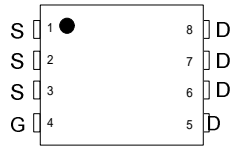
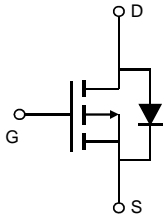
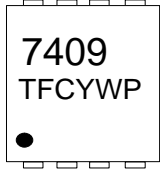


<p><b>30V P-Channel MOSFET</b></p> <p><b>PRODUCT SUMMARY</b></p> <p><math>V_{DS}</math> -30V  <math>I_D</math> (at <math>V_{GS}=-10V</math>) -32A  <math>R_{DS(ON)}</math> (at <math>V_{GS}=-10V</math>) &lt; 15m<math>\Omega</math>  <math>R_{DS(ON)}</math> (at <math>V_{GS}=-4.5V</math>) &lt; 22m<math>\Omega</math></p> <p>100% UIS Tested  100% <math>R_g</math> Tested</p> <ul style="list-style-type: none"> <li>• Trench Power <math>\alpha</math>MOS Technology</li> <li>• Low <math>R_{DS(ON)}</math></li> <li>• Low Gate Charge</li> <li>• High Current Capability</li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• DC/DC Converters in Computing</li> <li>• Isolated DC/DC Converters in Telecom and Industrial</li> </ul>	<p>PDFN3X3-8L</p>  <p><b>Equivalent Circuit</b></p>  <p><b>MARKING</b></p>  <p>Y :year code W :week code</p>
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Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted					
Parameter		Symbol	Maximum	Units	
Drain-Source Voltage		$V_{DS}$	-30	V	
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V	
Continuous Drain Current <sup>G</sup>	$T_C=25^\circ\text{C}$	$I_D$	-32	A	
Pulsed Drain Current <sup>C</sup>		$I_{DM}$	-128		
Continuous Drain Current	$T_A=25^\circ\text{C}$	$I_{DSM}$	-16	A	
Avalanche Current <sup>C</sup>		$I_{AS}$	40	A	
Avalanche energy $L=0.1\text{mH}$ <sup>C</sup>		$E_{AS}$	80	mJ	
Power Dissipation <sup>B</sup>	$T_C=25^\circ\text{C}$	$P_D$	96	W	
Power Dissipation <sup>A</sup>	$T_A=25^\circ\text{C}$	$P_{DSM}$	3.1	W	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$	
Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$t \leq 10\text{s}$	$R_{\theta JA}$	30	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A D</sup>	Steady-State		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Case		$R_{\theta JC}$	1	1.3	$^\circ\text{C/W}$

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$ , $V_{GS}=0\text{V}$			-1	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 25\text{V}$			$\pm 10$	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-1.4	-1.8	-2.0	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-10\text{V}$ , $V_{DS}=-5\text{V}$	-128			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$ , $I_D=-16\text{A}$		12	15	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}$ , $I_D=-10\text{A}$		18	22	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=-5\text{V}$ , $I_D=-16\text{A}$		-43		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1\text{A}$ , $V_{GS}=0\text{V}$		-0.7	-1	V
$I_S$	Maximum Body-Diode Continuous Current <sup>G</sup>				-32	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=-15\text{V}$ , $f=1\text{MHz}$		2142		pF
$C_{oss}$	Output Capacitance			474		pF
$C_{riss}$	Reverse Transfer Capacitance			363		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		2.3	4.6	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=-10\text{V}$ , $V_{DS}=-15\text{V}$ , $I_D=-16\text{A}$		41	58	nC
$Q_g(4.5\text{V})$	Total Gate Charge			18.5	27	nC
$Q_{gs}$	Gate Source Charge			15		nC
$Q_{gd}$	Gate Drain Charge			6		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10\text{V}$ , $V_{DS}=-15\text{V}$ , $R_L=0.9\Omega$ , $R_{GEN}=3\Omega$		13		ns
$t_r$	Turn-On Rise Time			12		ns
$t_{D(off)}$	Turn-Off DelayTime			34		ns
$t_f$	Turn-Off Fall Time			18.5		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=-16\text{A}$ , $di/dt=500\text{A}/\mu\text{s}$		17.5		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-16\text{A}$ , $di/dt=500\text{A}/\mu\text{s}$		44.5		nC

A. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA}$   $t \leq 10\text{s}$  value and the maximum allowed junction temperature of  $150^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

B. The power dissipation  $P_D$  is based on  $T_{J(MAX)}=150^\circ\text{C}$ , using junction-to-case thermal impedance, 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  $T_{J(MAX)}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .

D. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  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  $T_{J(MAX)}=150^\circ\text{C}$ . 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 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

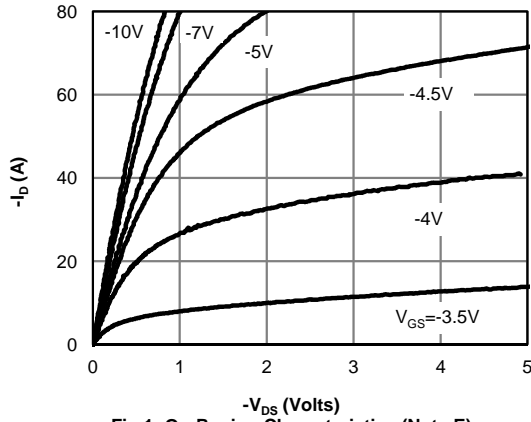


Fig 1: On-Region Characteristics (Note E)

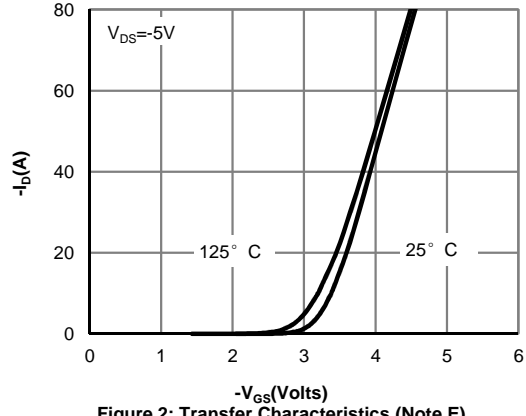


Figure 2: Transfer Characteristics (Note E)

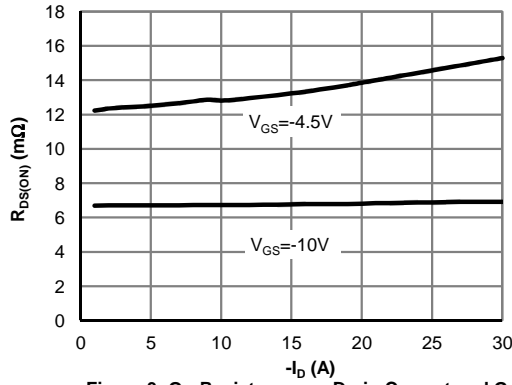


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

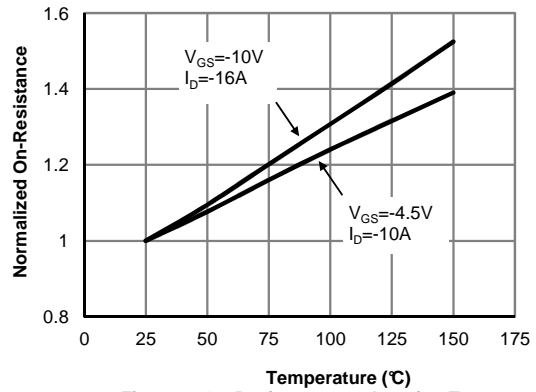


Figure 4: On-Resistance vs. Junction Temperature (Note E)

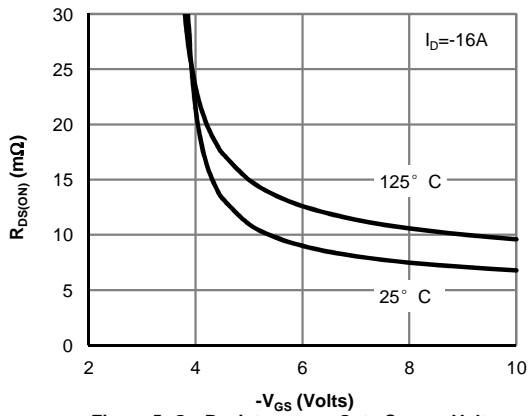


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

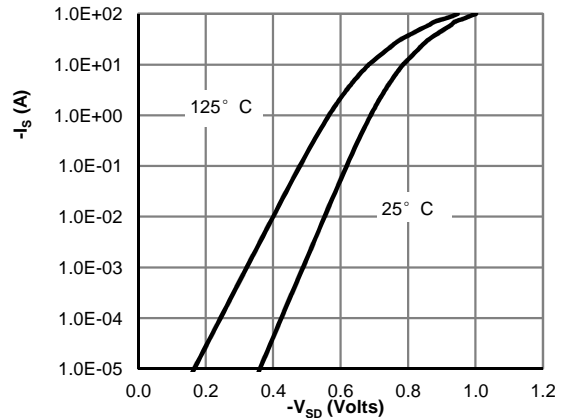


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

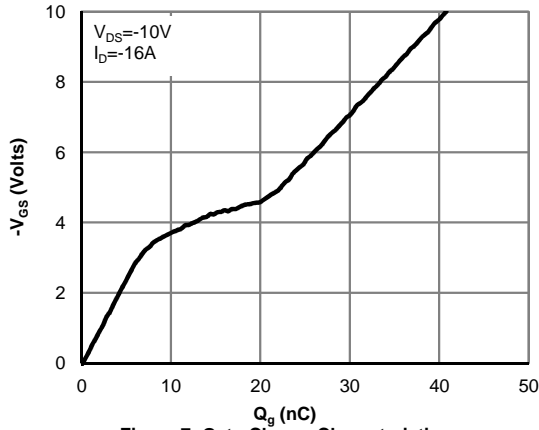


Figure 7: Gate-Charge Characteristics

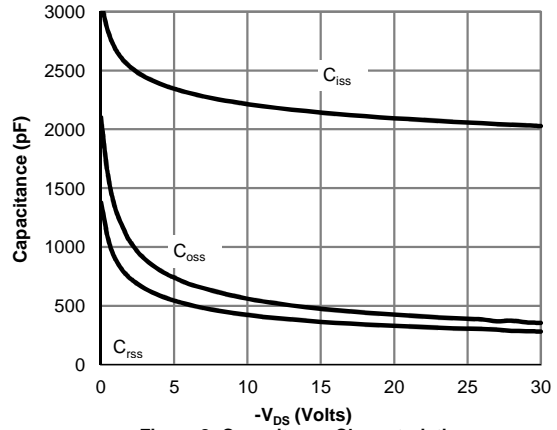


Figure 8: Capacitance Characteristics

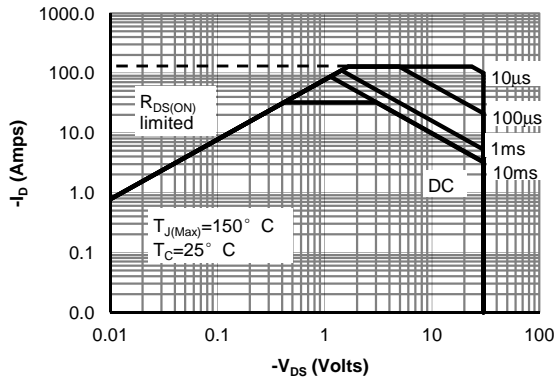


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

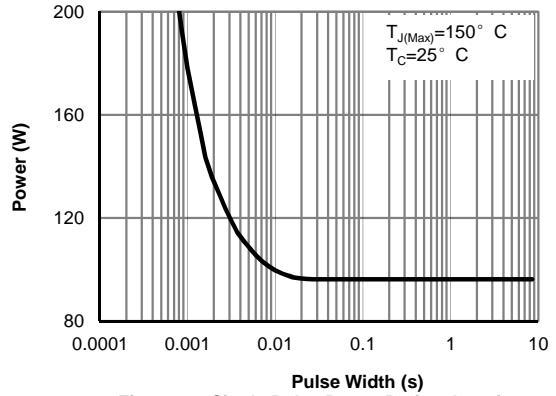


Figure 10: Single Pulse Power Rating Junction-to-Ca (Note F)

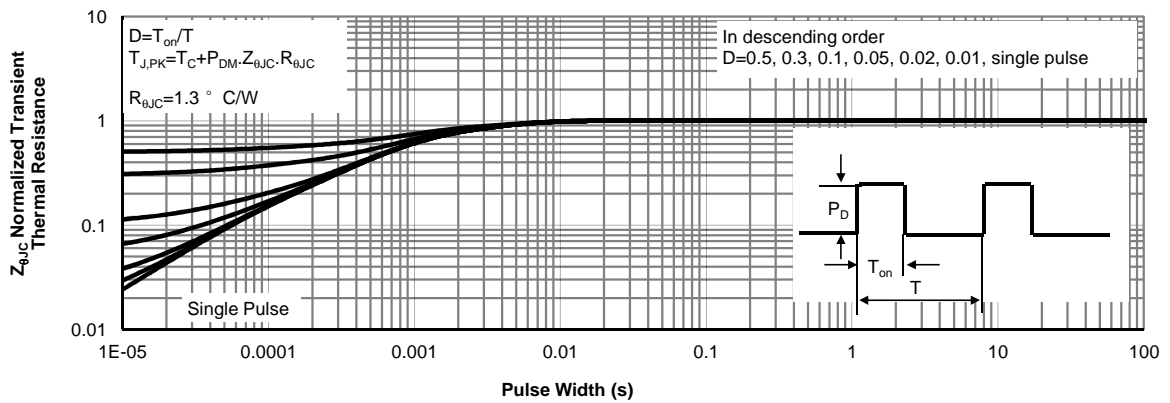


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

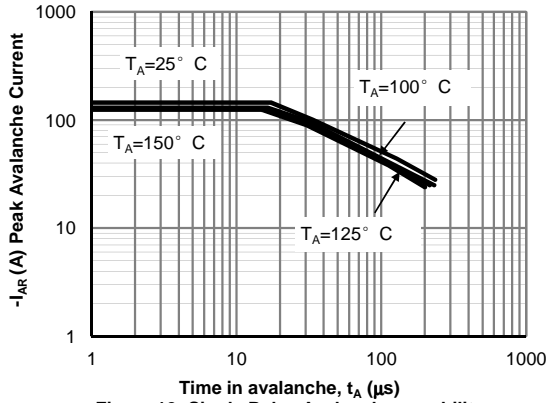


Figure 12: Single Pulse Avalanche capability (Note C)

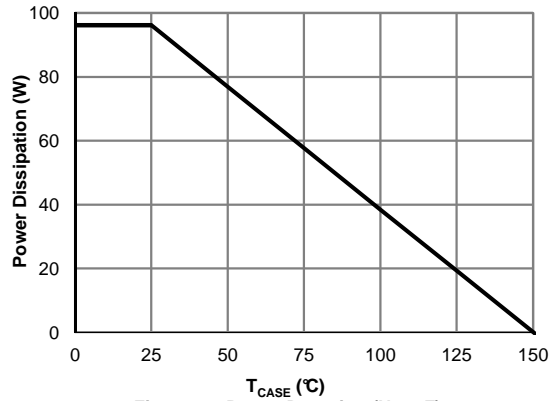


Figure 13: Power De-rating (Note F)

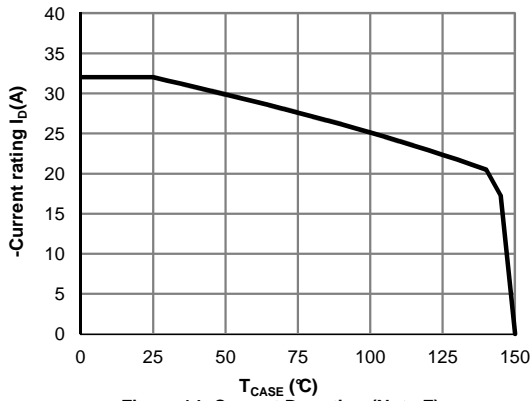


Figure 14: Current De-rating (Note F)

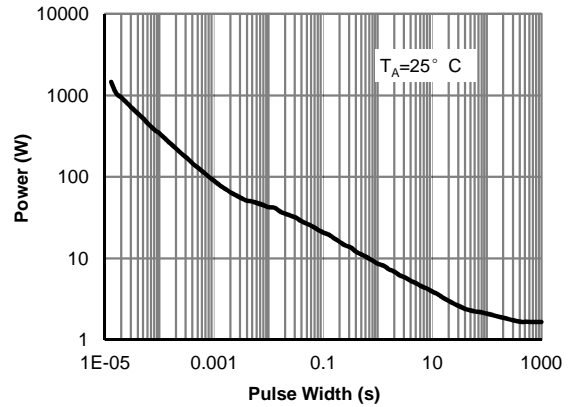


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

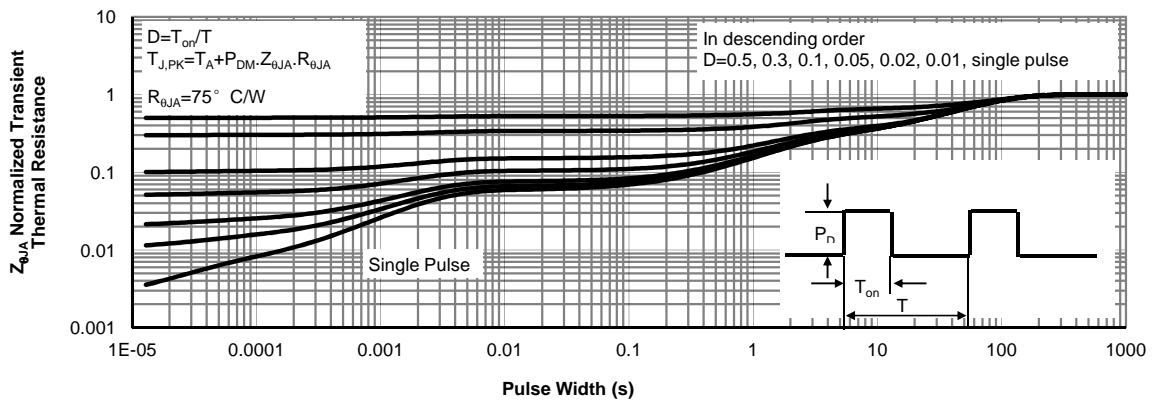
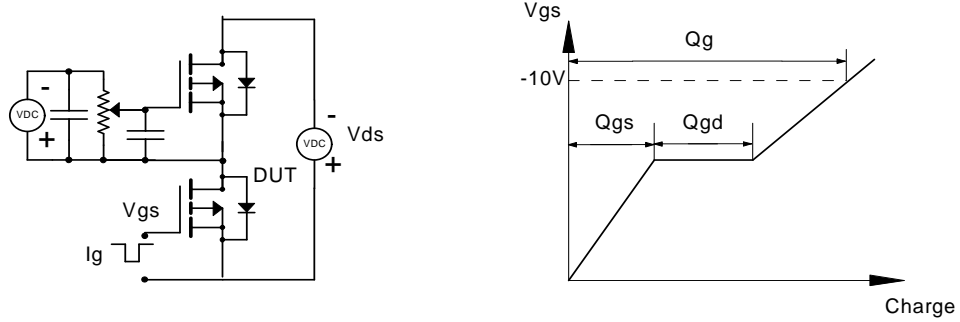
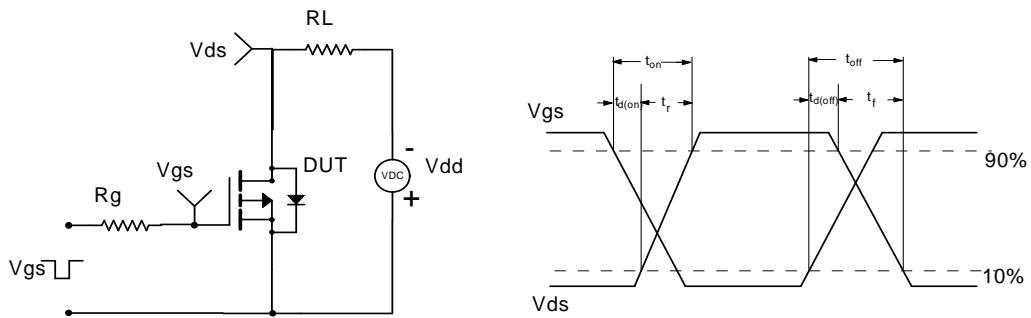


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

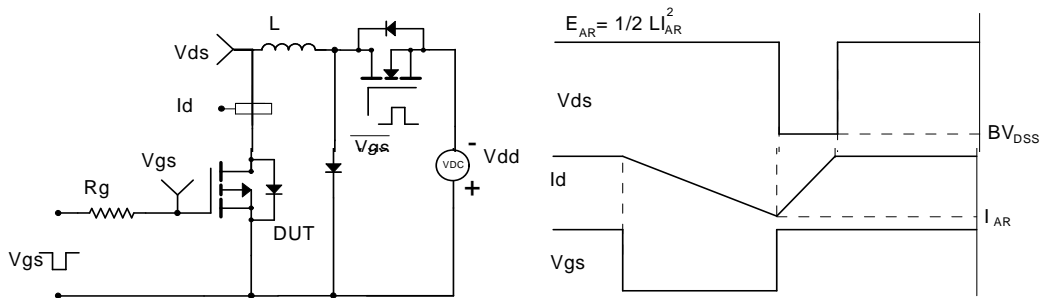
Gate Charge Test Circuit & Waveform



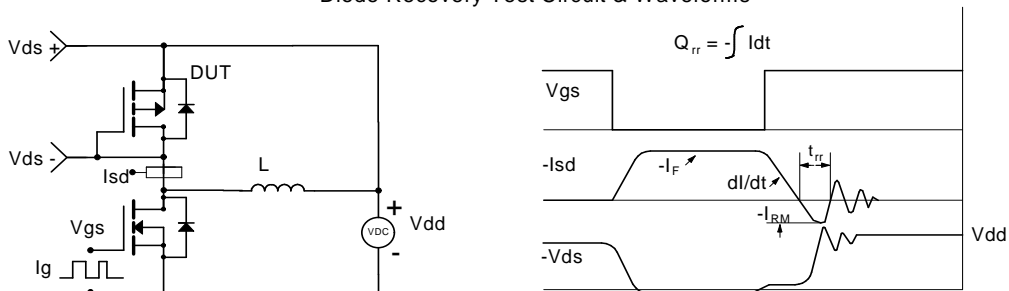
Resistive Switching Test Circuit & Waveforms



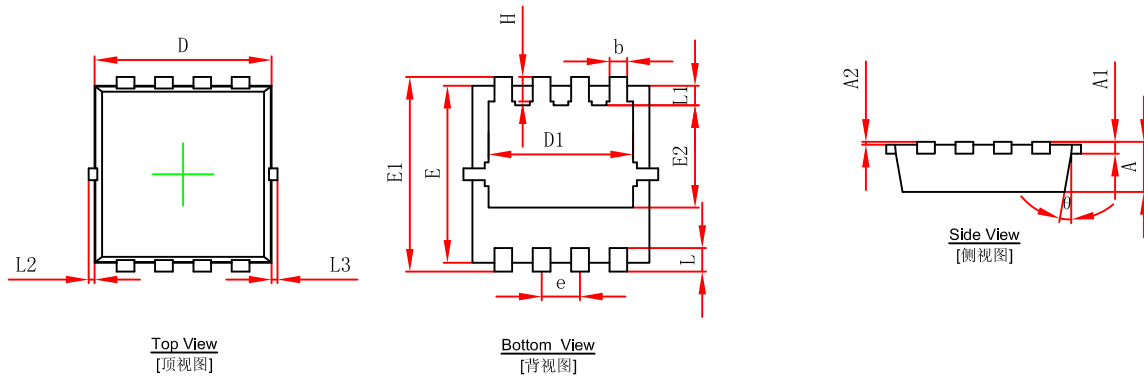
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

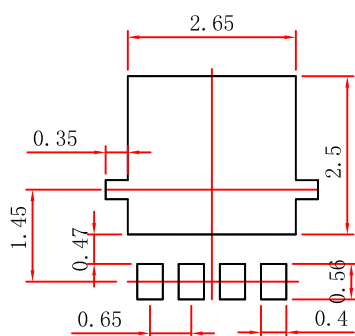


PDFNWB3.3x3.3-8L Package Outline Dimensions



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:  $\pm 0.05\text{mm}$ .  
3. The pad layout is for reference purposes only.