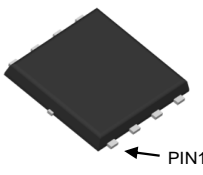
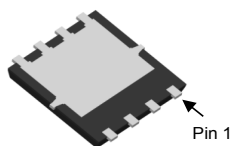

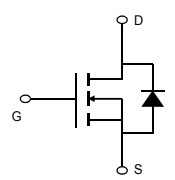


30V N-Channel MOSFET

<p><b>General Features</b></p> <p><math>V_{DS} = 30V</math>  <math>I_D</math> (at <math>V_{GS} = 10V</math>) = 140A  <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 2.5m<math>\Omega</math>  <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 3.5m<math>\Omega</math></p> <p>100% UIS Tested          100% <math>R_g</math> Tested</p> <ul style="list-style-type: none"> <li>• Latest Trench Power LV technology</li> <li>• Very Low <math>R_{DS(on)}</math> at 4.5V<math>_{GS}</math></li> <li>• Low Gate Charge</li> <li>• High Current Capability</li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>• DC/DC Converters in Computing, Servers, and POL</li> <li>• Isolated DC/DC Converters in Telecom and Industrial</li> </ul>	<p><b>PDFN5X6-8L</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View</p>  </div> <div style="text-align: center;"> <p>Bottom View</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>Top View</p>  <p>6406 TFCYW P</p> <p>Y : year code W : week code</p> </div> <div style="text-align: center;"> <p>Equivalent Circuit</p>  </div> </div>
---	--

Absolute Maximum Ratings $T_A=25^\circ C$ 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>	$T_C=25^\circ C$	$I_D$	140	A	
Pulsed Drain Current <sup>C</sup>		$I_{DM}$	280		
Continuous Drain Current	$T_A=25^\circ C$	$I_{DSM}$	25	A	
	$T_A=70^\circ C$		19		
Avalanche Current <sup>C</sup>		$I_{AS}$	60	A	
Avalanche energy $L=0.1mH$ <sup>C</sup>		$E_{AS}$	180	mJ	
Power Dissipation <sup>B</sup>	$T_C=25^\circ C$	$P_D$	110	W	
Power Dissipation <sup>A</sup>	$T_A=25^\circ C$	$P_{DSM}$	2.3	W	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ C$	
Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$t \leq 10s$	$R_{\theta JA}$	14	17	$^\circ C/W$
	Steady-State		40	55	
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.85	1.1	$^\circ C/W$

Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	30	36		V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±16V			10	uA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA	1.3	1.8	2.4	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		2.1	2.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A		2.6	3.5	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		130		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.67	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current <sup>G</sup>				140	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz		4300	5200	pF
C <sub>oss</sub>	Output Capacitance			720		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			420		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	1	2	3	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =20A		70	100	nC
Q <sub>g</sub> (4.5V)	Total Gate Charge			33		nC
Q <sub>gs</sub>	Gate Source Charge			10		nC
Q <sub>gd</sub>	Gate Drain Charge			15		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3Ω		10		ns
t <sub>r</sub>	Turn-On Rise Time			6.5		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			75		ns
t <sub>f</sub>	Turn-Off Fall Time			18		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=500A/μs		30		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =20A, dI/dt=500A/μs		15		nC

- A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C. The Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> 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<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<sub>J(MAX)</sub>=150° C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25° C.
- D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> 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<sub>J(MAX)</sub>=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 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

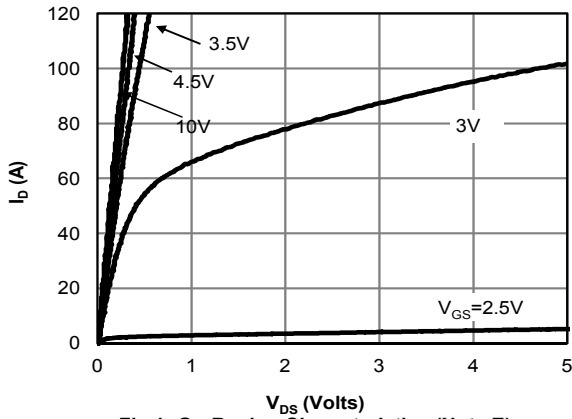


Fig 1: On-Region Characteristics (Note E)

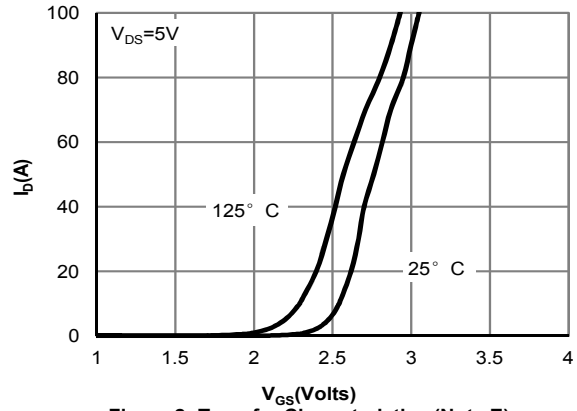


Figure 2: Transfer Characteristics (Note E)

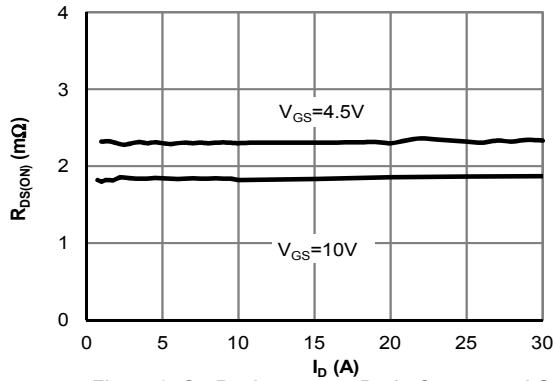


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

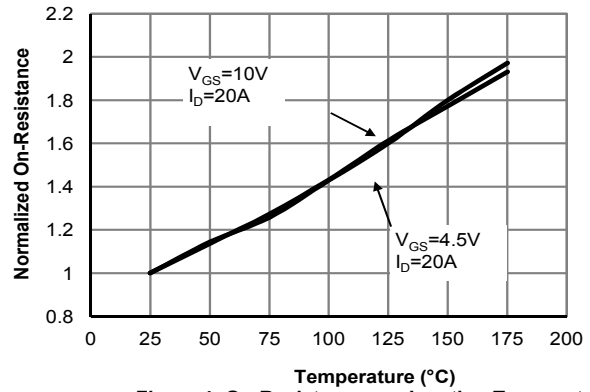


Figure 4: On-Resistance vs. Junction Temperature (Note E)

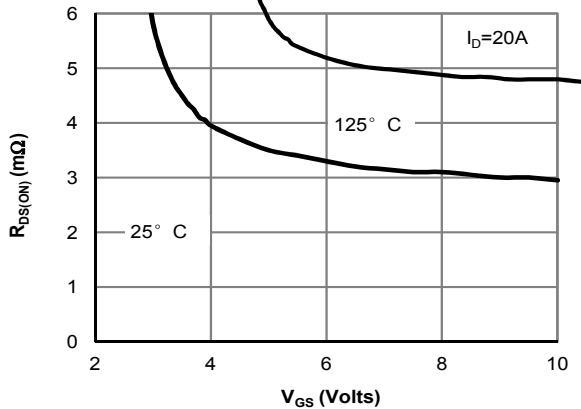


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

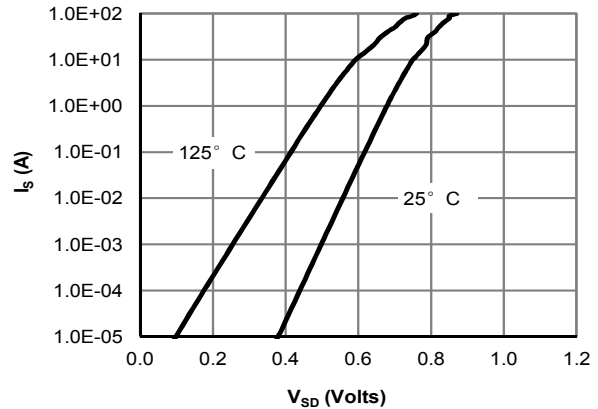


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

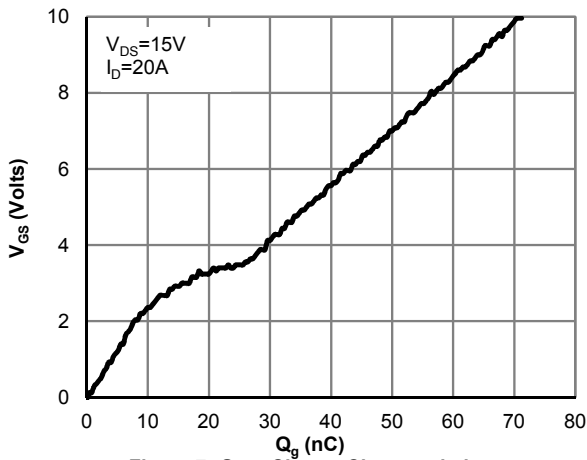


Figure 7: Gate-Charge Characteristics

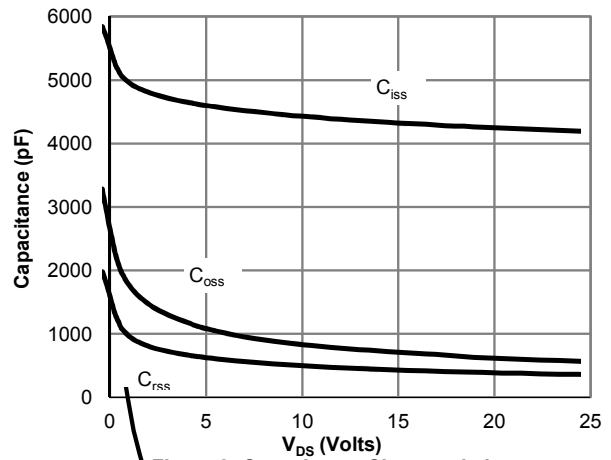


Figure 8: Capacitance Characteristics

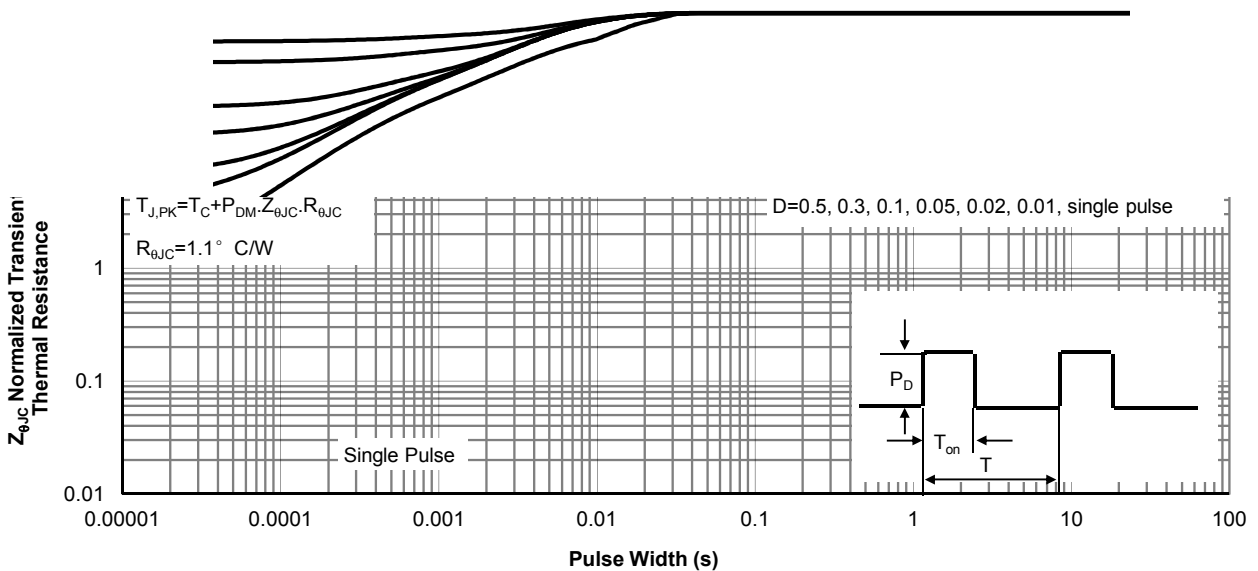
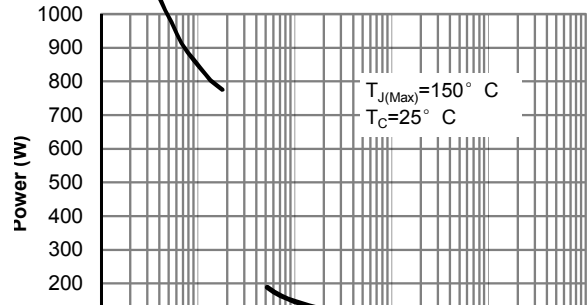
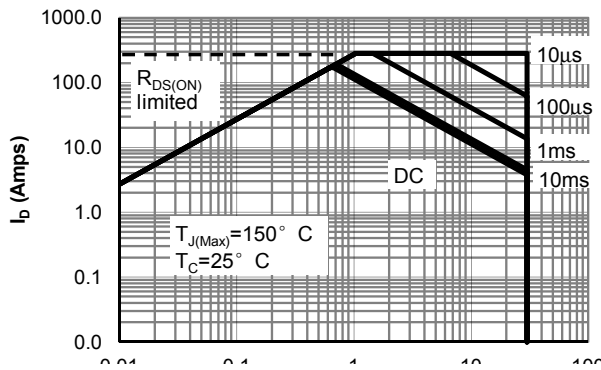


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

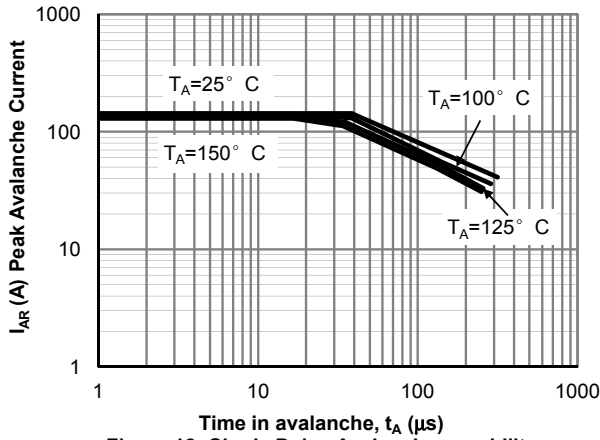


Figure 12: Single Pulse Avalanche capability (Note C)

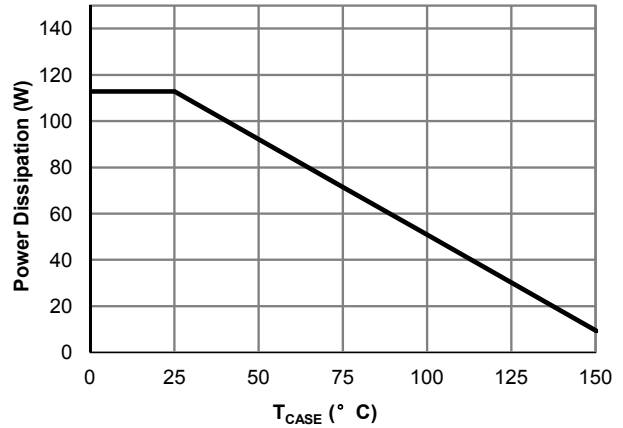


Figure 13: Power De-rating (Note F)

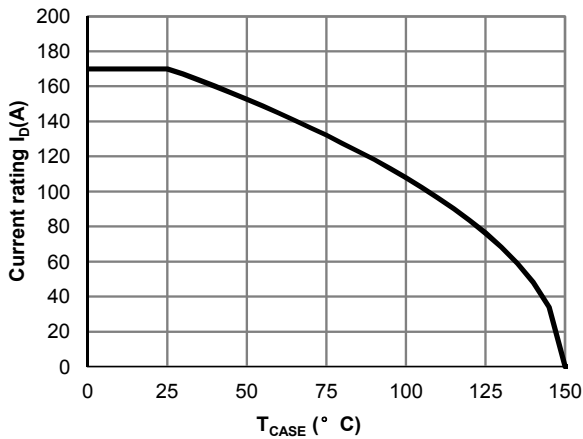


Figure 14: Current De-rating (Note F)

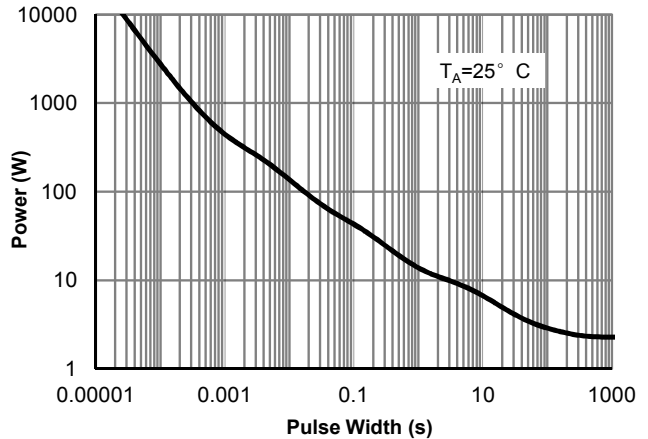


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

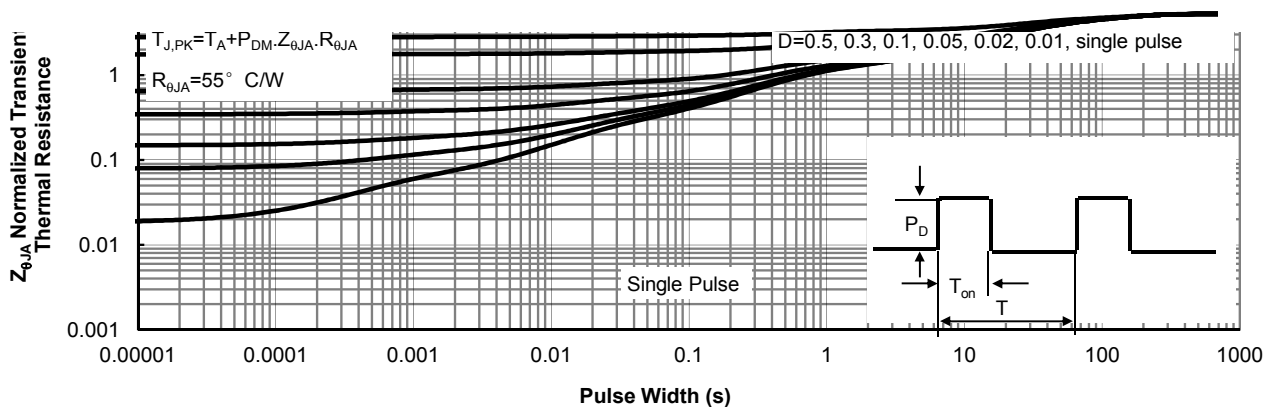
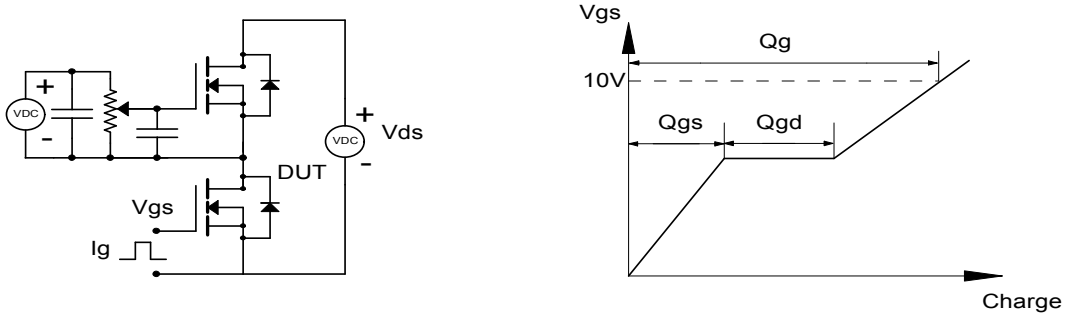
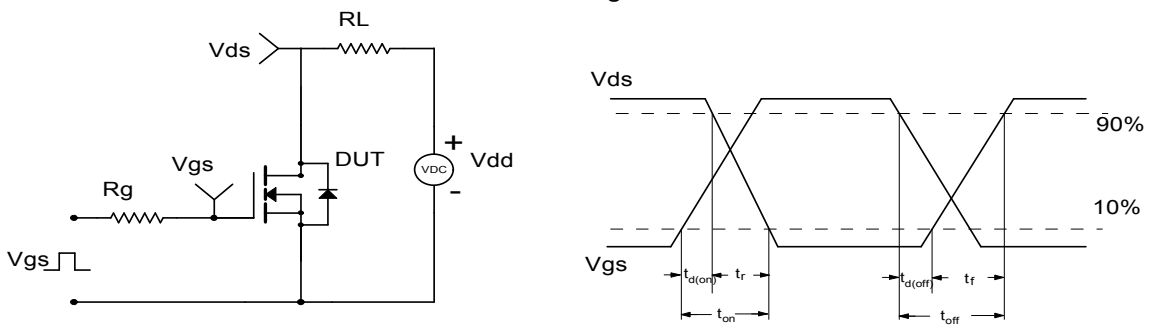


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

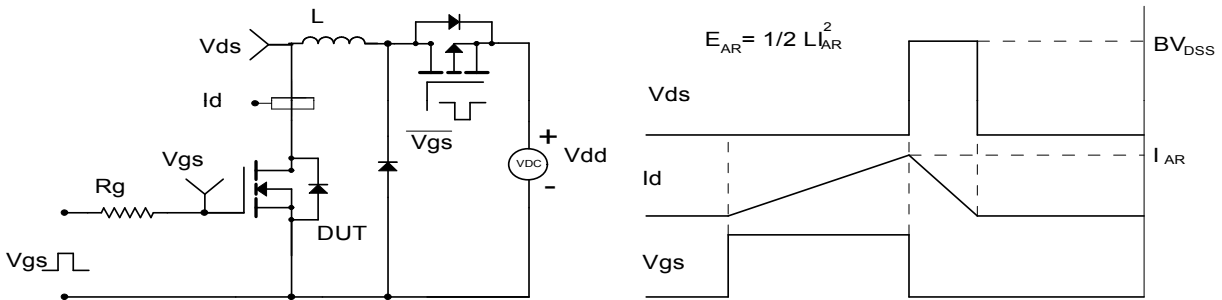
Gate Charge Test Circuit & Waveform



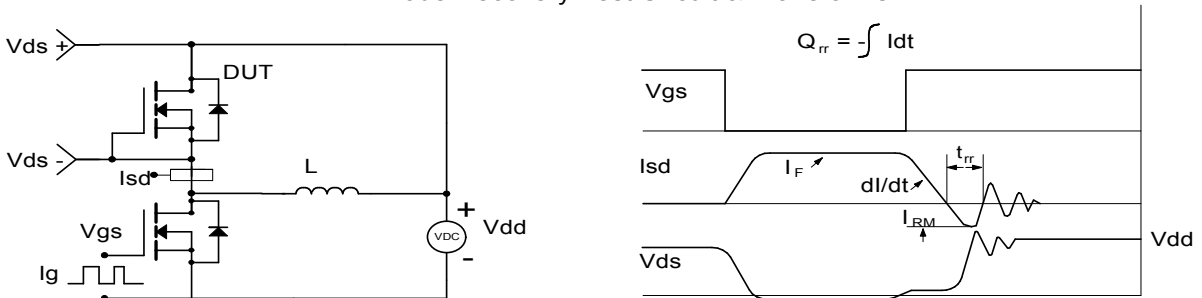
Resistive Switching Test Circuit & Waveforms



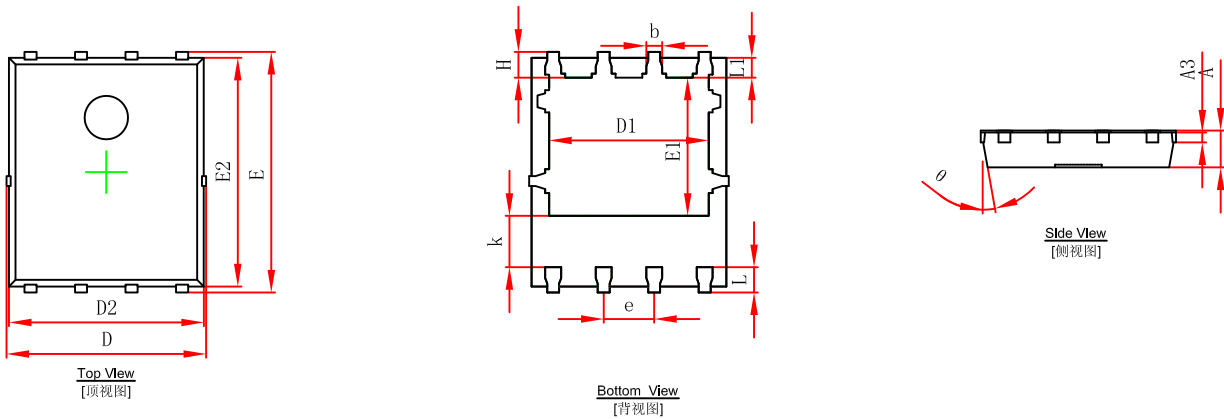
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

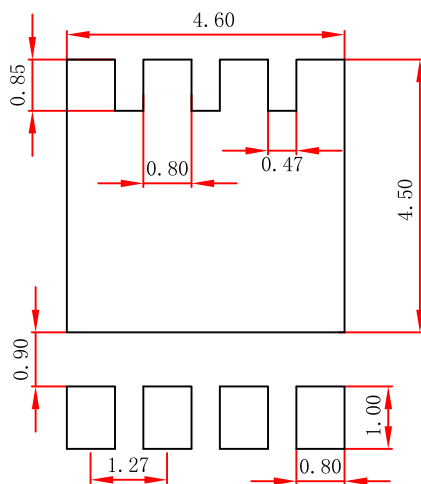


PDFNWB5x6-8L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

PDFNWB5x6-8L 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.