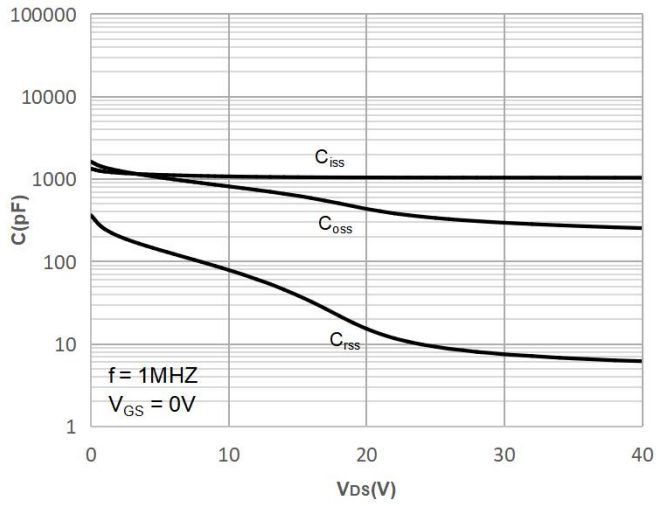


Figure 6: Capacitance Characteristics



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Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

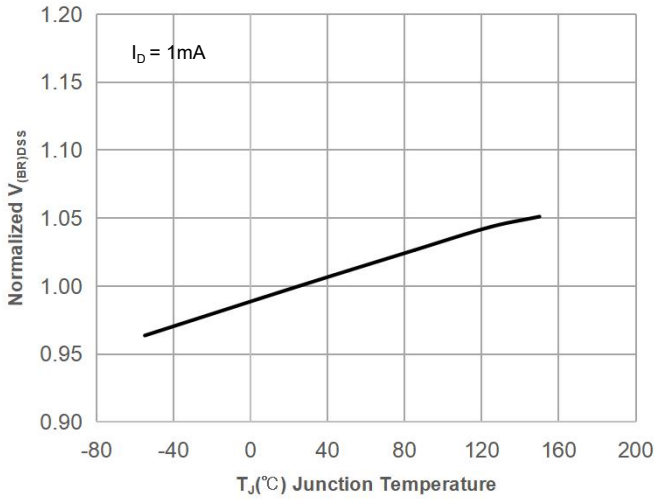


Figure 8: Normalized on Resistance vs. Junction Temperature

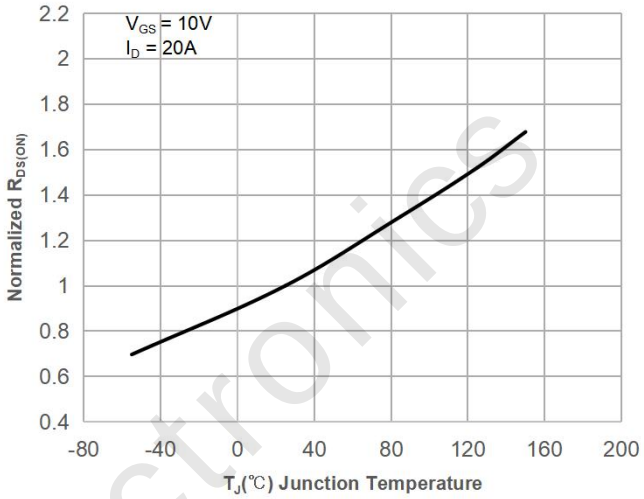


Figure 9: Maximum Safe Operating Area

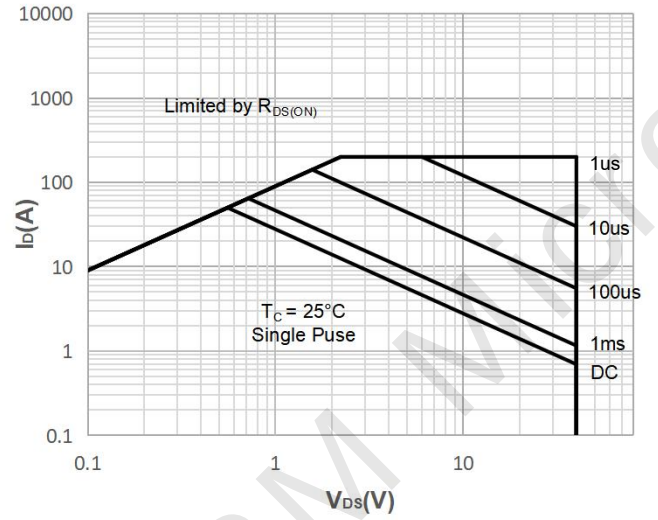


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

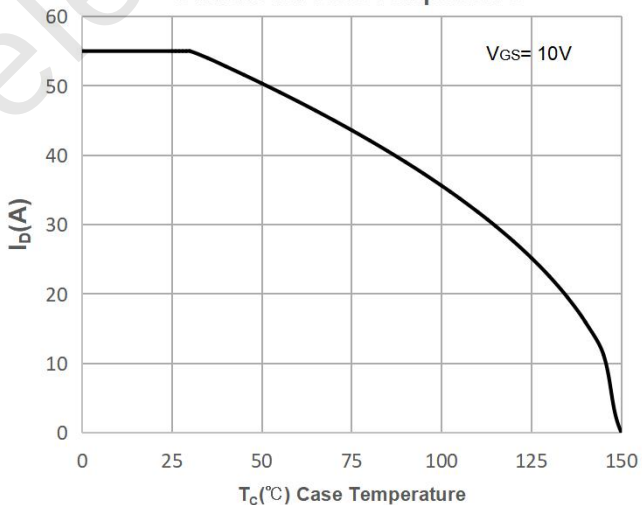


Figure 11: Normalized Maximum Transient Thermal Impedance

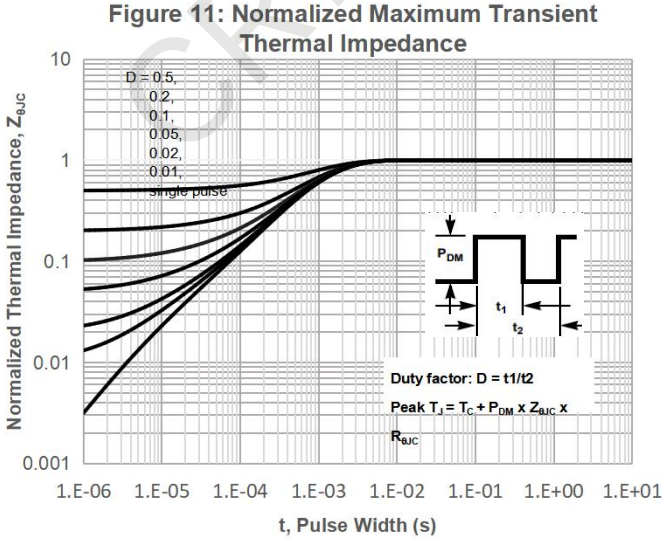
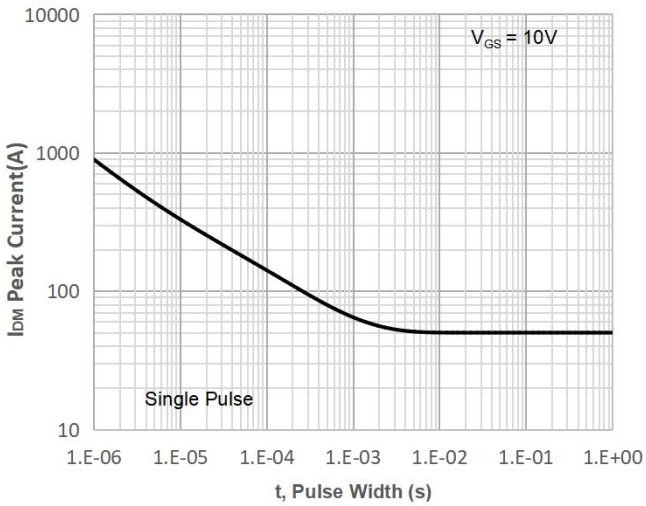


Figure 12: Peak Current Capacity



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Test Circuit

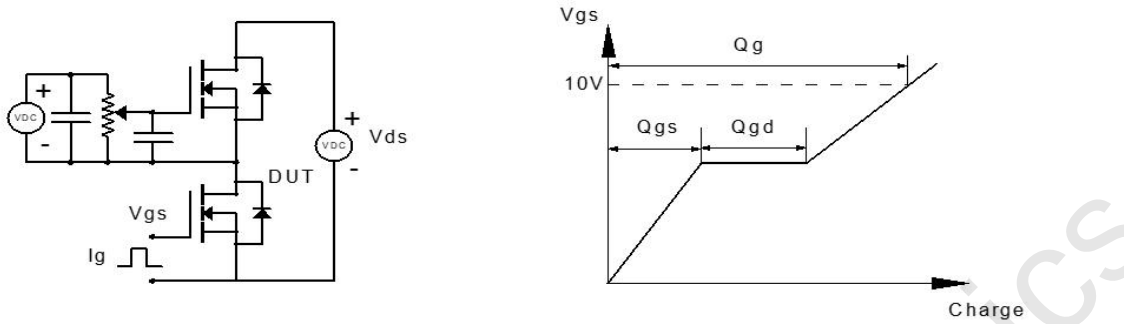

Figure 1: Gate Charge Test Circuit & Waveform

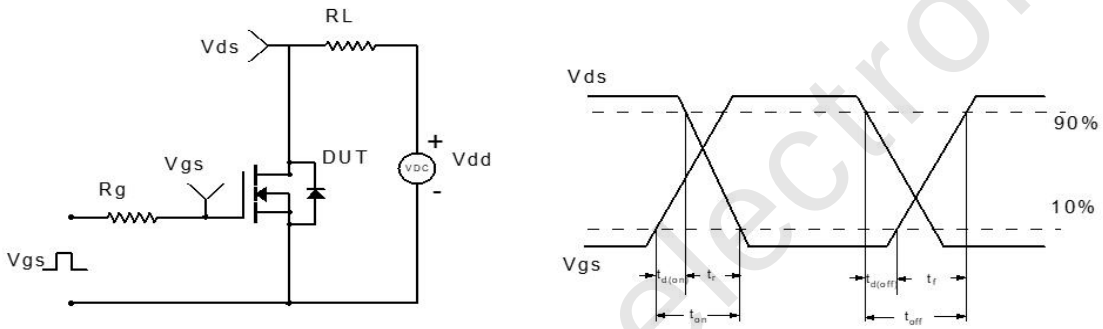

Figure 2: Resistive Switching Test Circuit & Waveform

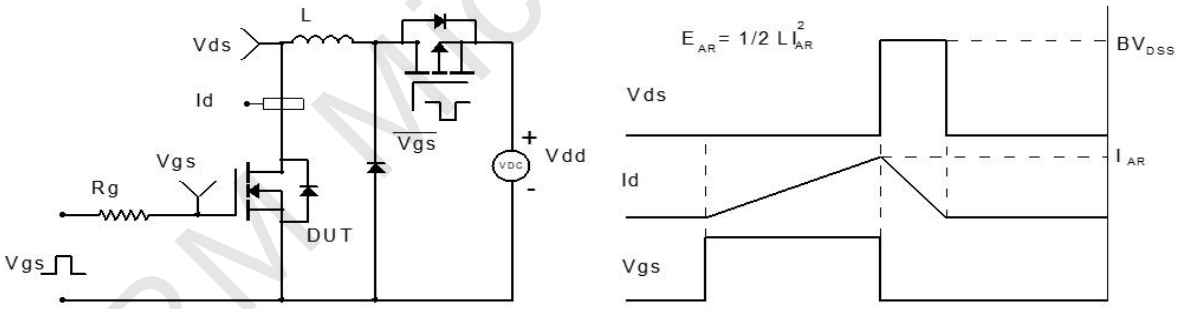

Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

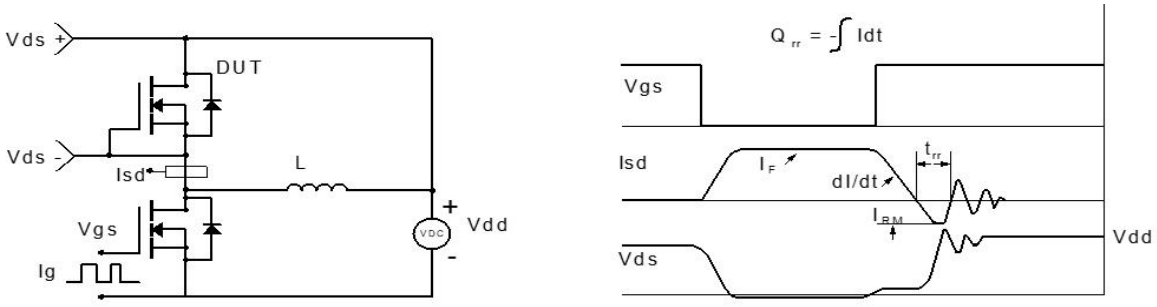

Figure 4: Diode Recovery Test Circuit & Waveform

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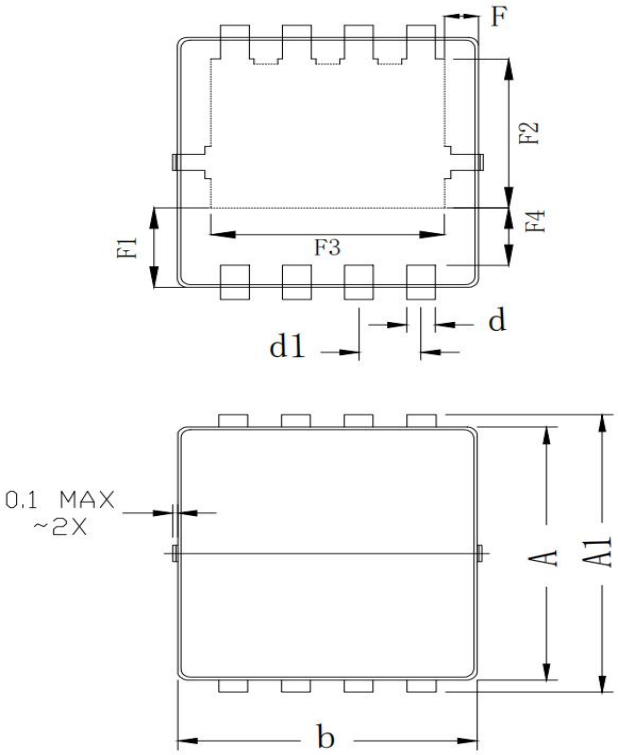
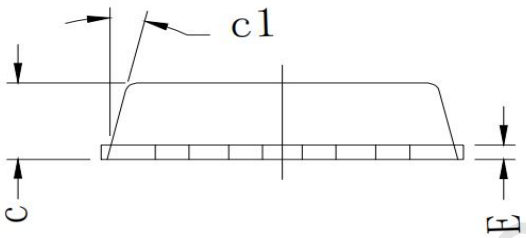
Package Mechanical Data(PDFN3.3x3.3-8L)





COMMON DIMENSION (MM)			
PKG	PDFN 3.3×3.3-8L		
SYMBOL	MIN	TYP	MAX
A	3.070	3.100	3.130
A1	3.300	3.400	3.500
b	3.070	3.100	3.130
c	0.770	0.800	0.830
c1	–	13°	–
d	0.275	0.300	0.325
d1	0.625	0.650	0.675
E	0.144	0.152	0.160
F	0.300	0.325	0.350
F1	0.960	0.985	1.010
F2	1.775	1.800	1.825
F3	2.425	2.450	2.475
F4	0.660	0.685	0.710

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