CRMGGL0402A

N-Channel 40V, 1.5mΩ Typ. Power MOSFET

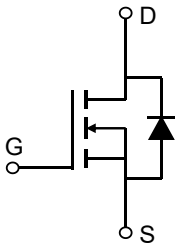
Description

Features

- 40V, 140A

  $R_{DS(ON)}$ Typ = 1.5mΩ @ V_{GS} = 10V

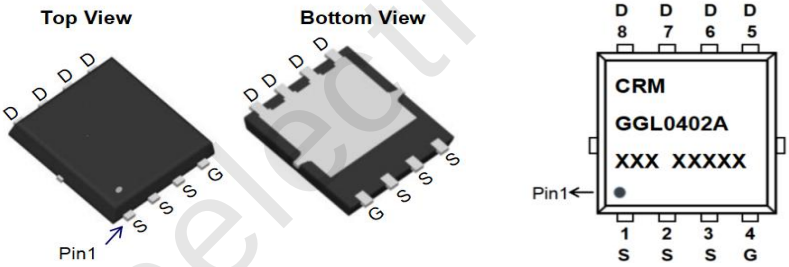
  $R_{DS(ON)}$ Typ = 2mΩ @ V_{GS} = 4.5V
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS TESTED!
- 100% ΔVds TESTED!



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)
CRMGGL0402A	CRMGGL0402A	PDFN5x6-8L	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	140	A
		T_C = 100°C	84	A
I_{DM}	Pulsed Drain Current (1)		560	A
E_{AS}	Single Pulsed Avalanche Energy (2)		196	mJ
P_D	Power Dissipation	T_C = 25°C	67.6	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.85	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

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	1.5	2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 30A	-	1.5	2	mΩ
		V_{GS} = 4.5V, I_D = 20A	-	2	2.6	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	2879	-	pF
C_{oss}	Output Capacitance		-	985	-	pF
C_{rss}	Reverse Transfer Capacitance		-	60	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 20V, I_D = 75A	-	42	-	nC
Q_{gs}	Gate Source Charge		-	10	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	7	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V, I_D= 75A, R_{GEN} = 1.6Ω	-	9	-	ns
t_r	Turn-On Rise Time		-	103	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	37	-	ns
t_f	Turn-Off Fall Time		-	129	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	140	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	560	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 20A, di/dt = 100A/us	-	38	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	19	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=28A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

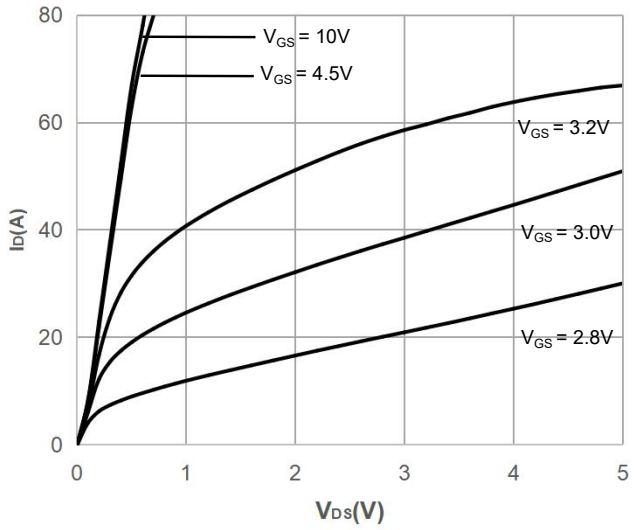


Figure 2: Typical Transfer Characteristics

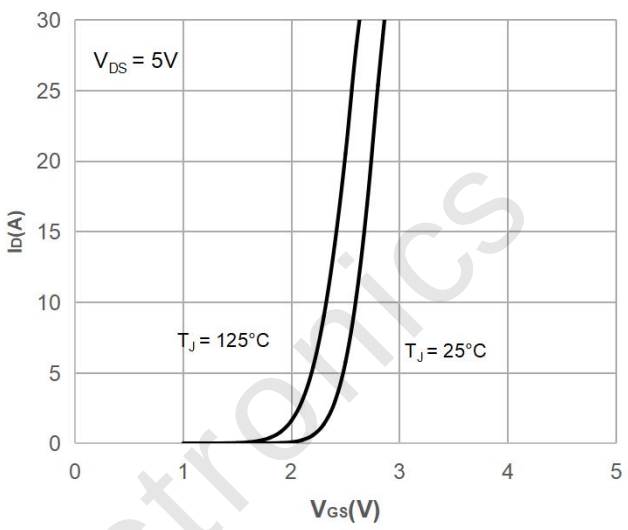


Figure 3: On-resistance vs. Drain Current

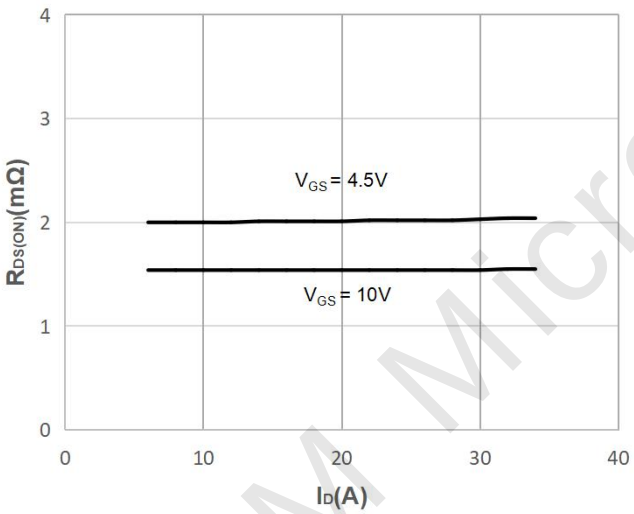


Figure 4: Body Diode Characteristics

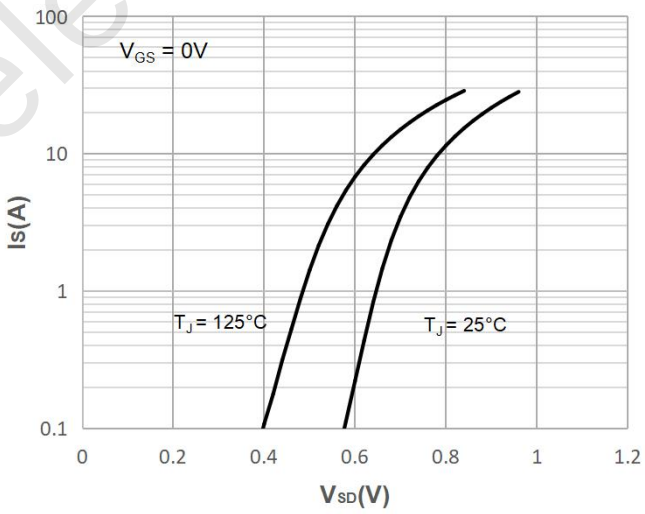


Figure 5: Gate Charge Characteristics

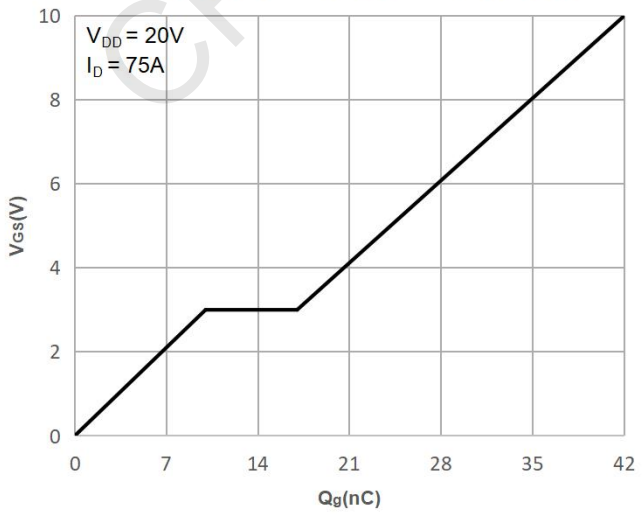
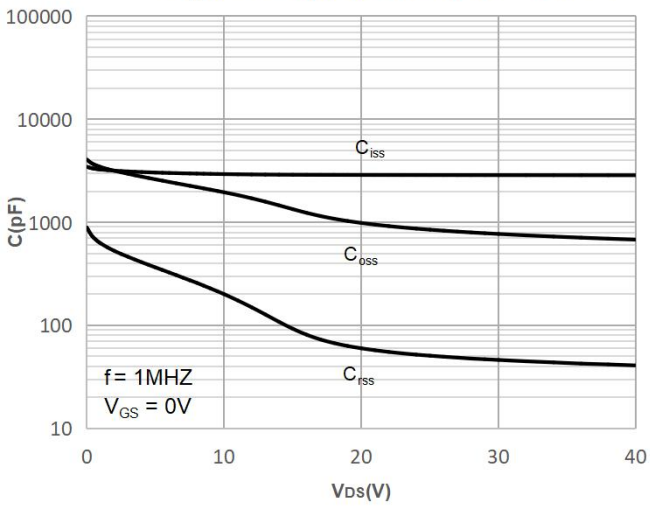


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

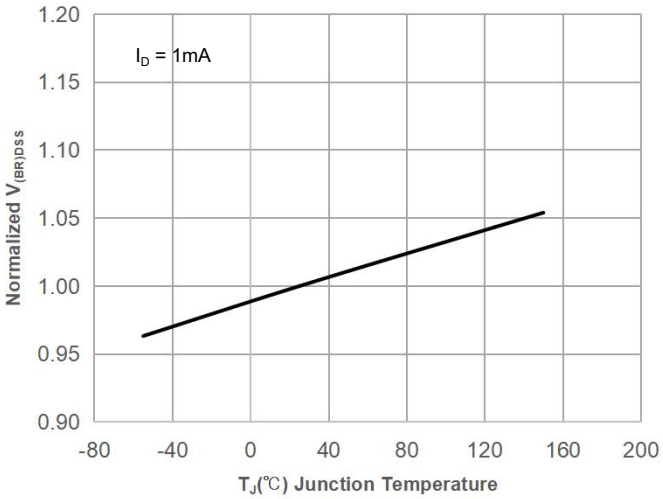


Figure 8: Normalized on Resistance vs. Junction Temperature

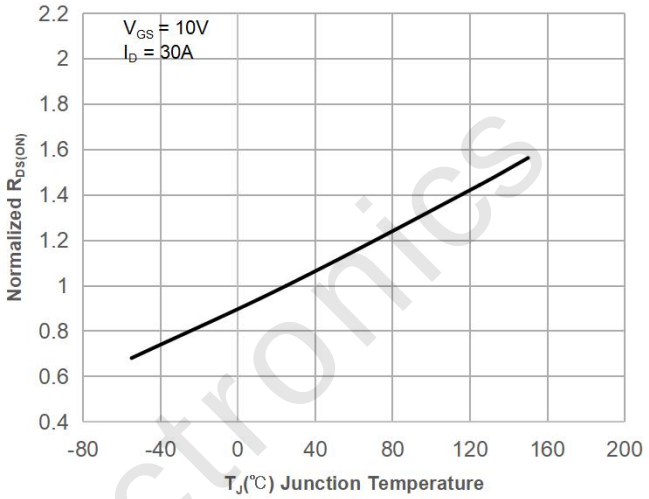


Figure 9: Maximum Safe Operating Area

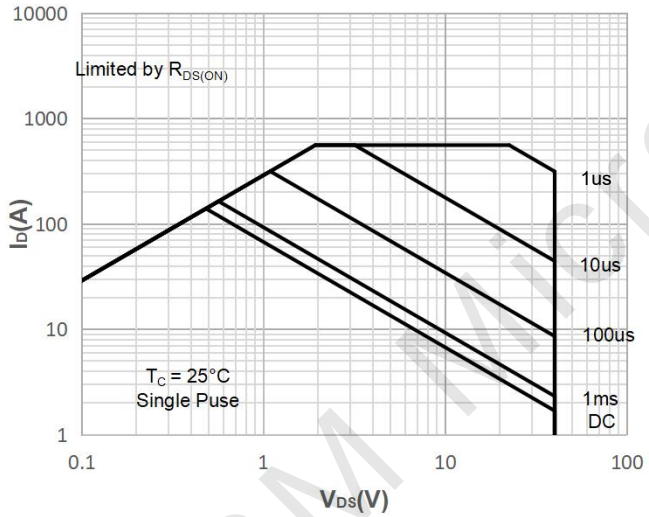


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

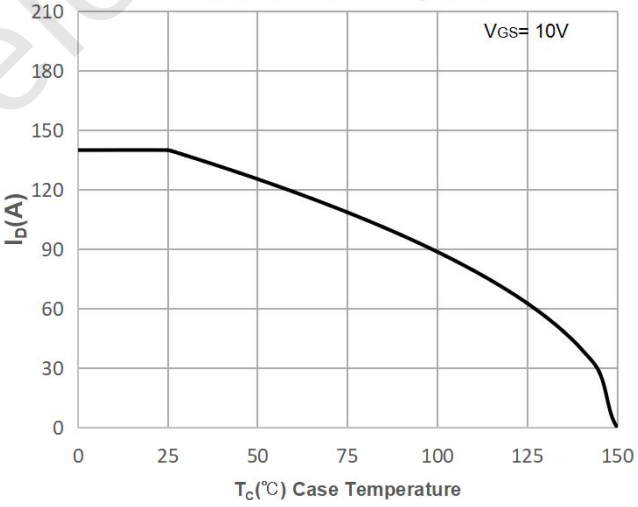


Figure 11: Normalized Maximum Transient Thermal Impedance

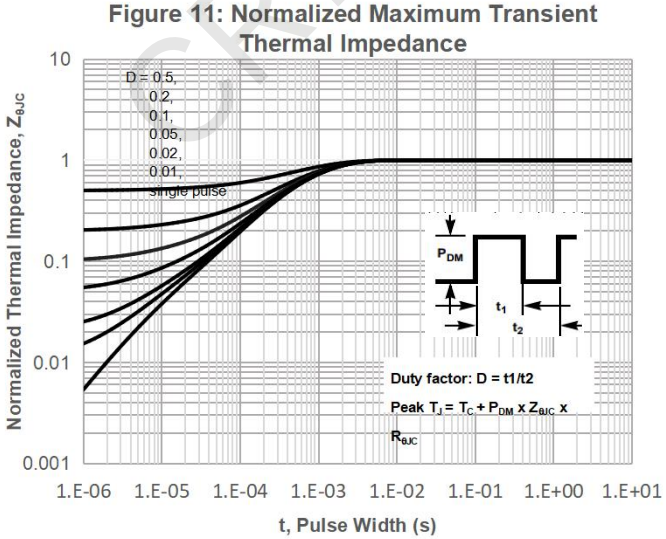
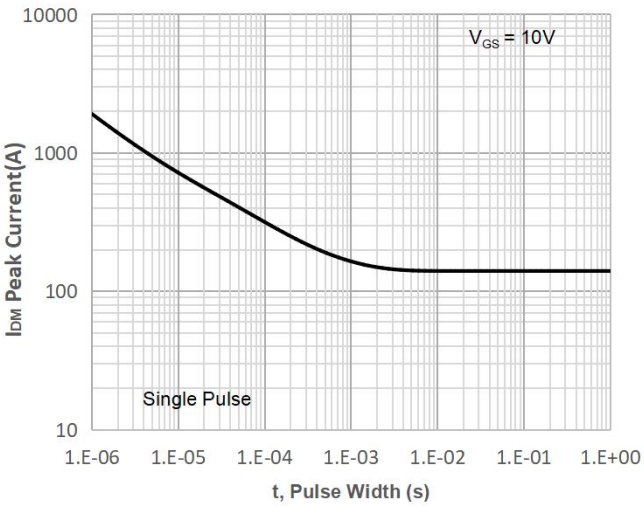


Figure 12: Peak Current Capacity



Test Circuit

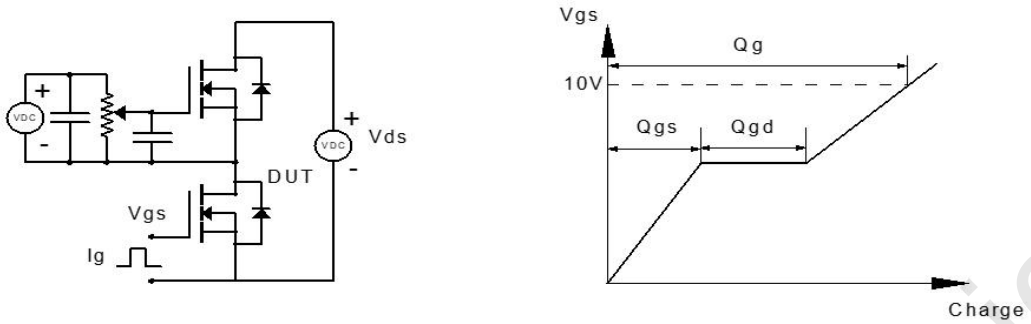


Figure 1: Gate Charge Test Circuit & Waveform

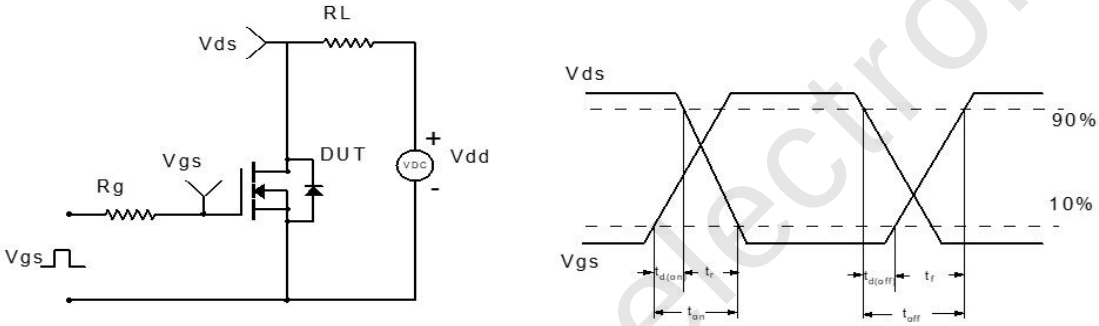


Figure 2: Resistive Switching Test Circuit & Waveform

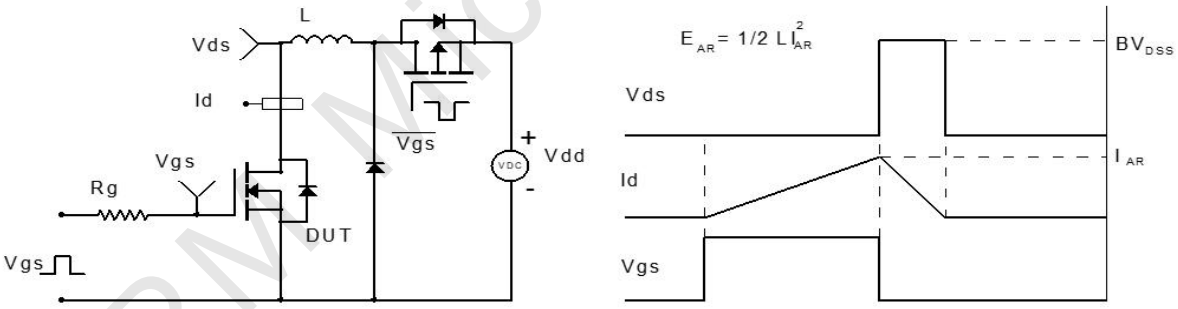


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

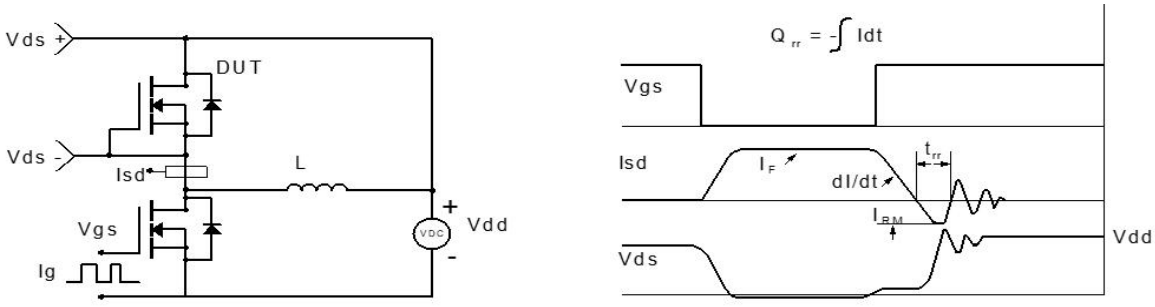
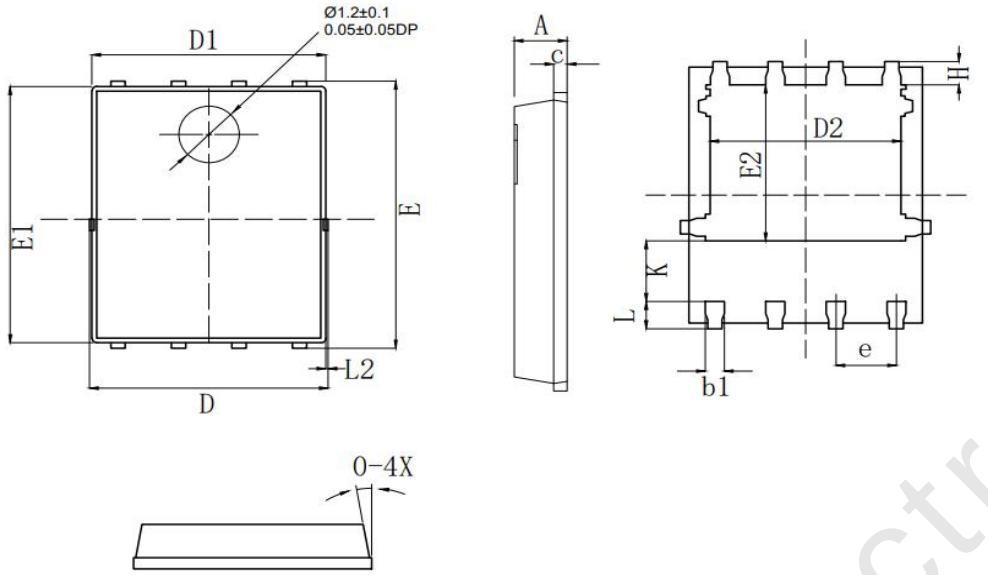


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN5x6-8L)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.30	0.35
b1	0.30	0.40	0.45
c	0.22	0.25	0.28
D	——	——	5.30
D1	4.90	5.05	5.20
D2		3.90REF	
E	6.00	6.15	6.30
E1	5.70	5.85	6.00
E2		3.50REF	
e	1.10	1.27	1.40
H	0.51	0.61	0.71
K	1.10	——	——
L	0.51	0.61	0.71
L2	——	——	0.10
Φ	8°	——	12°

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