

Product Summary

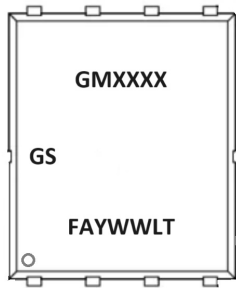
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
40	7.2 @ $V_{GS} = 10V$	42 ⁽¹⁾

Features

- Advanced Split Gate Trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

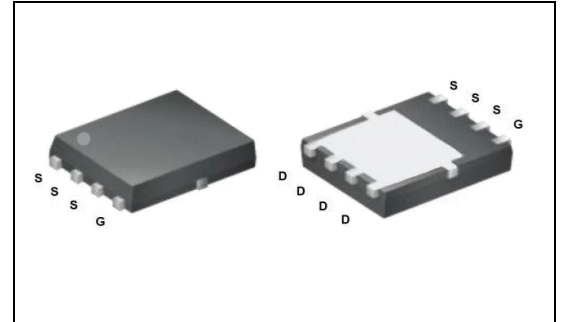
- Load Switch
- PWM Application
- Power Management



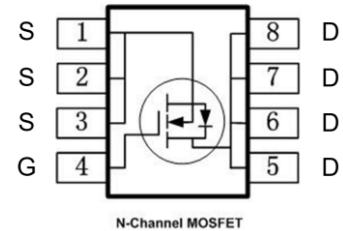
PDFN3333

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

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Equivalent circuit



Absolute maximum rating@25°C

Parameter		Symbol	Limit	Unit
Drain-source voltage		V _{DS}	40	V
Gate-source voltage		V _{GS}	±2 0	
Continuous drain current	T _C =25°C ⁽¹⁾	I _D	42	A
	T _C =100°C ⁽¹⁾		26	
Pulsed drain current ⁽²⁾		I _{D,pulse}	168	
Avalanche energy, single pulse ⁽³⁾		E _{AS}	36	mJ
Power dissipation	T _C =25°C	P _D	22	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	$R_{\theta JC}$	5.7	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	48	

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

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0, I _D = 250 μA	40			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.1	1.6	2.2	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		6.4	8.3	mΩ
		V _{GS} = 4.5 V, I _D = 20 A		9.1	11.8	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 30 A		29		S
Dynamic ⁽⁵⁾						
Total gate charge V _{GS} = 10V	Q _g	V _{DS} = 20 V, I _D = 20 A, V _{GS} = 10 V		12		nC
Gate-source charge	Q _{gs}			1.6		
Gate-drain charge	Q _{gd}			2.0		
Turn-on delay time	t _{d(on)}	V _{DS} = 20 V, I _D = 20 A, V _{GS} = 10 V, R _{GEN} = 3 Ω		4.9		ns
Rise time	t _r			2.8		
Turn-off delay time	t _{d(off)}			20		
Fall time	t _f			2.5		
Input capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		645		pF
Output capacitance	C _{oss}			320		
Reverse transfer capacitance	C _{rss}			9		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 2 A		0.8	1.2	V
Reverse recovery time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		20		ns
Reverse recovery charge	Q _{rr}			11		nC

Notes

- (1) Limited by maximum junction temperature.
- (2) Pulse width limited by maximum junction temperature.
- (3) V_{DS} = 20 V, V_{GS} = 10 V, L = 0.5 mH.
- (4) Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
- (5) Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

Figure 1: Output Characteristics

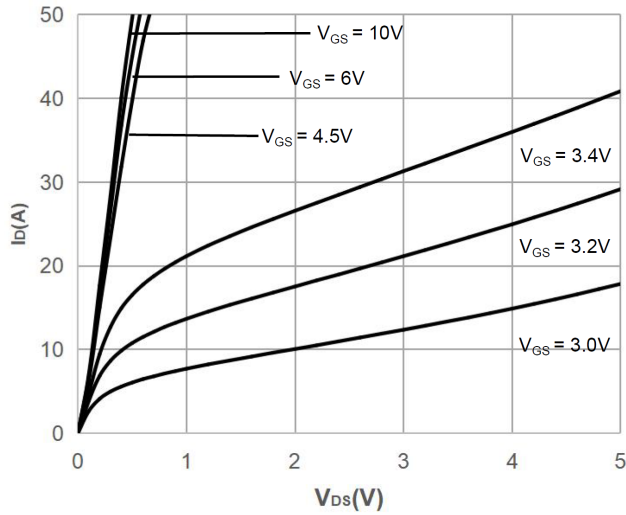


Figure 2: Typical Transfer Characteristics

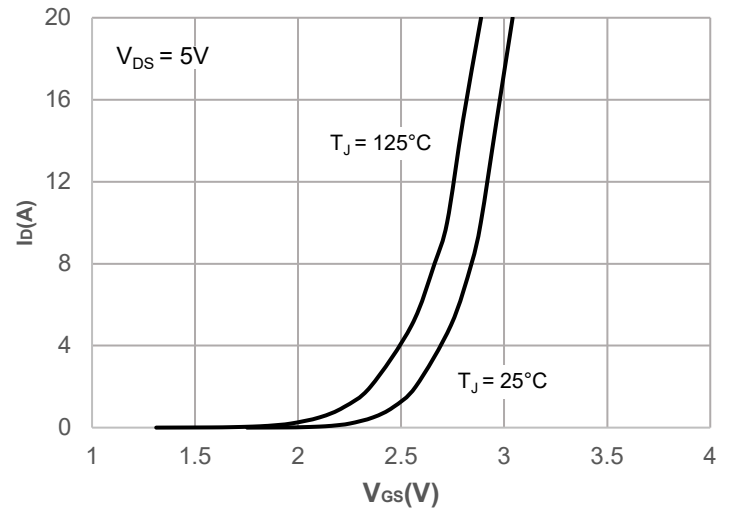


Figure 3: On-resistance vs. Drain Current

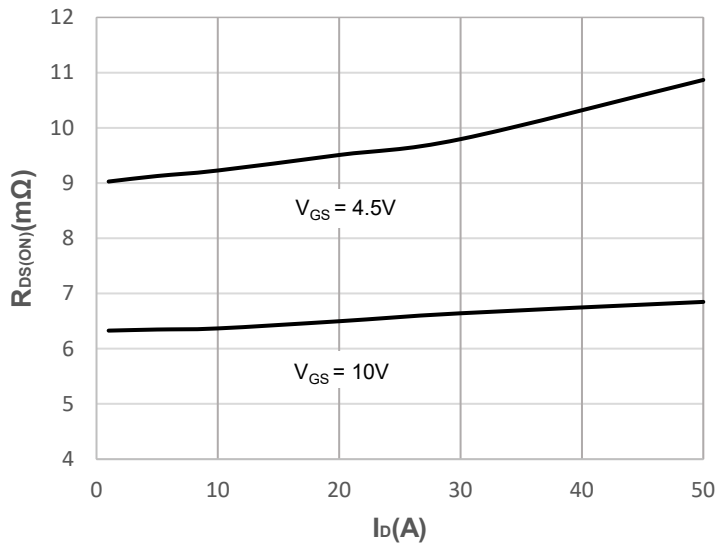
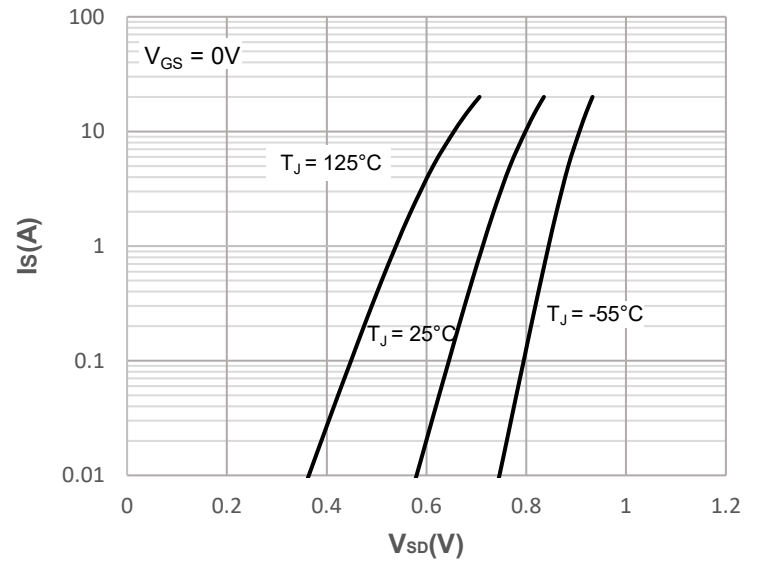


Figure 4: Body Diode Characteristics



Typical Performance Characteristics

Figure 5: Gate Charge Characteristics

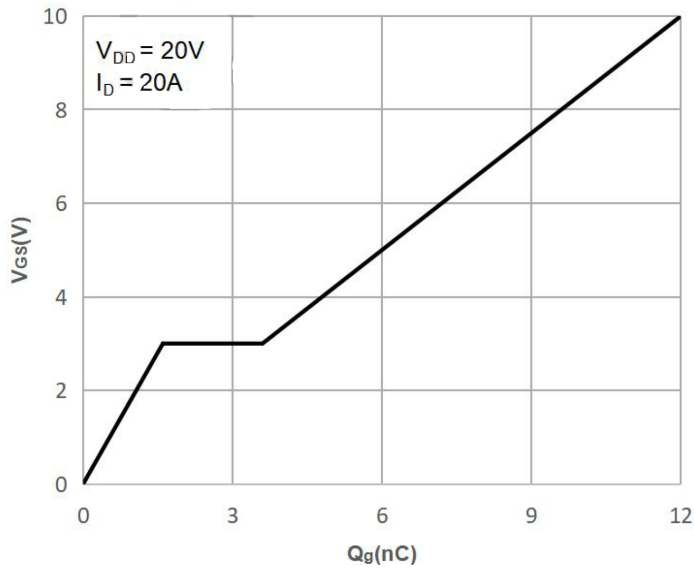


Figure 6: Capacitance Characteristics

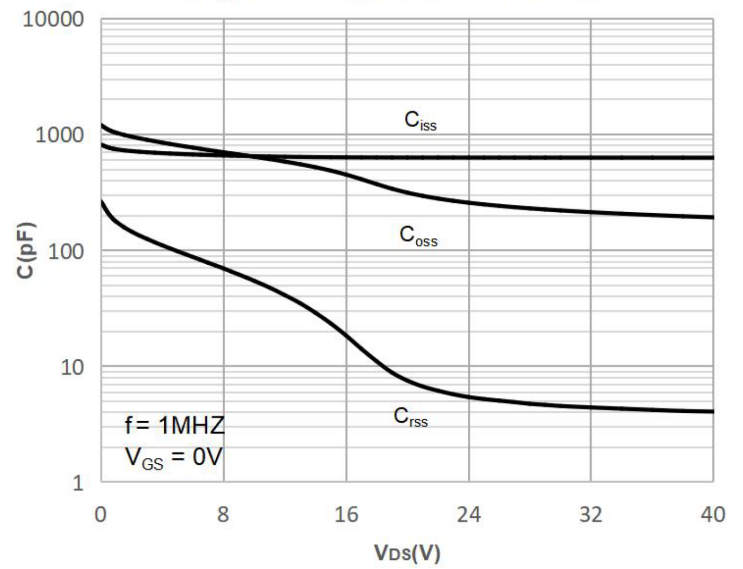


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

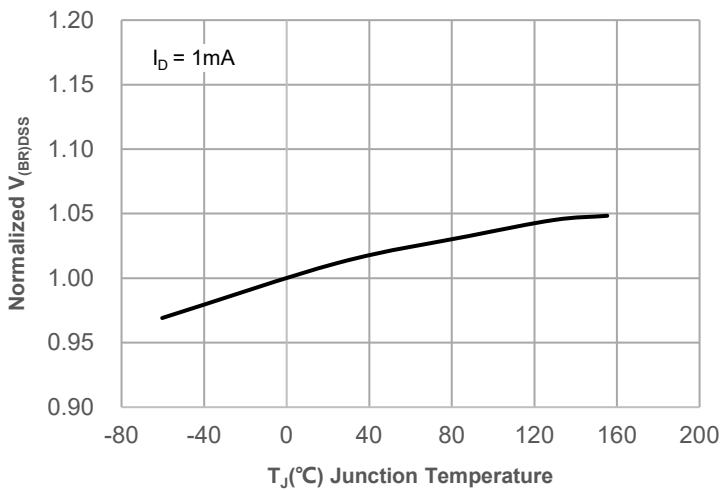
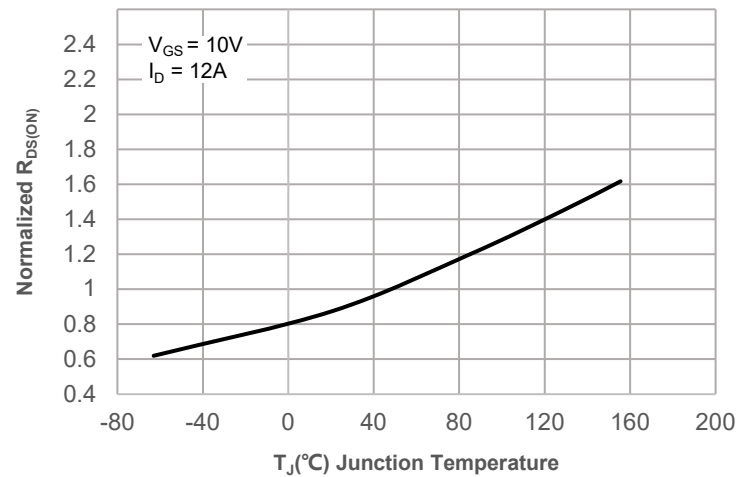
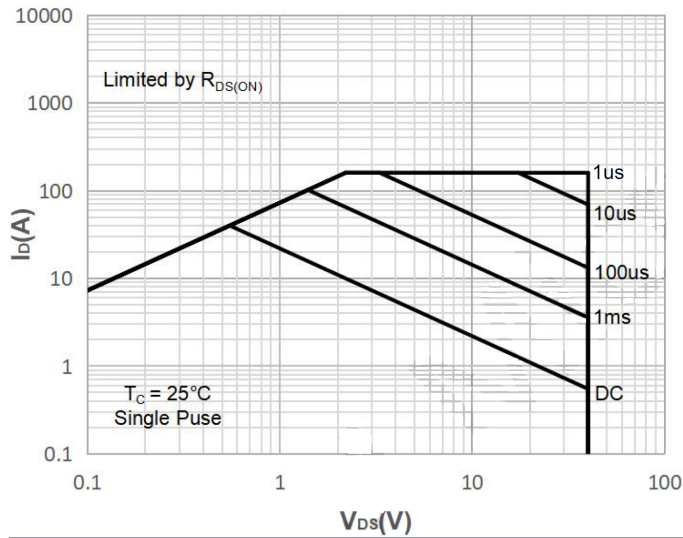
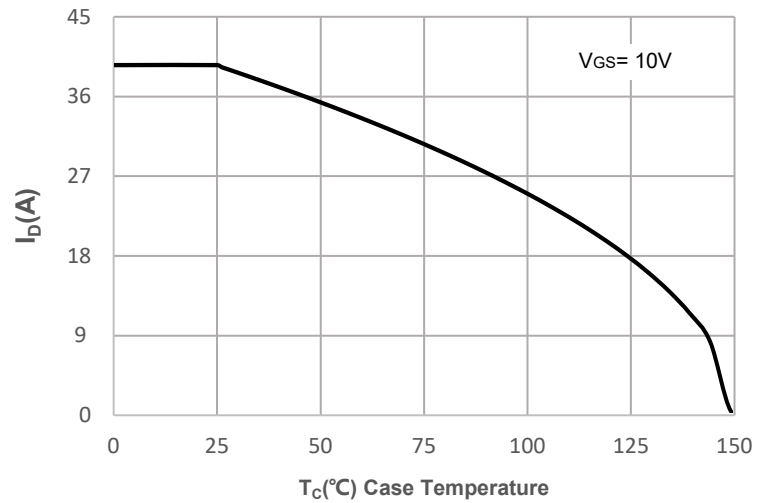
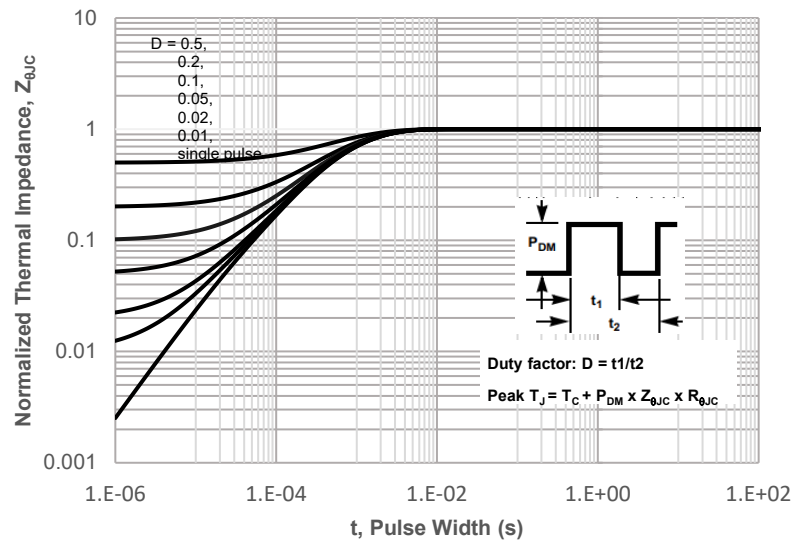


Figure 8: Normalized on Resistance vs. Junction Temperature

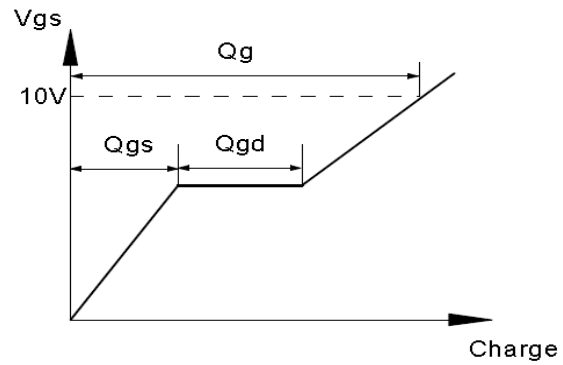
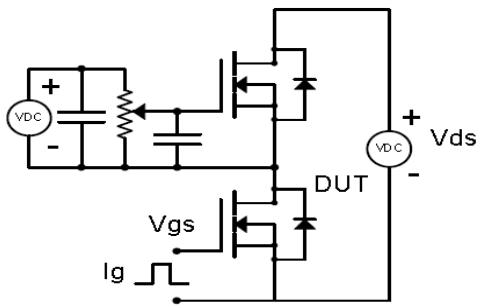


Typical Performance Characteristics

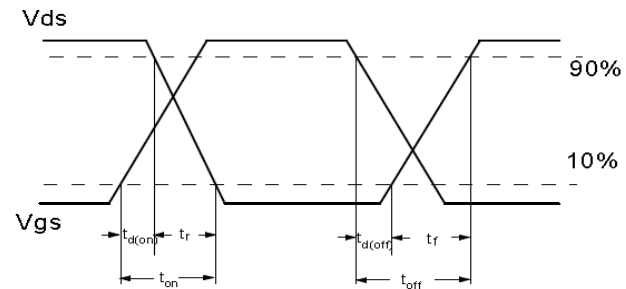
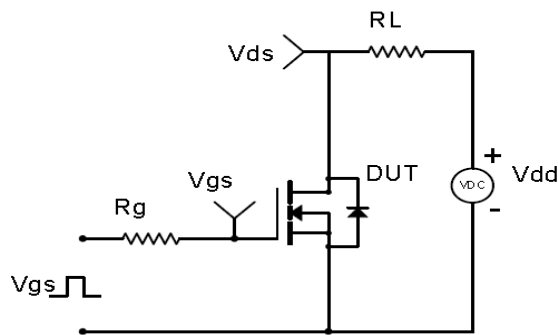
Figure 9: Maximum Safe Operating Area

Figure 10: Maximum Continuous Drain Current vs. Case Temperature

Figure 11: Normalized Maximum Transient Thermal Impedance


Test Circuit & Waveform

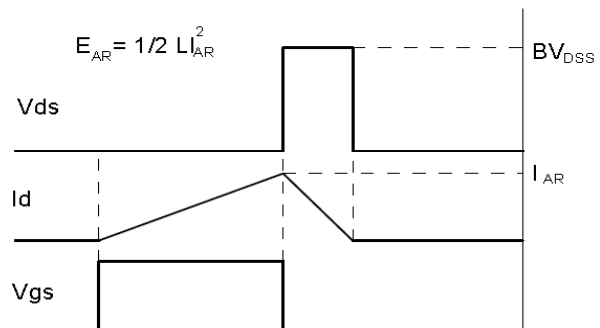
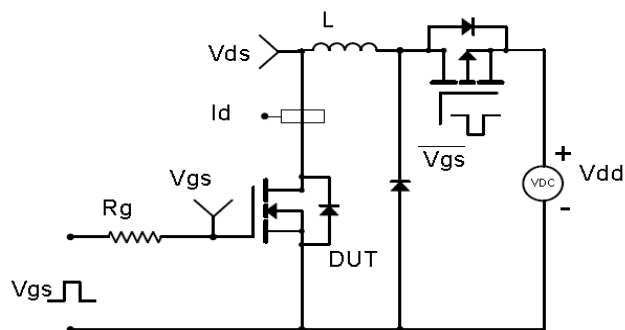
Gate Charge Test Circuit & Waveform



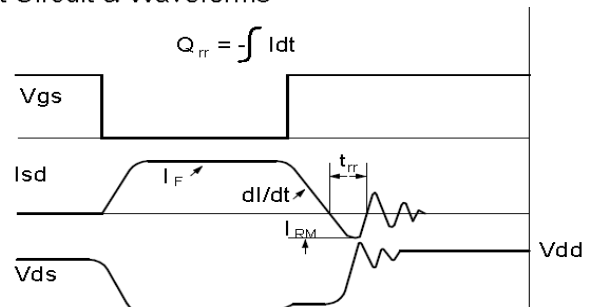
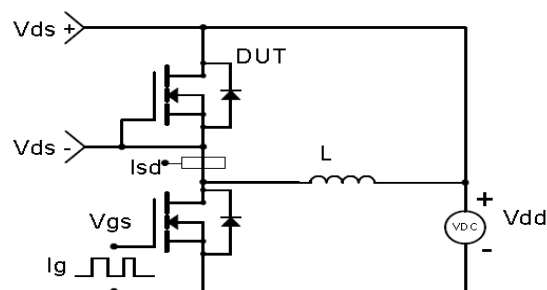
Resistive Switching Test Circuit & Waveforms



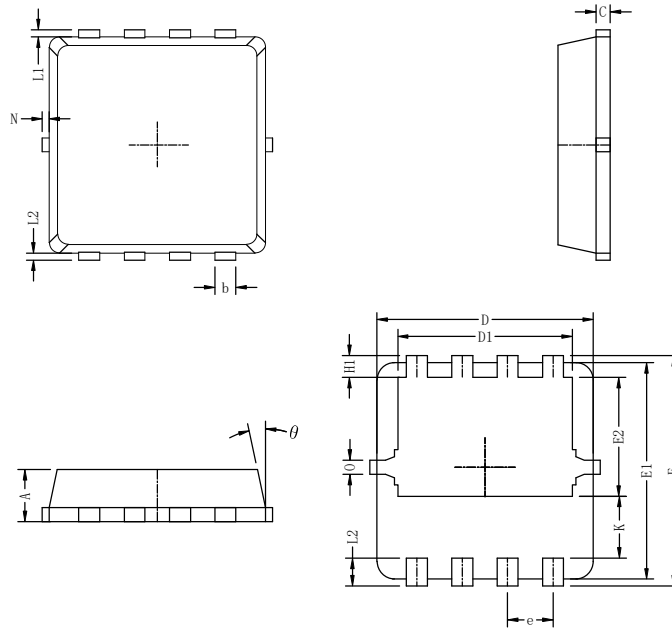
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Outline Drawing PDFN3333



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.78	0.88	0.98
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
0	0.2 REF.		

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