30V N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} = 30V
I_D =50A
$R_{DS(ON)\ TYP}$ = 5.8mΩ (V_{GS} = 10V)
$R_{DS(ON)\ TYP}$ =8.9mΩ (V_{GS} = 4.5V)

100% UIS Tested
100% R_g Tested

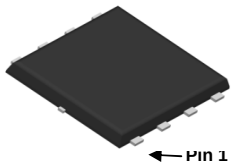
- Trench Power αMOS Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Applications

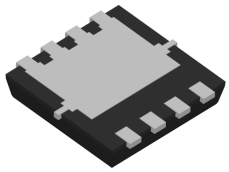
- DC/DC Converters in Computing
- Isolated DC/DC Converters in Telecom and Industrial

PDFN 3333

Top View

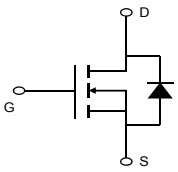


Bottom View



Top View

Equivalent Circuit



Y :year code W :week code

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3618	3618	PDFN3333-8	Ø330mm	12mm	4000 units

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [B]	T_C=25℃	I_D	50	A
Pulsed Drain Current [C]		I_{DM}	150	
Continuous Drain Current [A]	T_A=25℃	I_{DSM}	15	
Avalanche Current [C]		I_{AS}, I_{AR}	17	A
Repetitive avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	23	mJ
Power Dissipation [B]	T_C=25℃	P_D	20	W
Power Dissipation [A]	T_A=25℃	P_{DSM}	3.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	35	40	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		60	75	℃/W
Maximum Junction-to-Case [B]	Steady-State	$R_{\theta JC}$	5	6	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	μA
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	1.0	1.3	2.0	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=15A		5.8	7.5	mΩ
		V_{GS}=4.5V, I_D=10A		8.9	11	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=15A		30		S
V_{SD}	Diode Forward Voltage	I_S=15A,V_{GS}=0V		0.75	1	V
I_S	Maximum Body-Diode Continuous Current				15	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		1050		pF
C_{oss}	Output Capacitance			195		pF
C_{rss}	Reverse Transfer Capacitance			150		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.1		Ω
SWITCHING PARAMETERS						
Q_g (10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=15A		27.8		nC
Q_g (4.5V)	Total Gate Charge			12.0		nC
Q_{gs}	Gate Source Charge			7.2		nC
Q_{gd}	Gate Drain Charge			9.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V,R_{GEN}=6.8Ω		5		ns
t_r	Turn-On Rise Time			3.2		ns
$t_{D(off)}$	Turn-Off DelayTime			24		ns
t_f	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=15A, dI/dt=100A/ μs		20		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=15A, dI/dt=100A/ μs		102		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t ≤ 10s value and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it.
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: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300ms pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C.
G. The maximum current rating is limited by bond-wires.
H. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

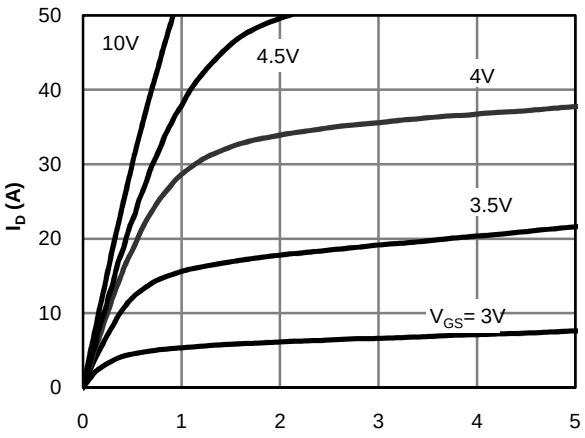


Figure 1: On-Region Characteristics

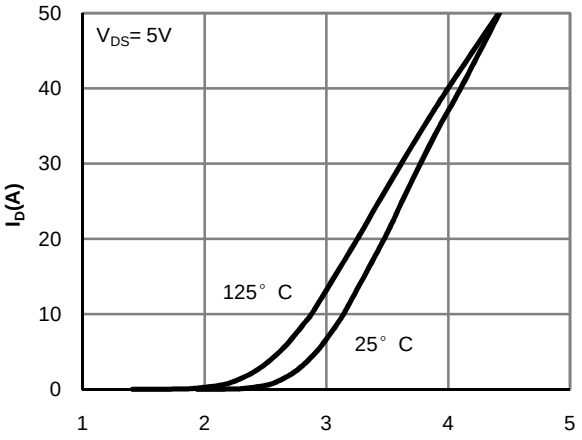


Figure 2: Transfer Characteristics

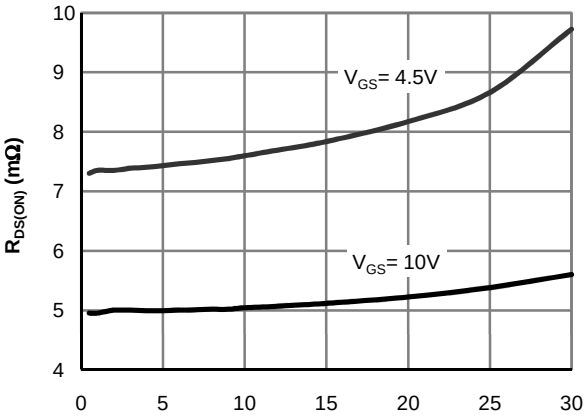


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

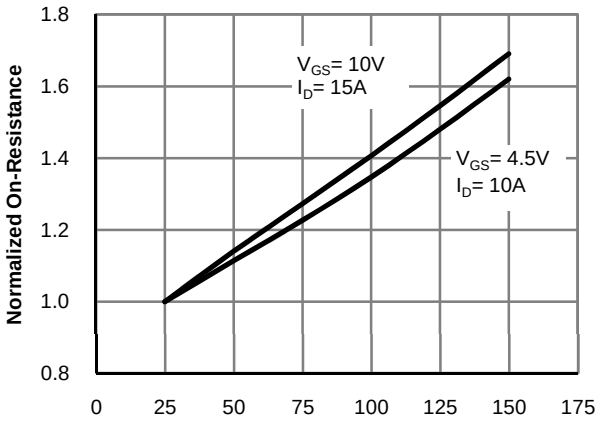


Figure 4: On-Resistance vs. Junction Temperature

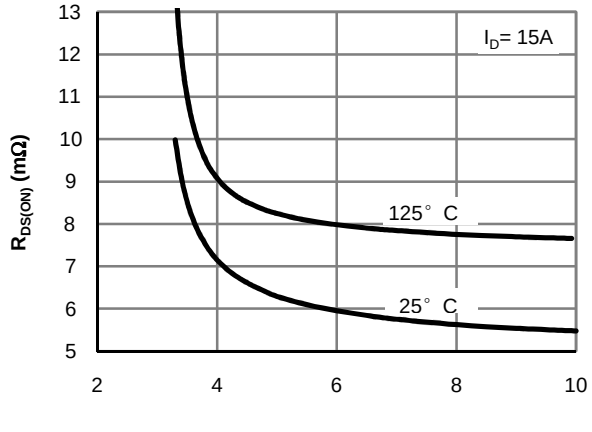


Figure 5: On-Resistance vs. Gate-Source Voltage

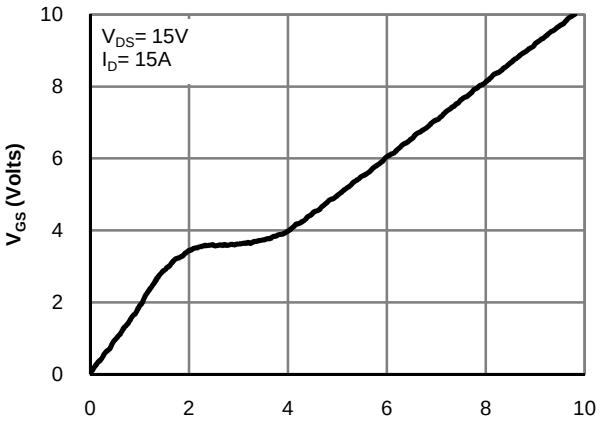


Figure 6: Gate-Charge Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

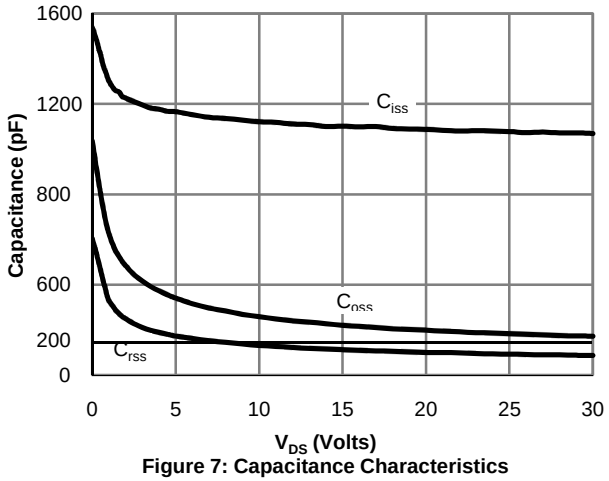


Figure 7: Capacitance Characteristics

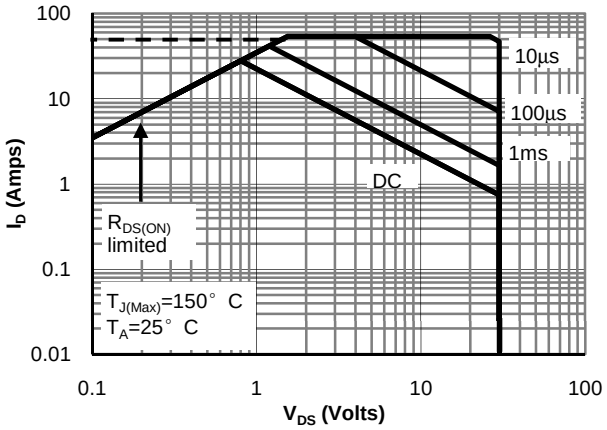


Figure 8: Maximum Forward Biased Safe Operating Area (Note H)

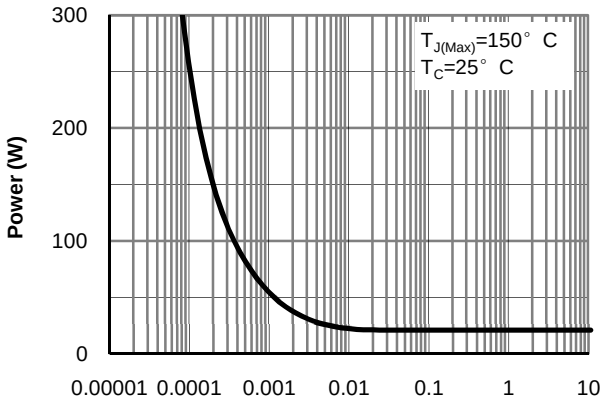


Figure 9: Single Pulse Power Rating Junction-to-Case (Note F)

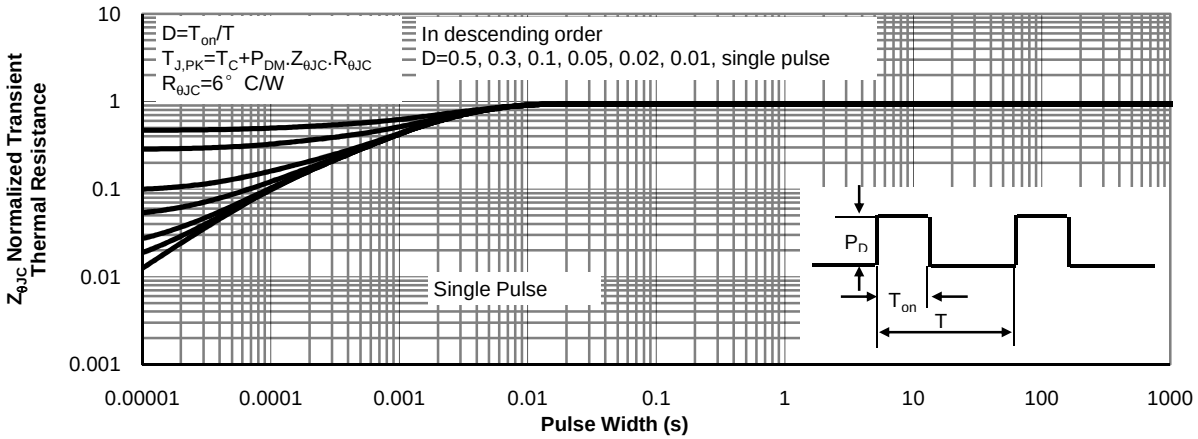


Figure 10: Normalized Maximum Transient Thermal Impedance(Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

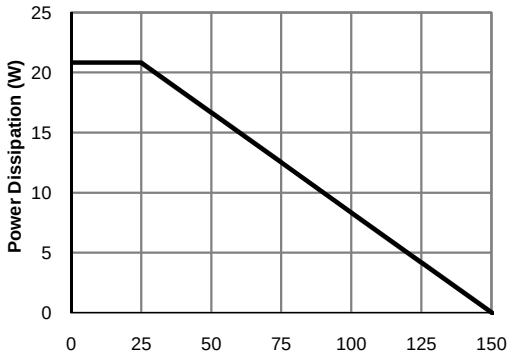


Figure 11: Power De-rating (Note F)

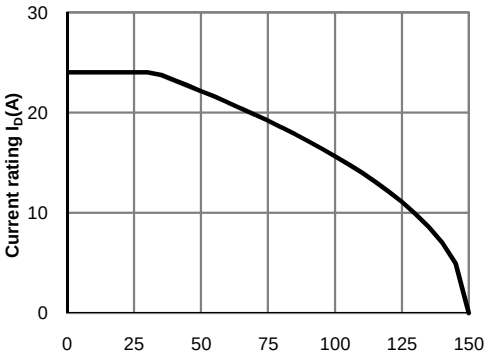


Figure 12: Current De-rating (Note F)

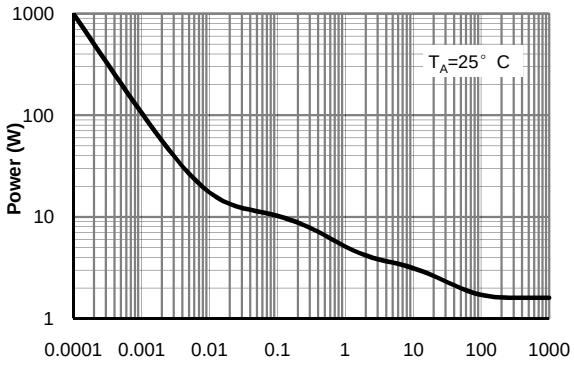


Figure 13: Single Pulse Power Rating Junction-to-Ambient (Note H)

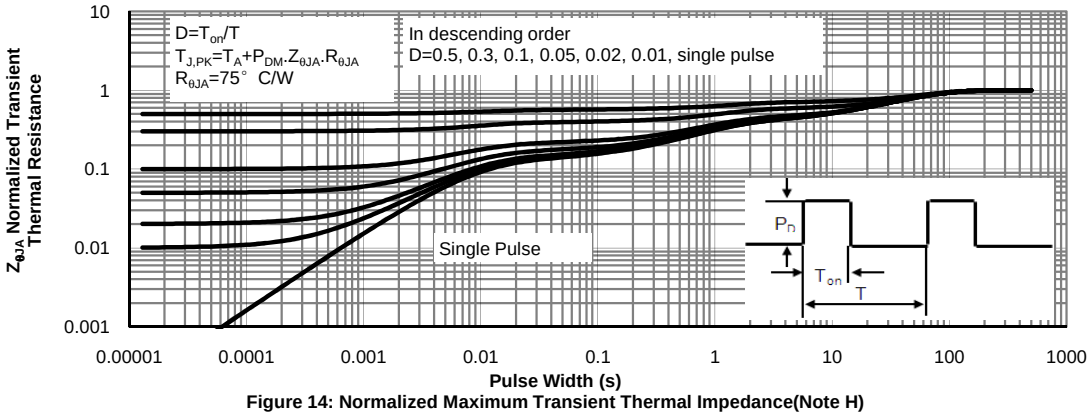
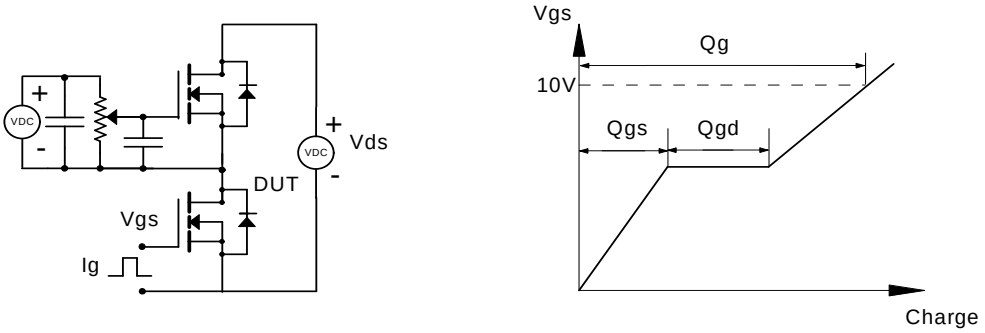
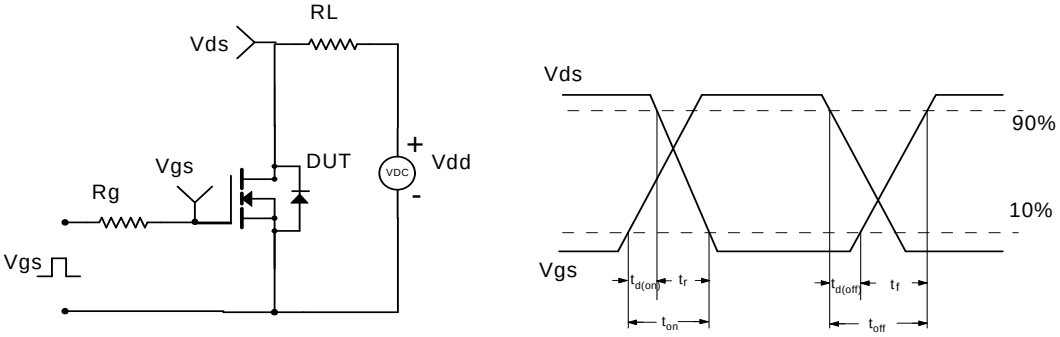


Figure 14: Normalized Maximum Transient Thermal Impedance(Note H)

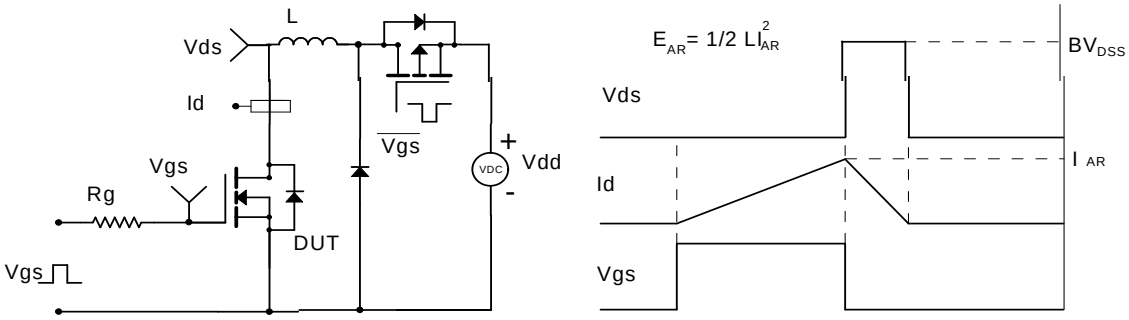
Gate Charge Test Circuit & Waveform



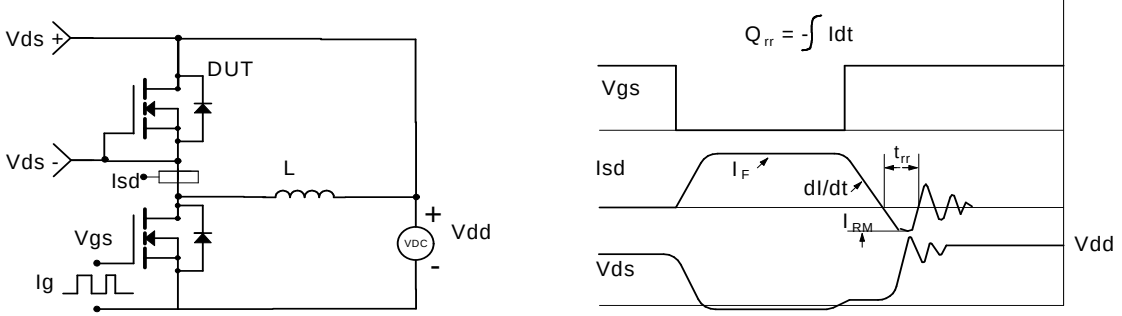
Resistive Switching Test Circuit & Waveforms



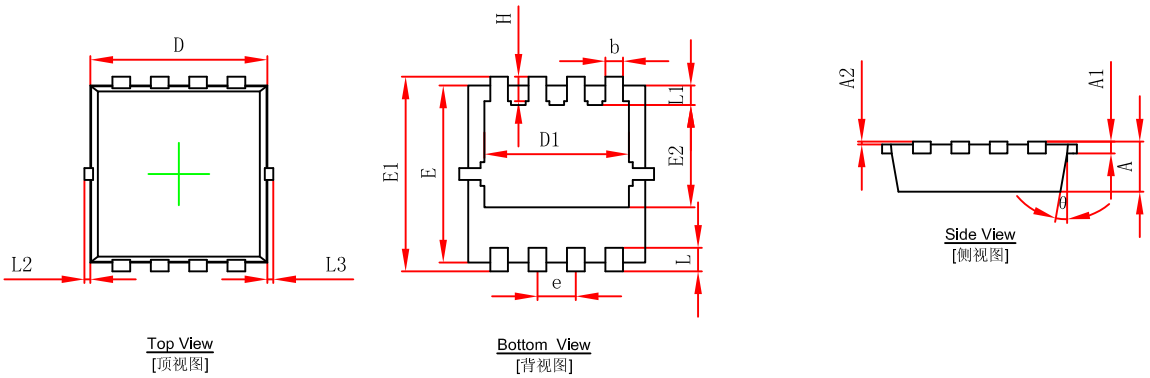
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

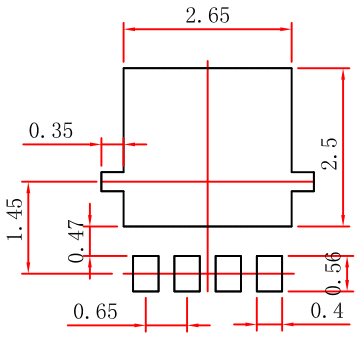


PDFNWB3.3x3.3-8L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

PDFNWB3.3x3.3-8L Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.