

Product Summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
32	2.2 @ $V_{GS} = 10V$	50 ^(G)

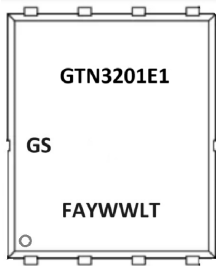
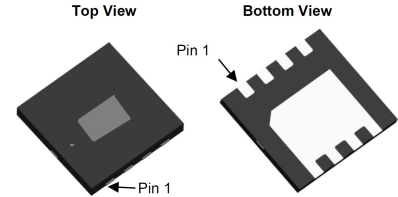
Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

- DC/DC conversion
- Power switch
- Motor drives
- Li- Battery Protection

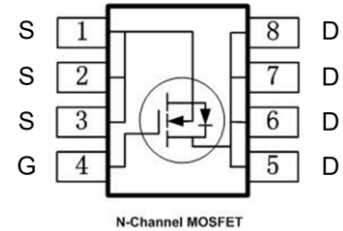
DFN3333



DFN3333

NOTE:
 LOGO - GS
 GTN3201E1- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

Equivalent circuit



Absolute maximum rating@25°C

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	32	V
Gate-source voltage	V_{GS}	±20	
Continuous drain current ^(G)	I_D	50	A
	$T_C=100^{\circ}C^{(G)}$	35	
Pulsed drain current ^(C)	$I_{D,pulse}$	200	
Avalanche energy, single pulse ^(C) L=0.1mH	E_{AS}	174	mJ
Power dissipation ^(B)	P_D	56	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2.2	°C/W
Thermal resistance, junction-to-ambient ^(A D)	$R_{\theta JA}$	60	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	32			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V			1	μA
		T _J =55°C			5	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1.2	1.7	2.2	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A		1.8	2.2	mΩ
		T _J =125°C		2.6	3.2	
		V _{GS} =4.5V, I _D =20A		2.4	3.1	
g _{FS}	Forward Trans conductance	V _{DS} =5V, I _D =20A		97		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current				50	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =16V, f=1MHz		6360		pF
C _{oss}	Output Capacitance			540		pF
C _{rss}	Reverse Transfer Capacitance			410		pF
R _g	Gate resistance	f=1MHz	1.4	2.9	4.4	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =16V, I _D =20A		105		nC
Q _{gs}	Gate Source Charge			18		nC
Q _{gd}	Gate Drain Charge			16		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =16V, R _L =0.8Ω, R _{GEN} =3Ω		10		ns
t _r	Turn-On Rise Time			9		ns
t _{D(off)}	Turn-Off Delay Time			100		ns
t _f	Turn-Off Fall Time			23		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=500A/μs		14		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=500A/μs		30		nC

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on R_{θJA} ≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature T_{J(MAX)}=150° C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

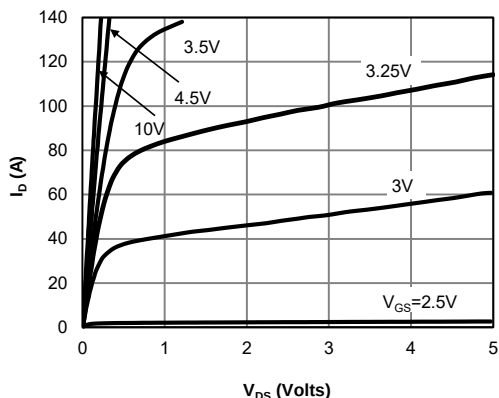


Figure 1: On-Region Characteristics (Note E)

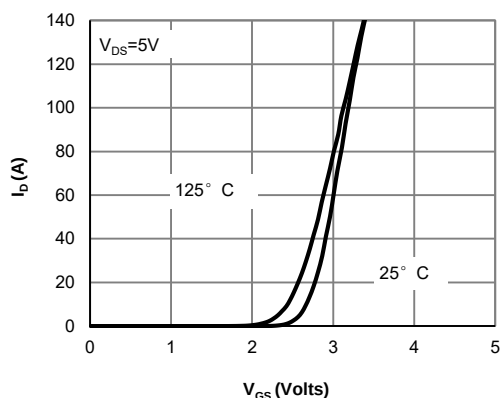


Figure 2: Transfer Characteristics (Note E)

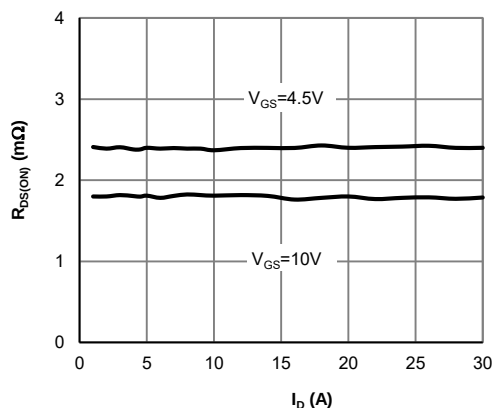


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

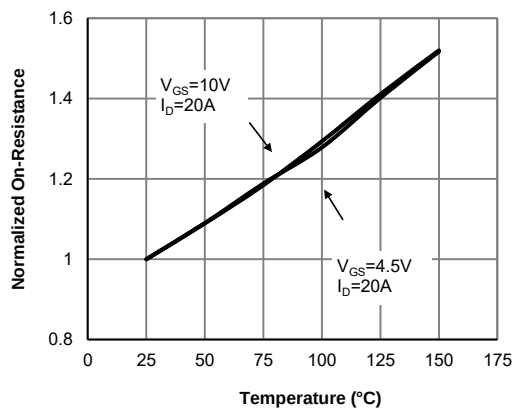


Figure 4: On-Resistance vs. Junction Temperature (Note E)

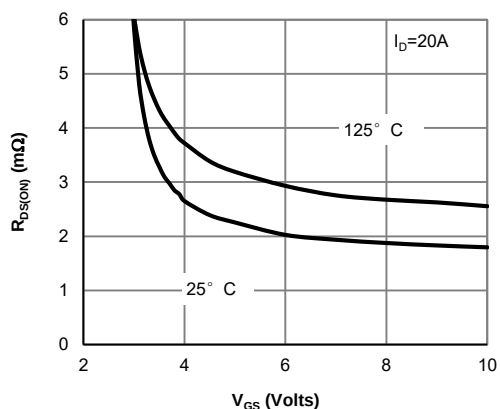


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

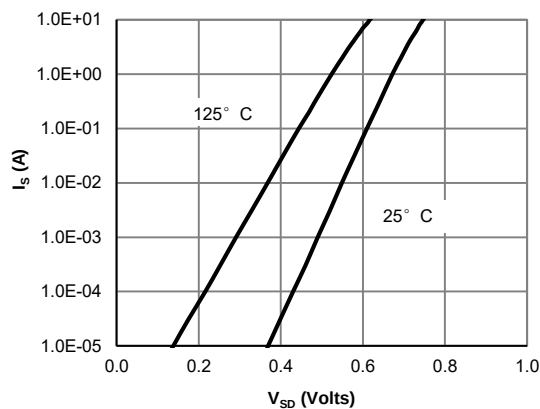


Figure 6: Body-Diode Characteristics (Note E)

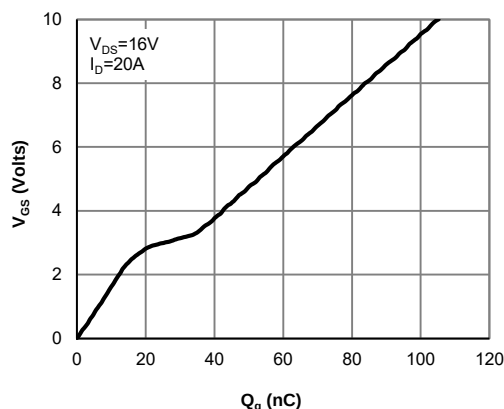


Figure 7: Gate-Charge Characteristics

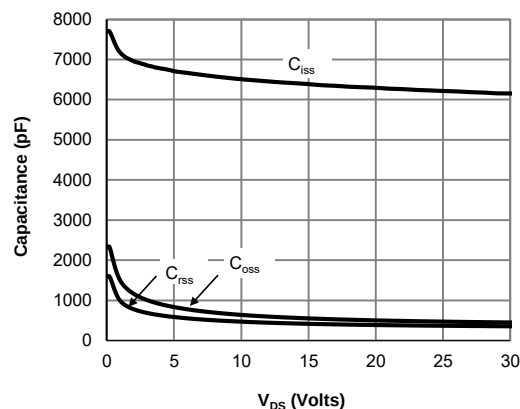


Figure 8: Capacitance Characteristics

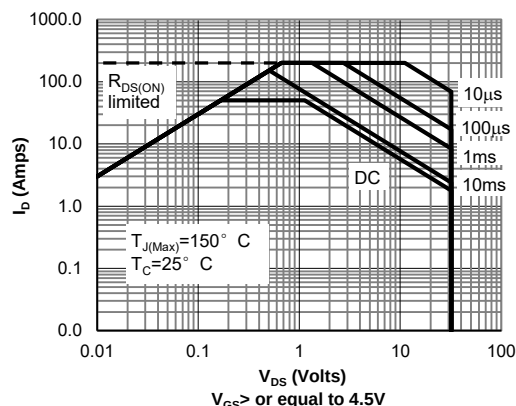


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

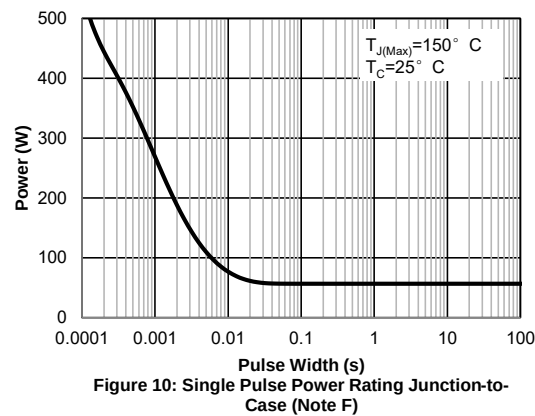


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

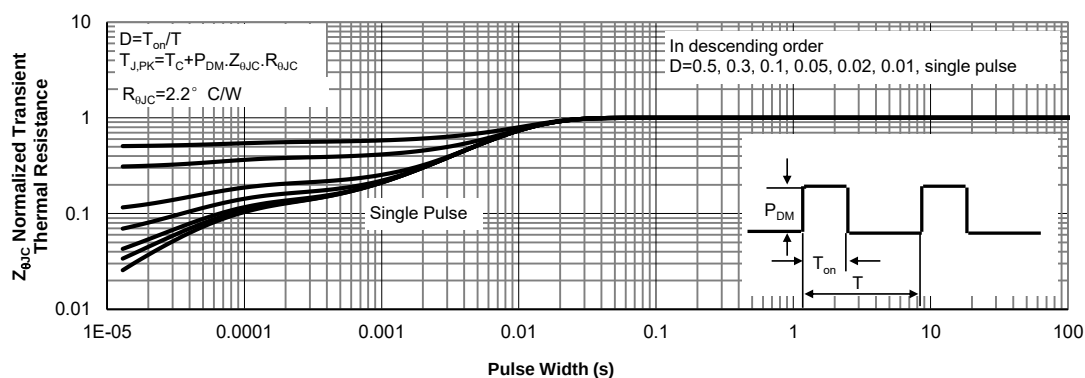


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

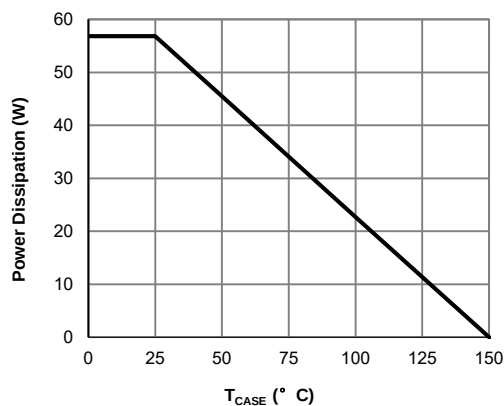


Figure 12: Power De-rating (Note F)

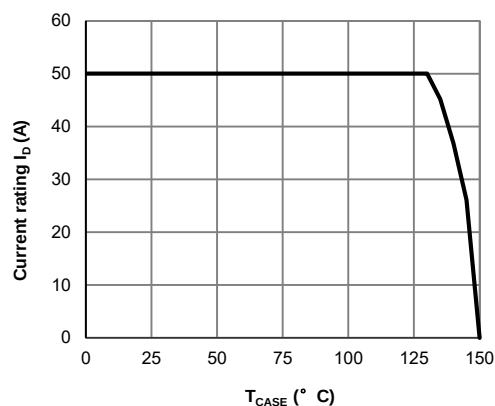


Figure 13: Current De-rating (Note F)

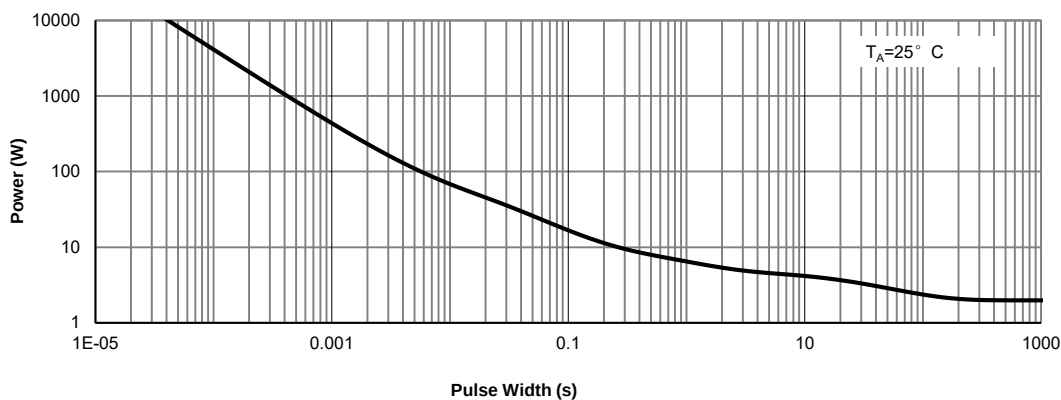


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

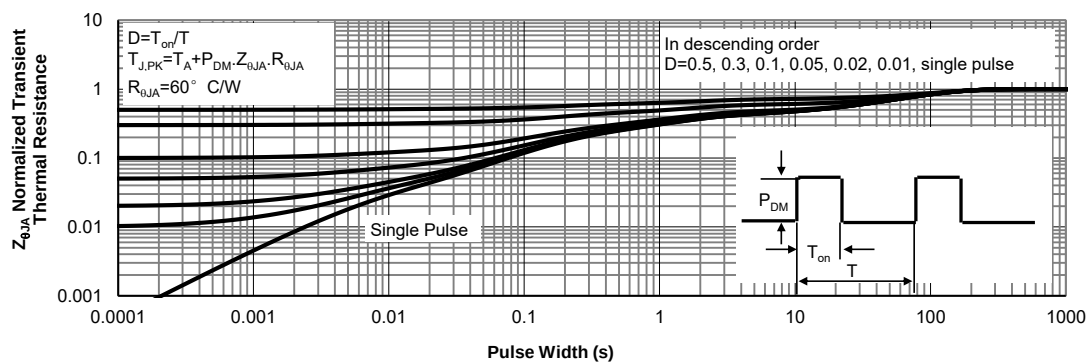


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Test Circuit

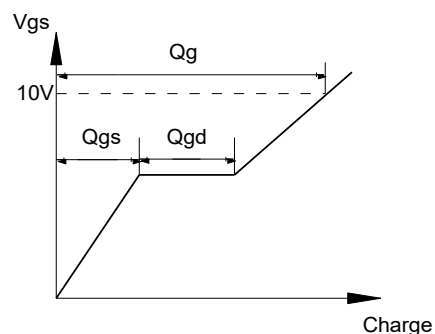
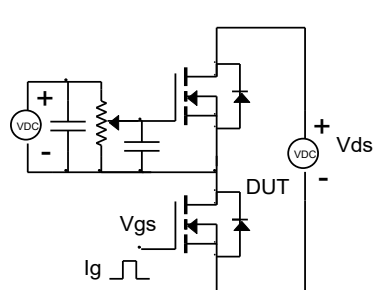


Figure B: Resistive Switching Test Circuit & Waveforms

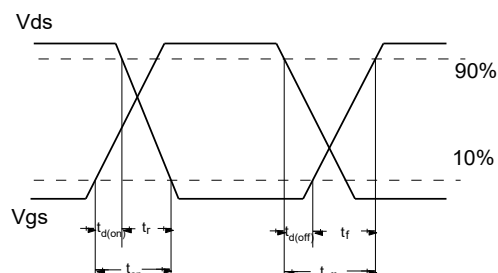
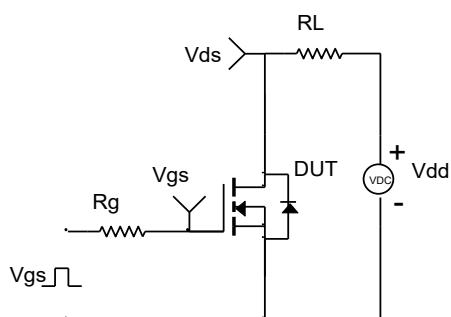


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

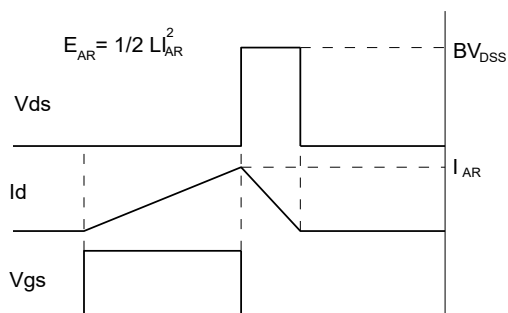
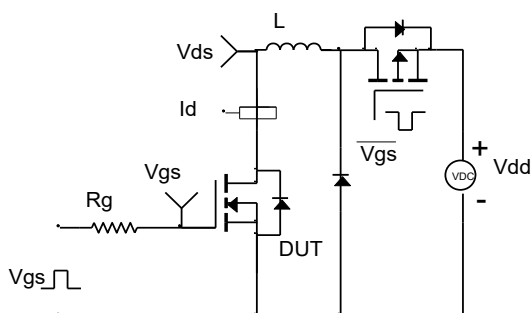
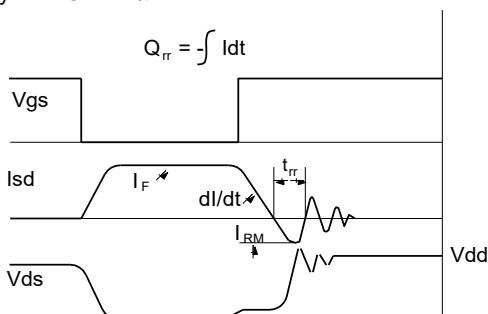
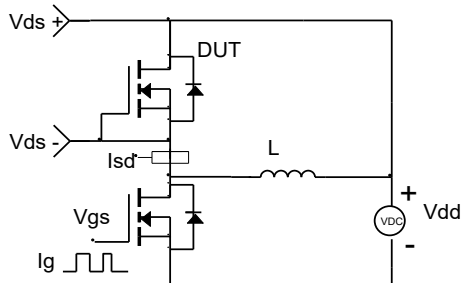
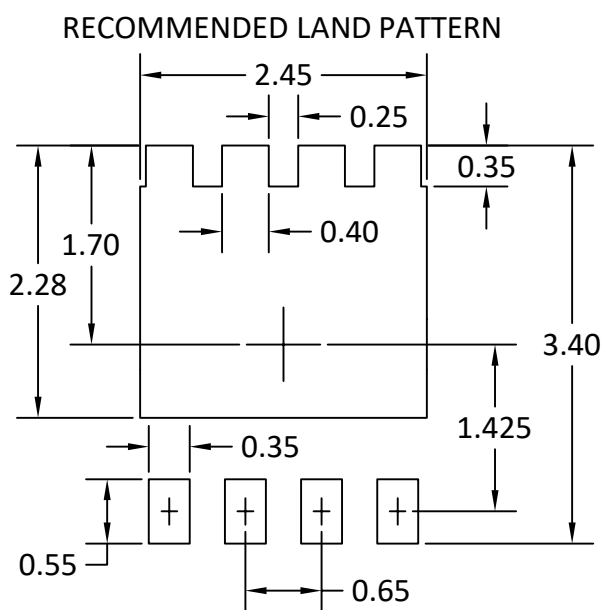
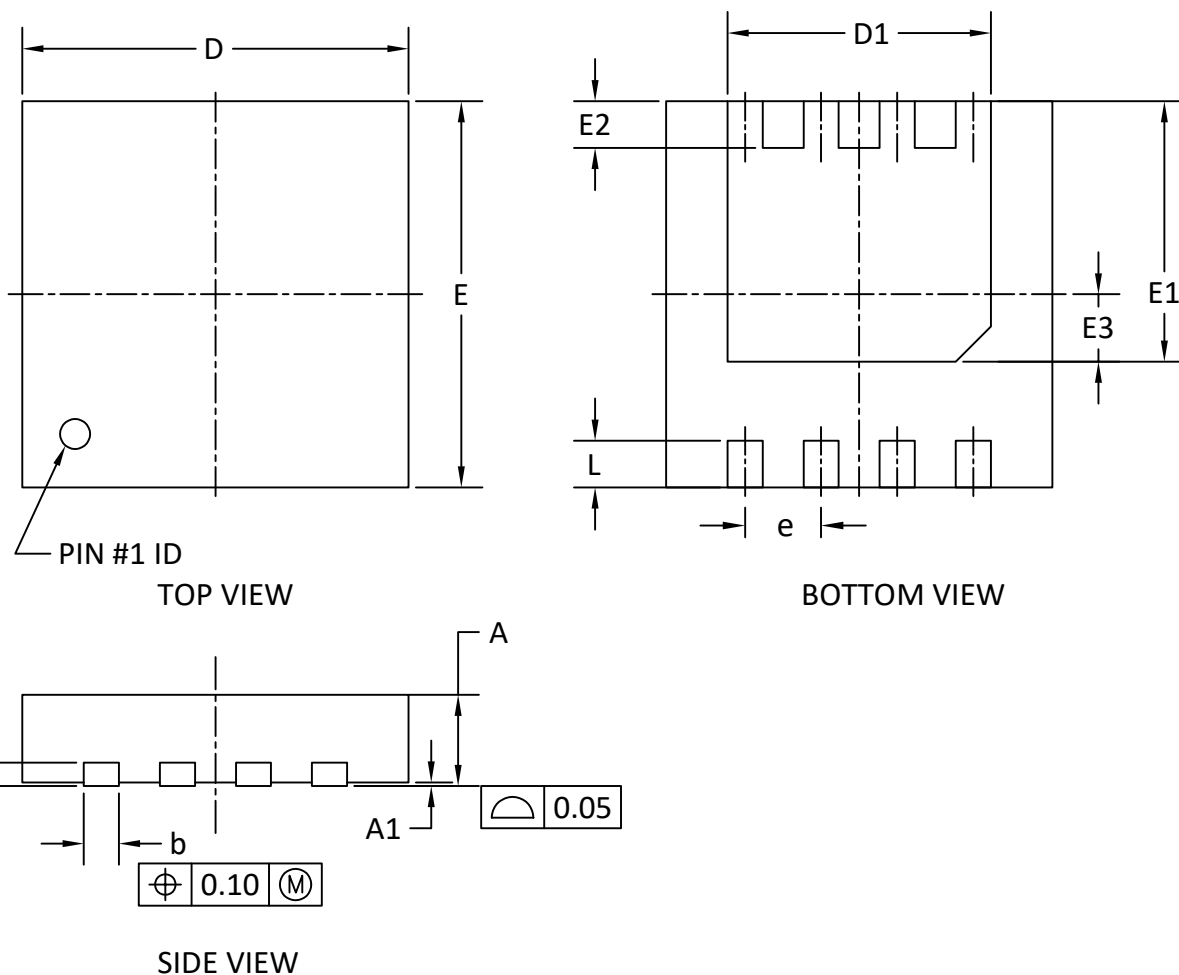


Figure D: Diode Recovery Test Circuit & Waveforms



Package outline:DFN3333



UNIT: mm

SYMBOL	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.028	0.030	0.032
A1	---	---	0.05	---	---	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.10	0.15	0.25	0.004	0.006	0.010
D	3.20	3.30	3.40	0.126	0.130	0.134
D1	2.15	2.25	2.35	0.085	0.089	0.093
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	2.13	2.23	2.33	0.084	0.088	0.092
E2	0.30	0.40	0.50	0.012	0.016	0.020
E3	0.48	0.58	0.68	0.019	0.023	0.027
e	0.65BSC			0.026BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020

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