CRMTGH0401A

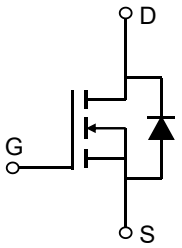
N-Channel 40V, 1.2mΩ Typ. Power MOSFET

Description

Features

- 40V, 250A

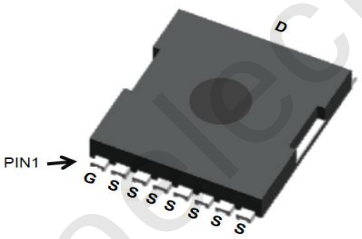
  $R_{DS(ON)}$ Typ = 1.2mΩ @ V_{GS} = 10V
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS TESTED!
- 100% ΔVds TESTED!

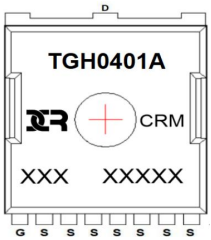


Schematic Diagram

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)
CRMTGH0401A	CRMTGH0401A	TOLL	TAPING	13"	2000	10000

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	250	A
		T_C = 100°C	150	A
I_{DM}	Pulsed Drain Current (1)		1000	A
E_{AS}	Single Pulsed Avalanche Energy (2)		576	mJ
P_D	Power Dissipation	T_C = 25°C	156	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.8	°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	2.4	3	3.6	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 30A	-	1.2	1.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	4495	-	pF
C_{oss}	Output Capacitance		-	2100	-	pF
C_{rss}	Reverse Transfer Capacitance		-	213	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 50A	-	50	-	nC
Q_{gs}	Gate Source Charge		-	17	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	14	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V I_D= 50A, R_{GEN} = 1.6Ω	-	10	-	ns
t_r	Turn-On Rise Time		-	5	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	20	-	ns
t_f	Turn-Off Fall Time		-	6	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	250	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	1000	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 = 50A, di/dt = 100A/us	-	21	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	59	-	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}=48A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

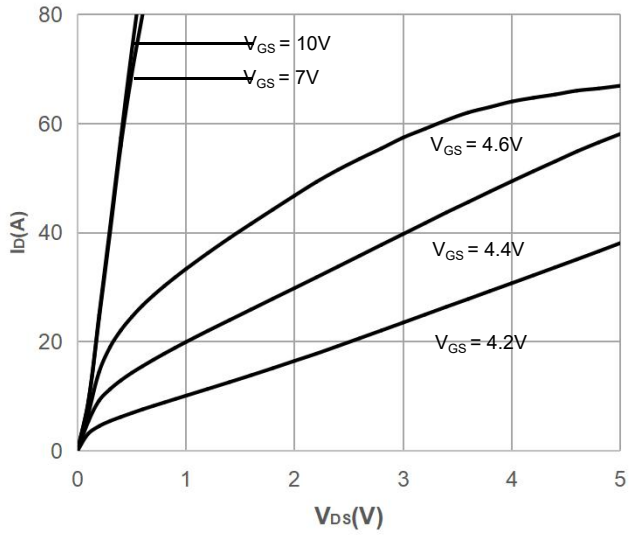


Figure 2: Typical Transfer Characteristics

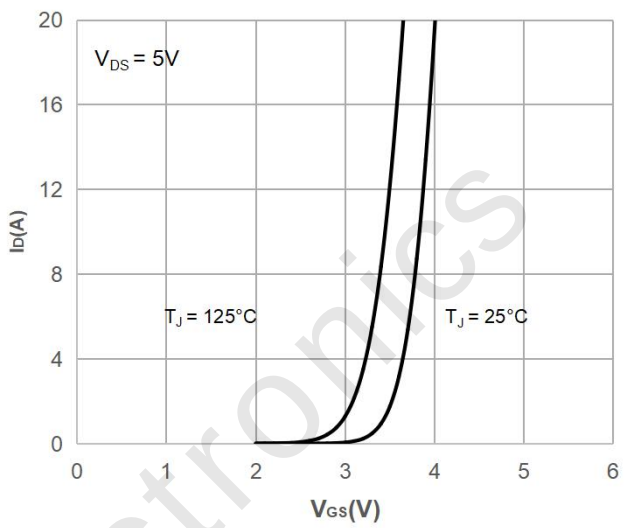


Figure 3: On-resistance vs. Drain Current

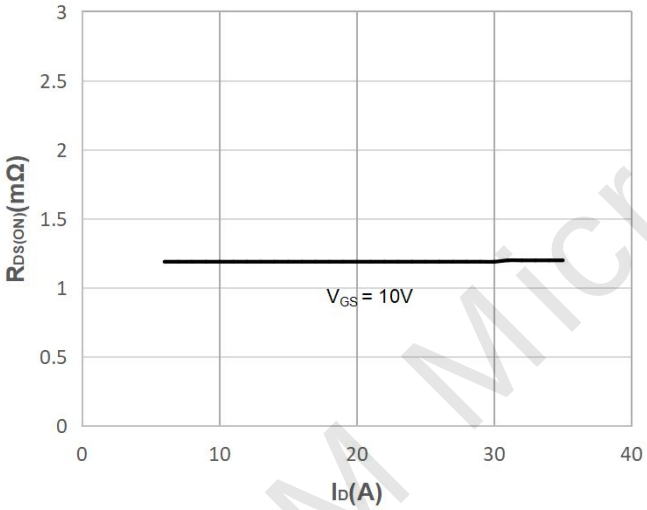


Figure 4: Body Diode Characteristics

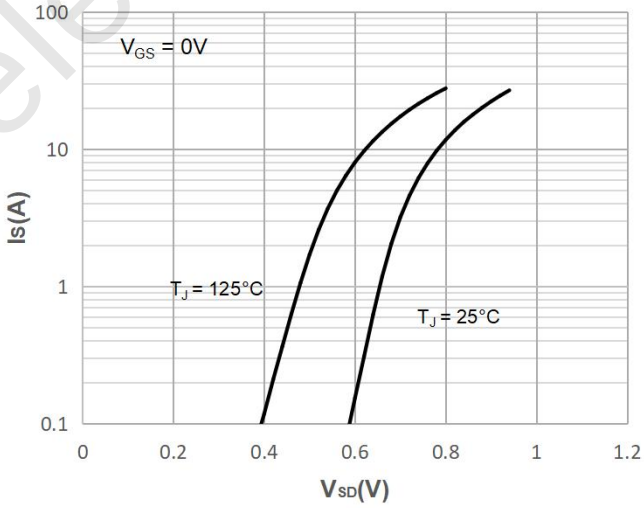


Figure 5: Gate Charge Characteristics

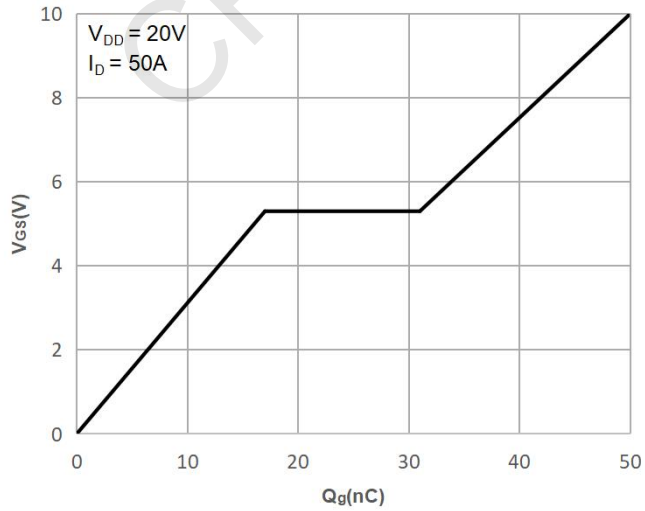
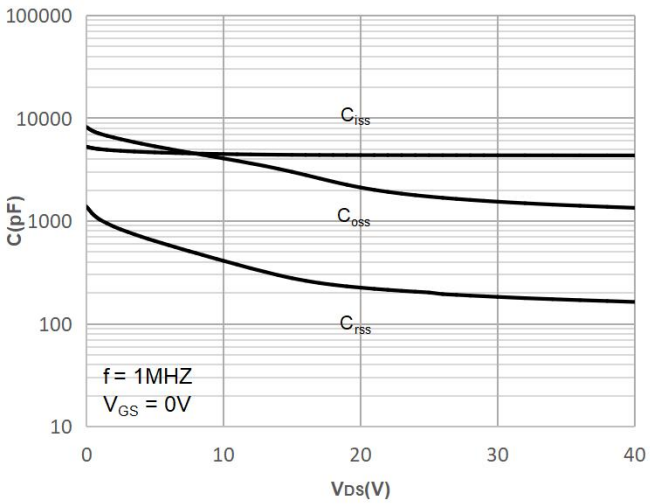


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

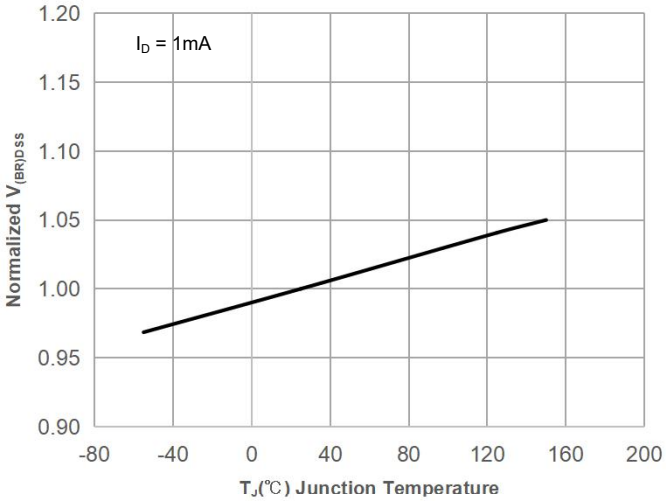


Figure 8: Normalized on Resistance vs. Junction Temperature

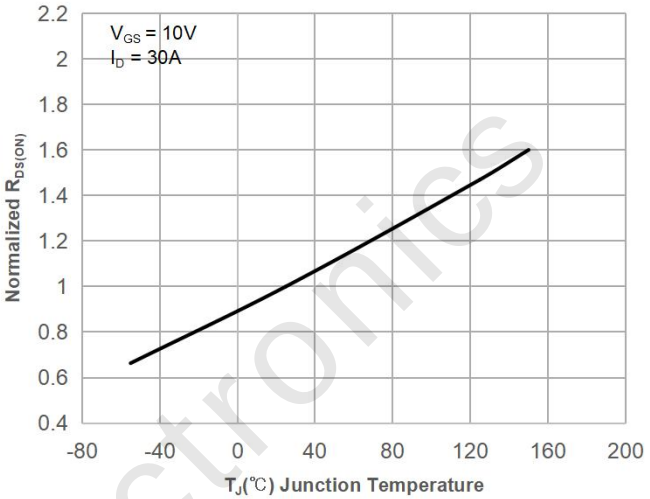


Figure 9: Maximum Safe Operating Area

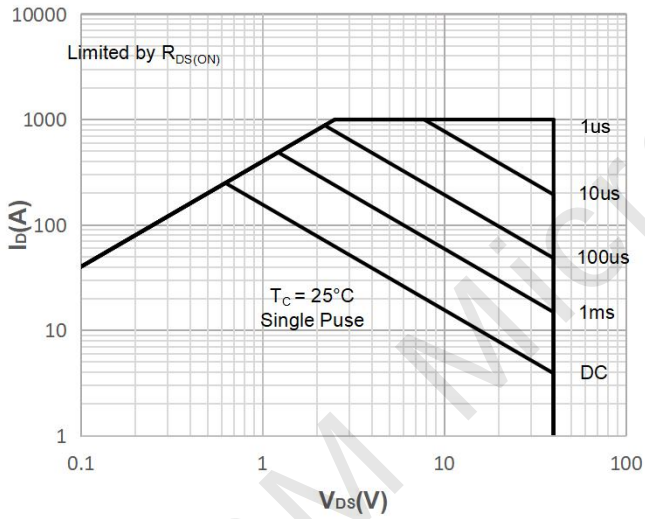


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

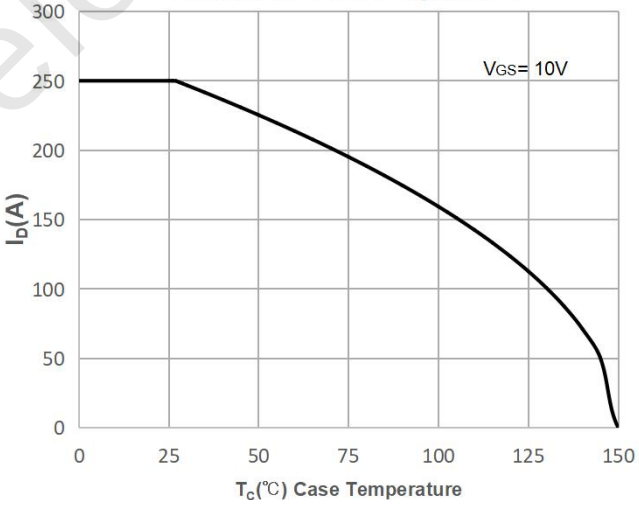


Figure 11: Normalized Maximum Transient Thermal Impedance

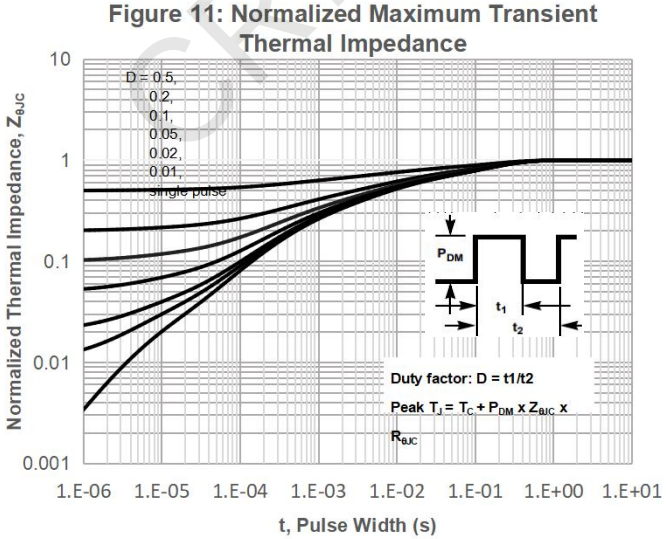
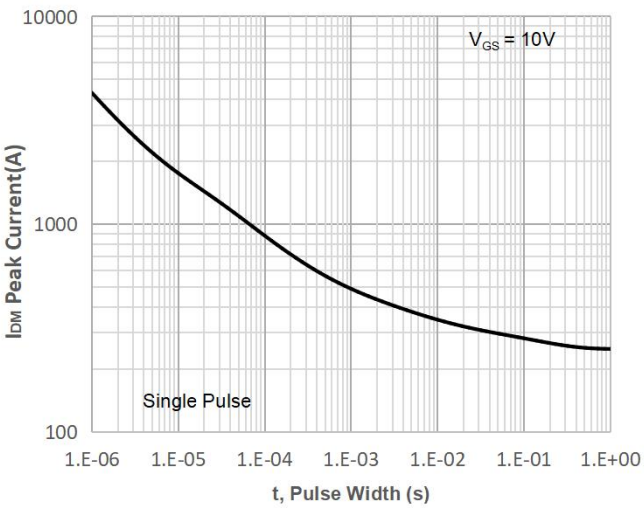


Figure 12: Peak Current Capacity



Test Circuit

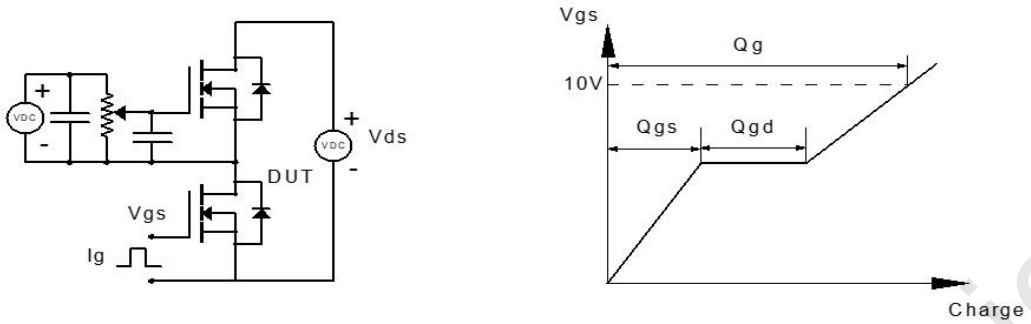


Figure 1: Gate Charge Test Circuit & Waveform

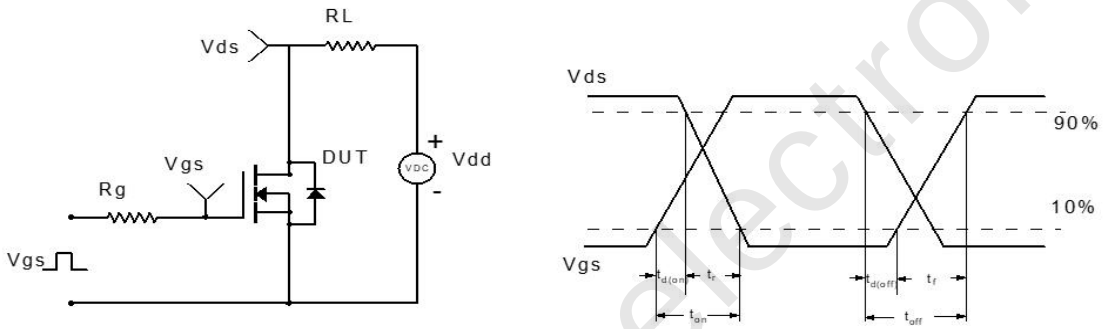


Figure 2: Resistive Switching Test Circuit & Waveform

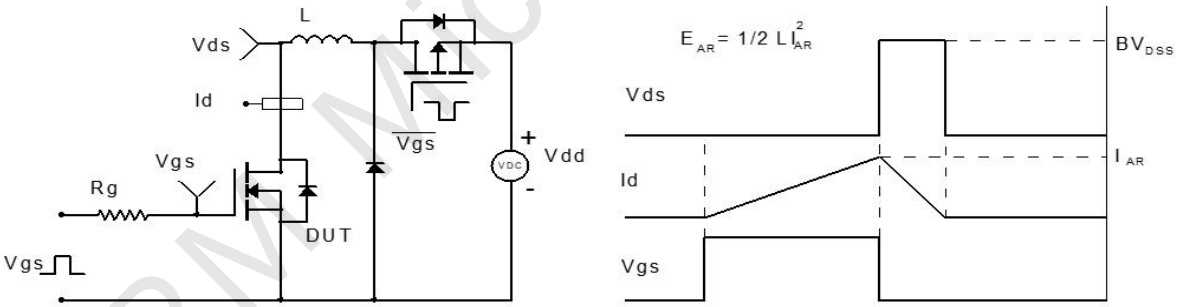


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

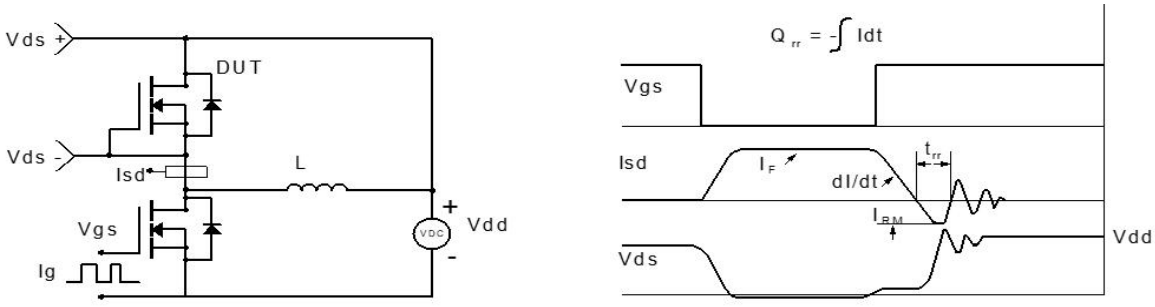
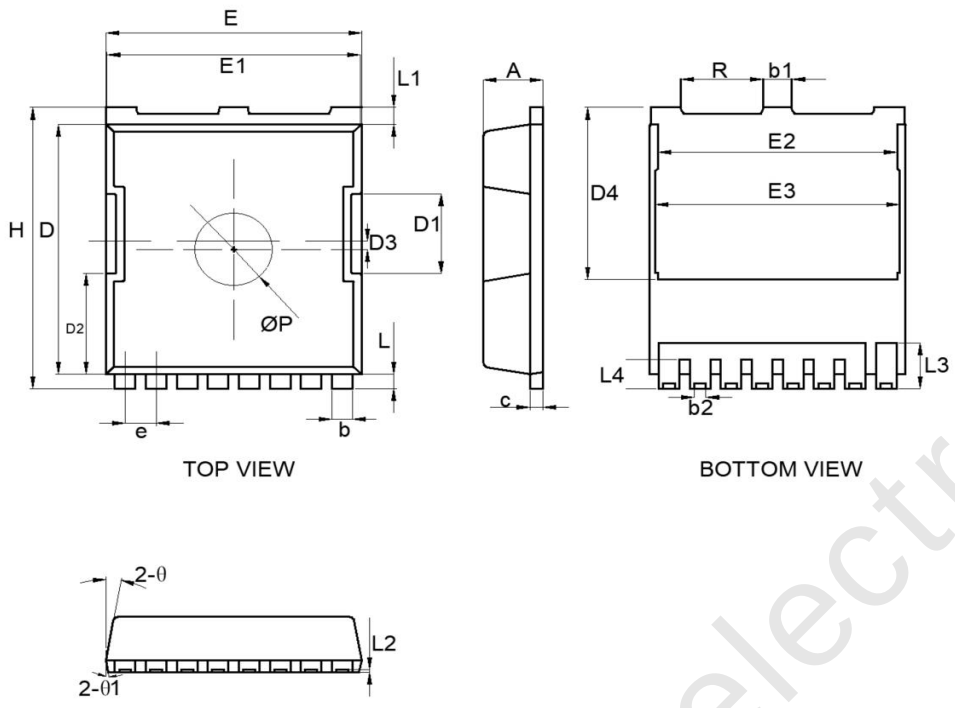


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TOLL)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.60	0.70	0.80
b1	1.10	1.20	1.30
b2		0.36 REF.	
c	0.40	0.50	0.60
D	10.30	10.40	10.50
D1	3.20	3.30	3.40
D2	4.08	4.18	4.28
D3	0.53	0.63	0.73
D4		7.35 REF.	
E	9.80	9.90	10.00
E1	9.70	9.80	9.90
E2		8.80 REF.	
E3		8.95 REF.	
e		1.20 BSC.	
H	11.50	11.70	11.90
L	0.50	0.60	0.70
L1	0.60	0.70	0.80
L2		0.10 REF.	
L3		1.27 REF.	
L4		1.10 REF.	
P	2.00	3.00	4.00
R	3.00	3.10	3.20
θ	7°	9°	11°
θ1	3°	5°	7°

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