General Features

V_{DS} =30V
I_D (at V_{GS} =10V)=140A
$R_{DS(ON)}$ (at V_{GS} =10V)<2.5mΩ
$R_{DS(ON)}$ (at V_{GS} =4.5V)<3.5mΩ

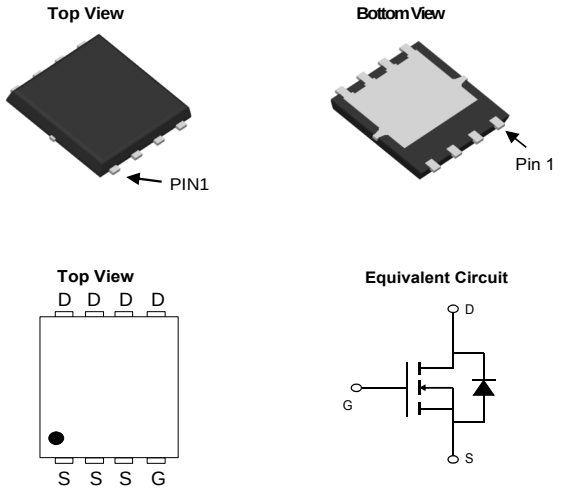
100% UIS Tested
100% R_g Tested

- Latest Trench Power LV technology
- Very Low $R_{DS(on)}$ at 4.5V_{GS}
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Application

- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

PDFN5X6-8L



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Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[G]	T_C=25°C	I_D	140	A
Pulsed Drain Current [C]		I_{DM}	280	
Continuous Drain Current	T_A=25°C	I_{DSM}	25	A
	T_A=70°C		19	
Avalanche Current [C]		I_{AS}	60	A
Avalanche energy L=0.1mH [C]		E_{AS}	180	mJ
Power Dissipation [B]	T_C=25°C	P_D	110	W
Power Dissipation [A]	T_A=25°C	P_{DSM}	2.3	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	14	17	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		40	55	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.85	1.1	°C/W

Electrical Characteristics (T_J=25°C 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	36		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}= ±16V			10	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250μA	1.3	1.8	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		2.1	2.5	mΩ
		V_{GS}=4.5V, I_D=20A		2.6	3.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		130		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.67	1	V
I_S	Maximum Body-Diode Continuous Current[G]				140	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		4300	5200	pF
C_{oss}	Output Capacitance			720		pF
C_{rss}	Reverse Transfer Capacitance			420		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	1	2	3	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		70	100	nC
Q_g(4.5V)	Total Gate Charge			33		nC
Q_{gs}	Gate Source Charge			10		nC
Q_{gd}	Gate Drain Charge			15		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω, R_{GEN}=3Ω		10		ns
t_r	Turn-On Rise Time			6.5		ns
$t_{D(off)}$	Turn-Off DelayTime			75		ns
t_f	Turn-Off Fall Time			18		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/μs		30		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/μs		15		nC

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A. The value of $R_{\theta JA}$ 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 $R_{\theta JA}$ 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. Ratings are based on low frequency and duty cycles to keep initial T_J =25° 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 <300μs 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. 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

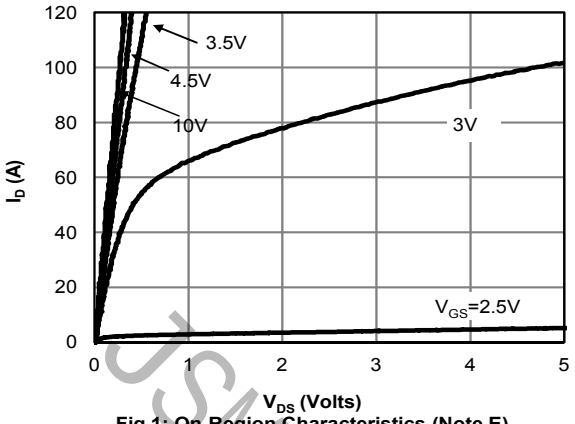

Fig 1: On-Region Characteristics (Note E)

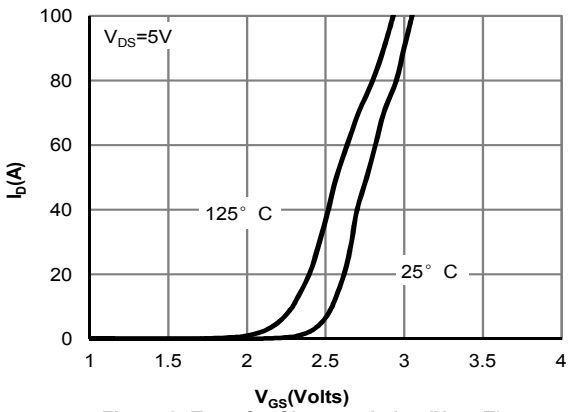

Figure 2: Transfer Characteristics (Note E)

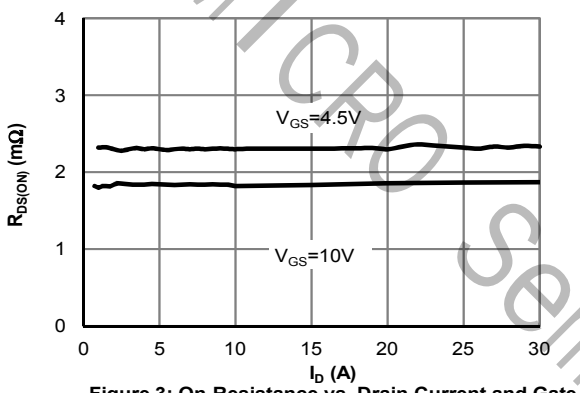

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

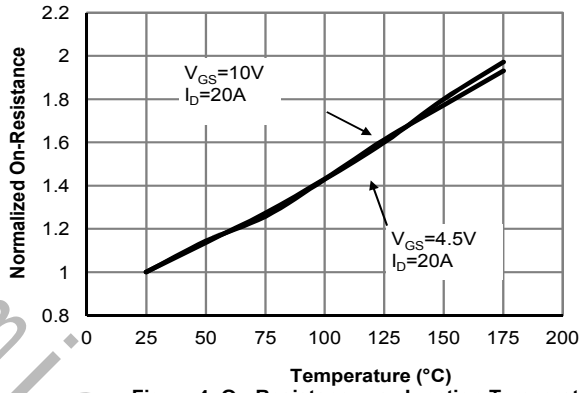

Figure 4: On-Resistance vs. Junction Temperature (Note E)

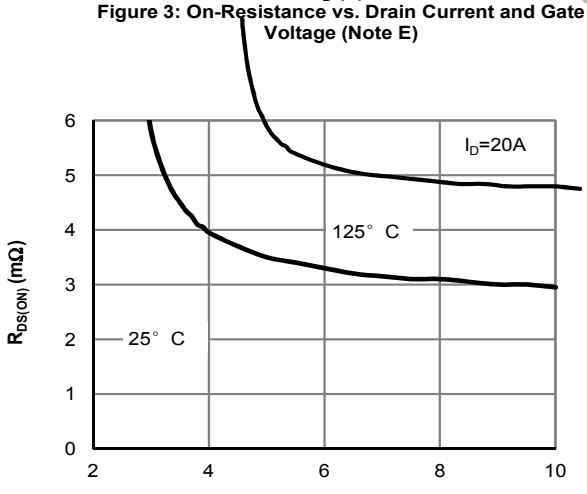

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

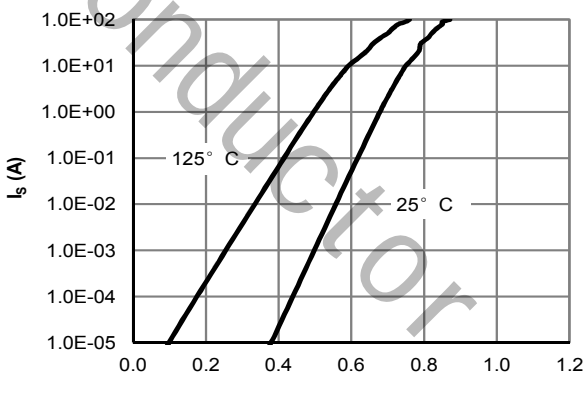

Figure 6: Body-Diode Characteristics (Note E)

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

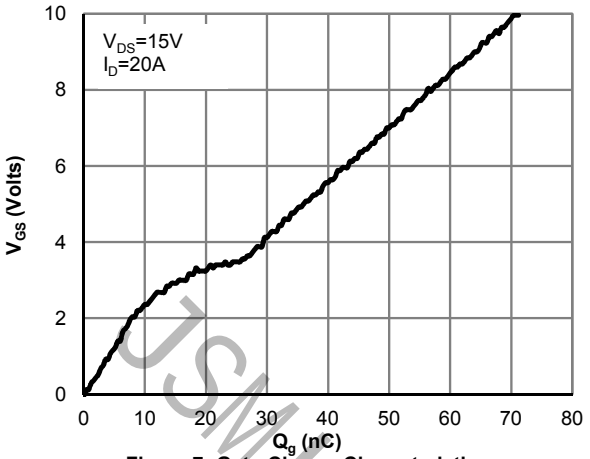


Figure 7: Gate-Charge Characteristics

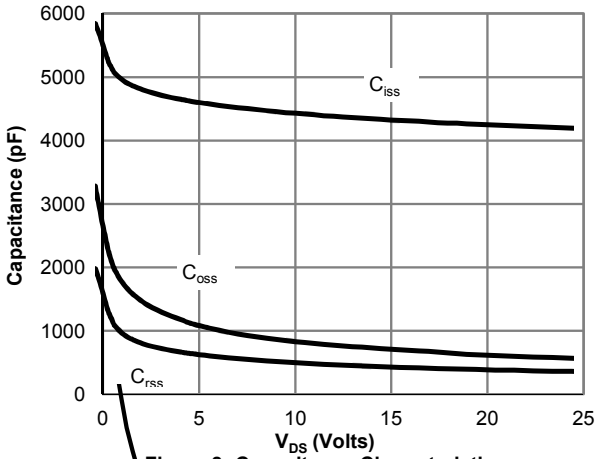
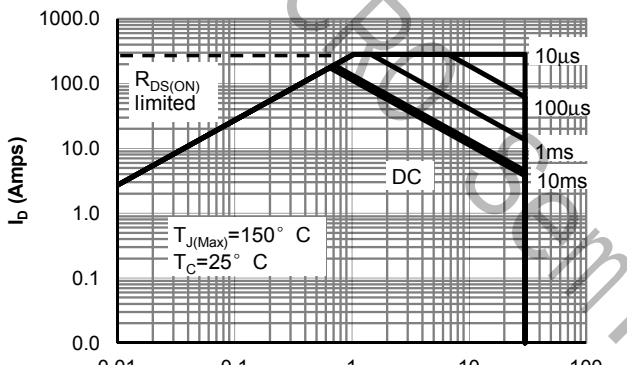
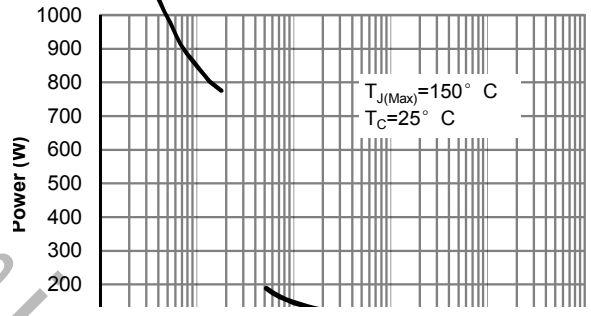


Figure 8: Capacitance Characteristics





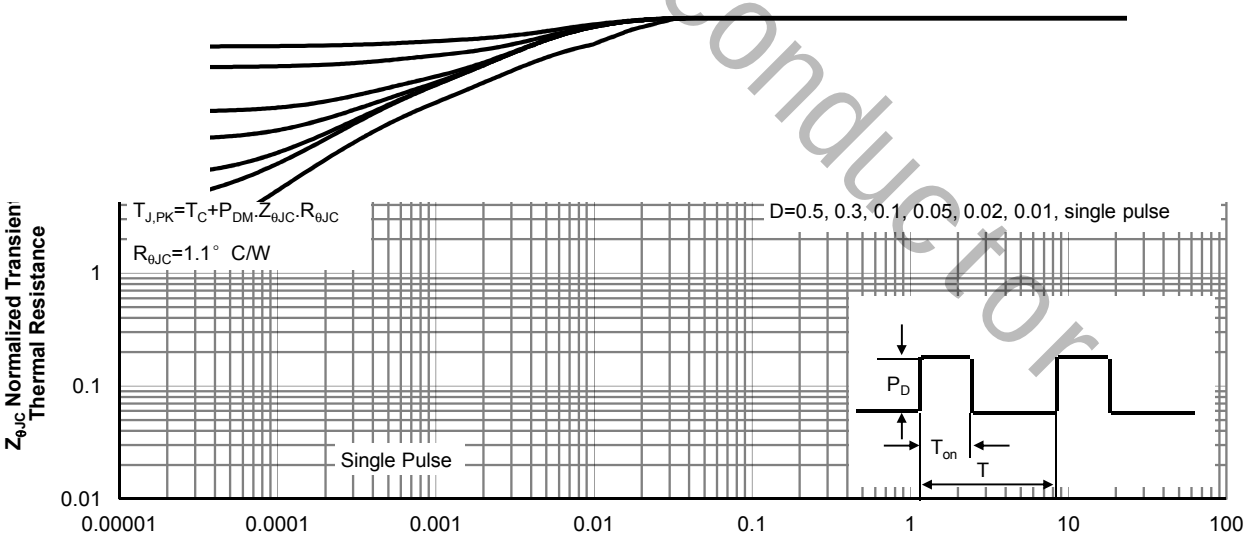


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

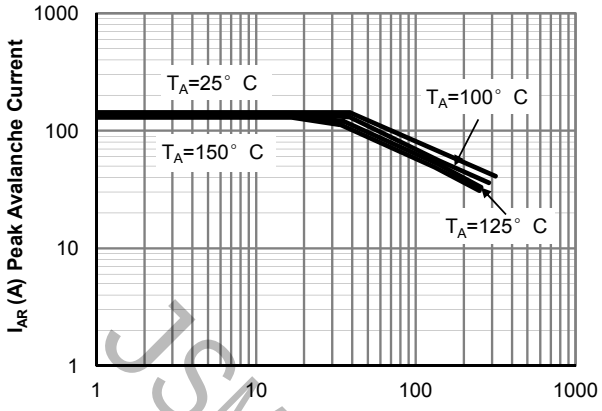

Figure 12: Single Pulse Avalanche capability (Note C)

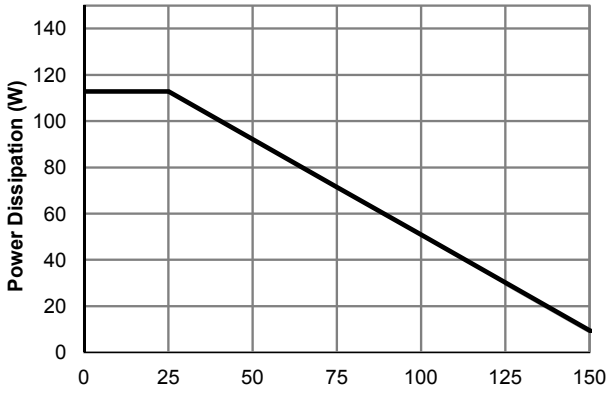

Figure 13: Power De-rating (Note F)

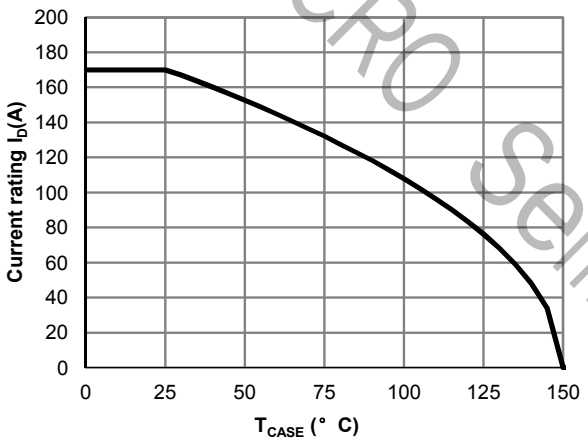

Figure 14: Current De-rating (Note F)

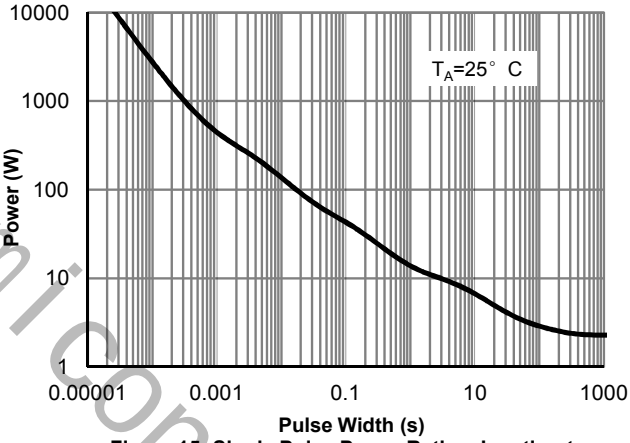

Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

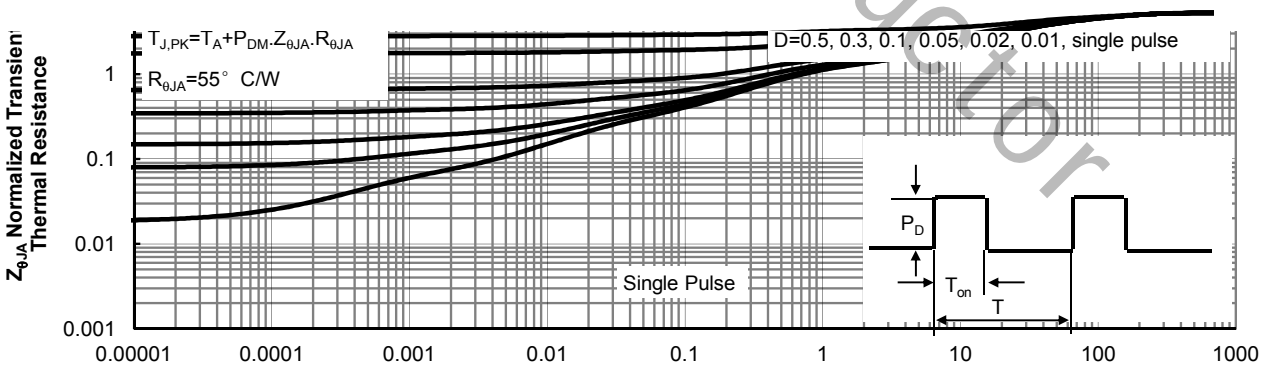

Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

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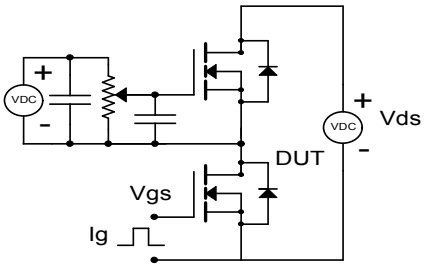
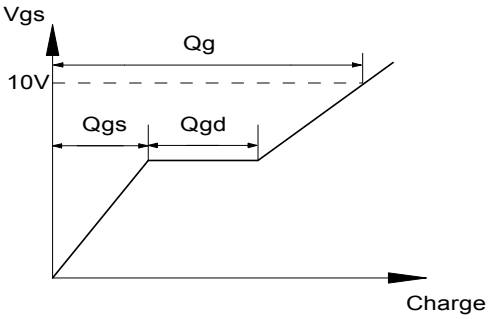
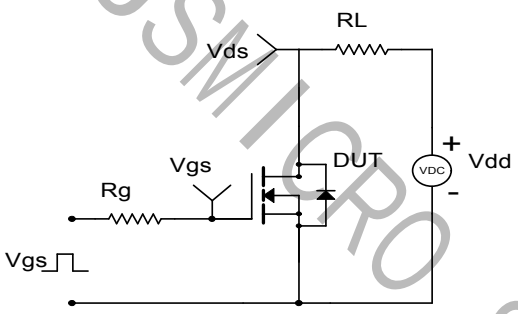
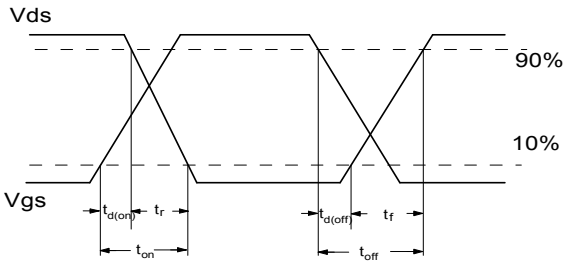
Gate Charge Test Circuit & Waveform



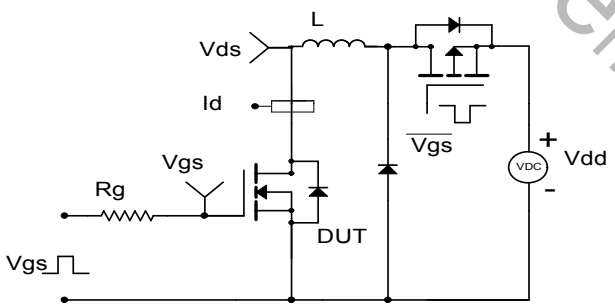


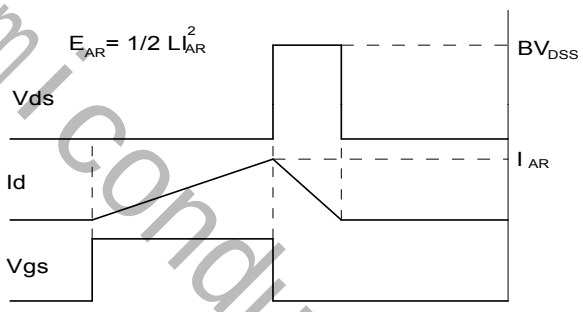
Resistive Switching Test Circuit & Waveforms



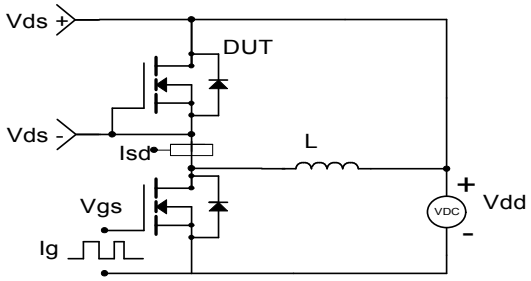


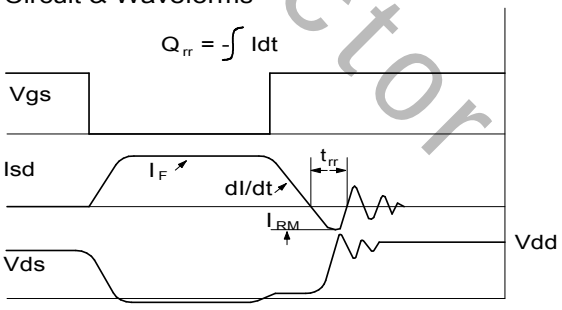
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





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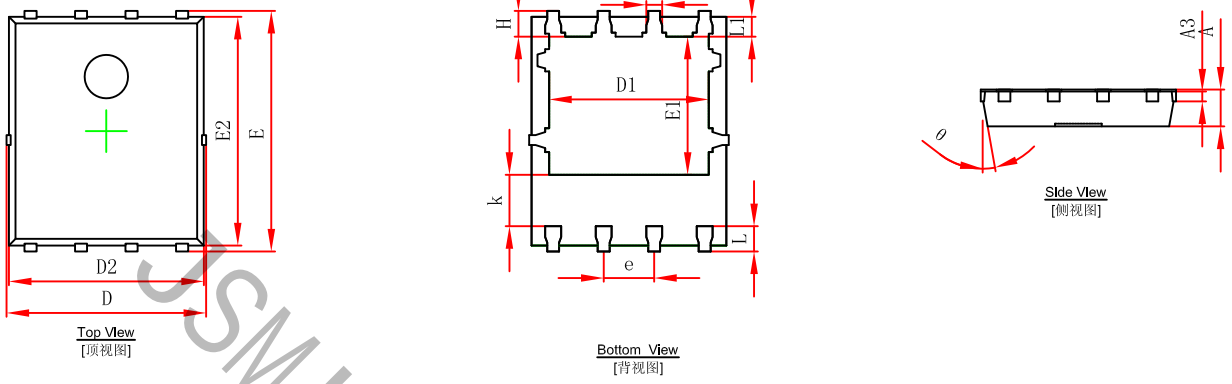
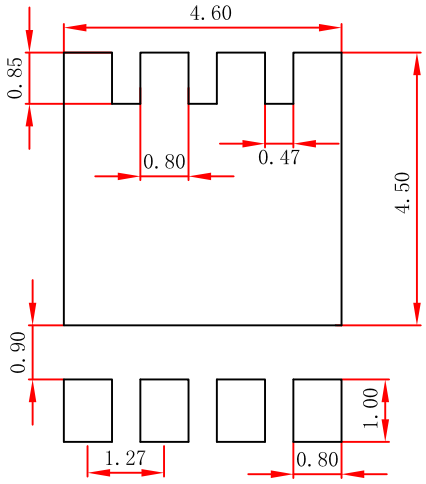
PDFNWB5x6-8L Package Outline Dimensions



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:±0.05mm.
3.The pad layout is for reference purposes only.

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