ZK17P05E

P-channel Enhancement Mode Power MOSFET

Features

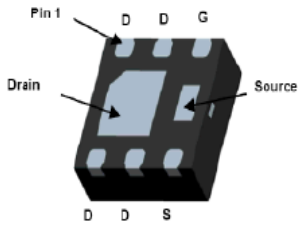
- Halogen free; RoHS compliant
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Pb free plating
- 100% UIS TESTED!
- 100% ΔVds TESTED!

Product Summary

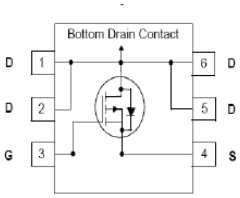
Parameters	Value	Unit
V_{DSS}	-12	V
$V_{GS(th)\_Typ}$	-0.6	V
I_D(@V_{GS}=-10V)	-4.1	A
$R_{DS(ON)\_Typ}$ @V_{GS}=-4.5V	24	mΩ
$R_{DS(ON)\_Typ}$ @V_{GS}=-2.5V	29	mΩ

Applications

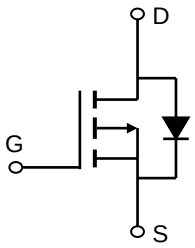
- Load Switch
- PWM Application
- Power Management



PDFN2x2-6L Bottom View



Marking



Schematic Diagram

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK17P05E	17P05	DFN2x2	Reel	N/A	N/A	5000

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-12	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_C = 25°C	I_D	-4.1	A
	T_C = 100°C		-2.9	
Pulsed Drain Current		I_{DM}	Refer to Fig.4	A
Power Dissipation		P_D	1.2	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	106	℃/W
Operating Junction and Storage Temperature Range		T_J ,T_{stg}	-55 to 150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D = -250uA	-12			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -12V, V_{GS} =0V			1.0	μA
Gate-body leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} =±12V			±100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250uA	-0.4	-0.6	-1.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-4.1A		24	31	mΩ
		V_{GS} =-2.5V, I_D =-3A		29	38	mΩ
Dynamic characteristics ④⑤						
Input capacitance	C_{iss}	V_{DS} =-6V,V_{GS} =0V f =1MHz		1010		pF
Output capacitance	C_{oss}			130		
Reverse transfer capacitance	C_{rss}			106		
Switching characteristics ④⑤						
Total gate charge	Q_g	V_{GS}=0 to -4.5V V_{DS}=-6V, I_D=-2A		10		nC
Gate-source charge	Q_{gs}			2		
Gate-drain charge	Q_{gd}			1		
Turn-on delay time	$t_{d(on)}$	V_{DD}=-6V,I_D=-2A V_{GS}=-10V,R_{GEN}=2.7Ω		5		ns
Turn-on rise time	t_r			12		
Turn-off delay time	$t_{d(off)}$			50		
Turn-off fall time	t_f			23		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=-4.1A			1.2	V
Continuous drain-source diode forward current	I_S ①				-4.1	A
Pulsed drain-source diode forward current	I_{SM} ②				-16	A
Reverse recovery time	trr	di/dt = 60A/μs, I_F = -2A		9		ns
Reverse recovery charge	Qrr			1.3		nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. RθJA is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB.
3. RθJA is measured with the device mounted on a 1inch2 pad of 2oz copper FR4 PCB.
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Power De-rating

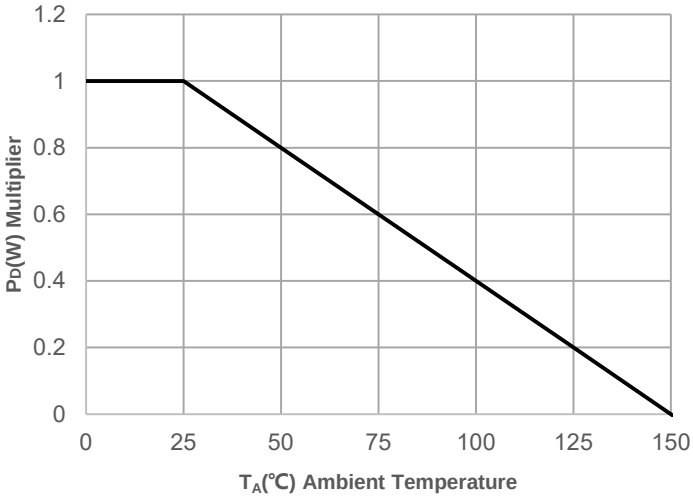


Figure 2: Current De-rating

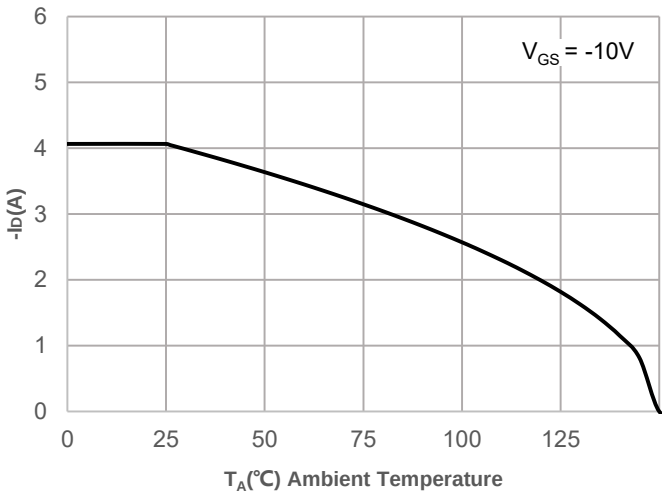


Figure 3: Normalized Maximum Transient Thermal Impedance

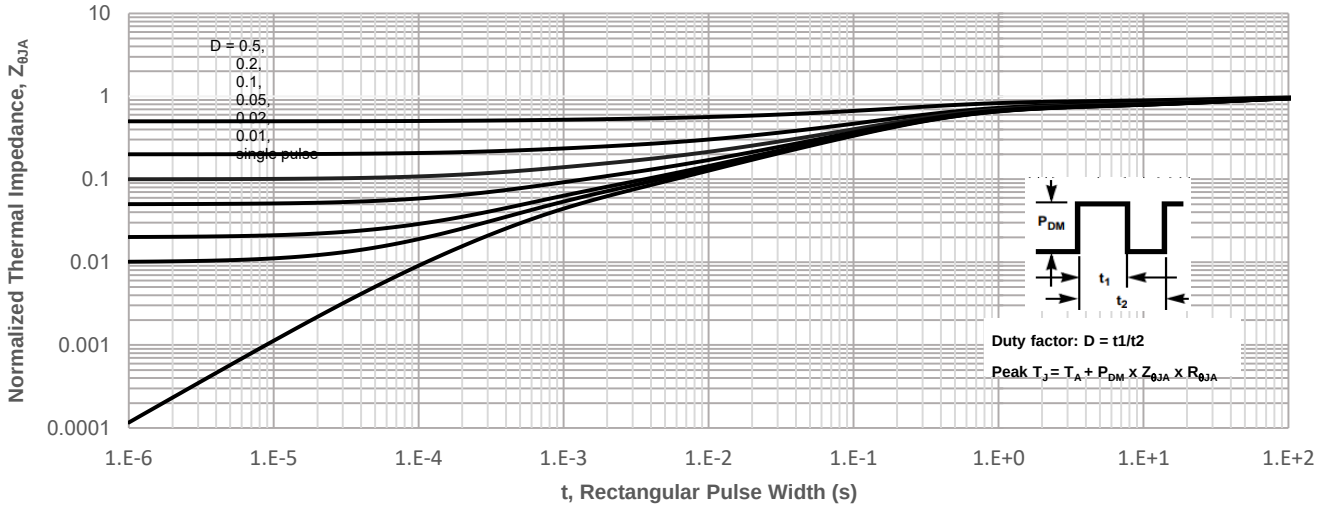
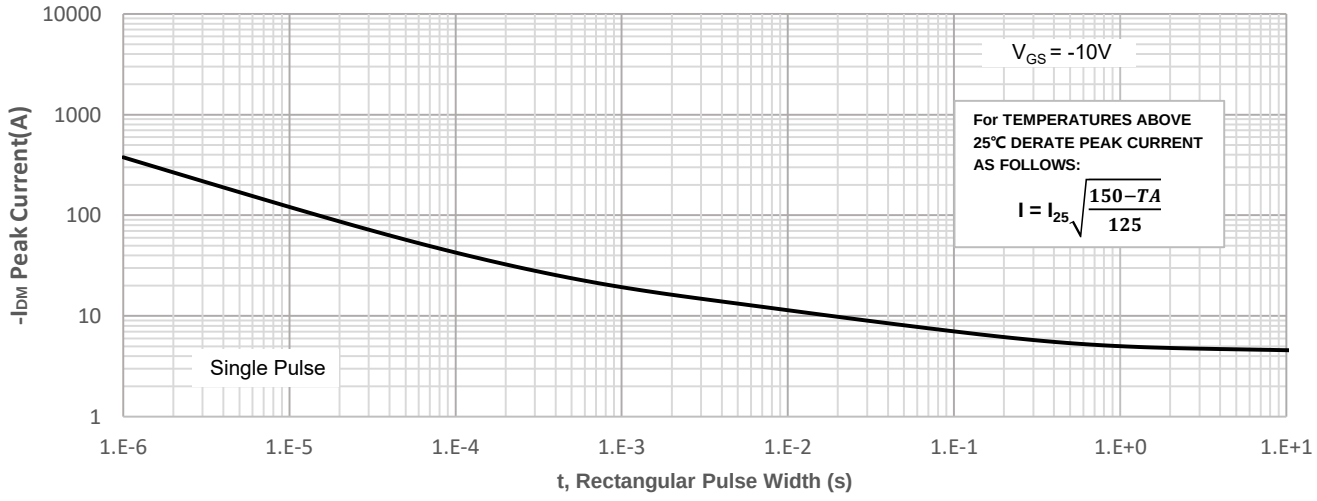


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

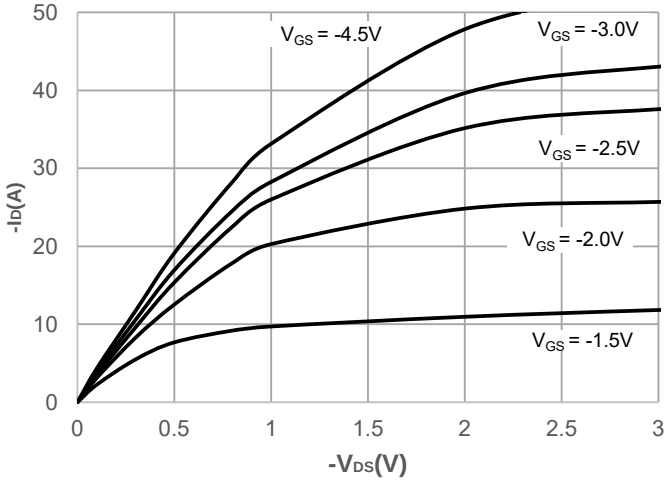


Figure 6: Typical Transfer Characteristics

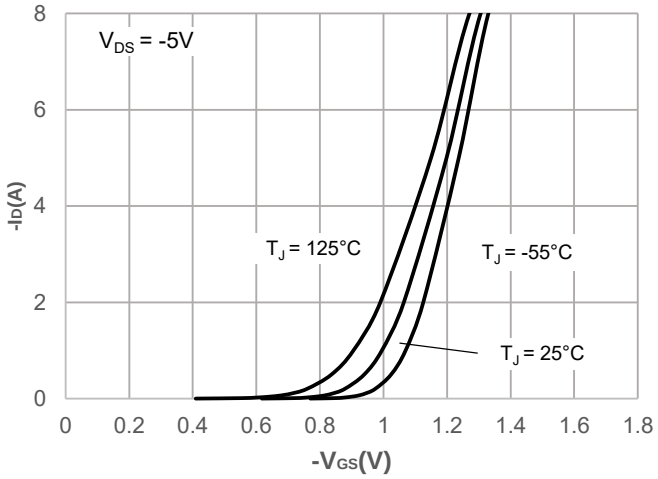


Figure 7: On-resistance vs. Drain Current

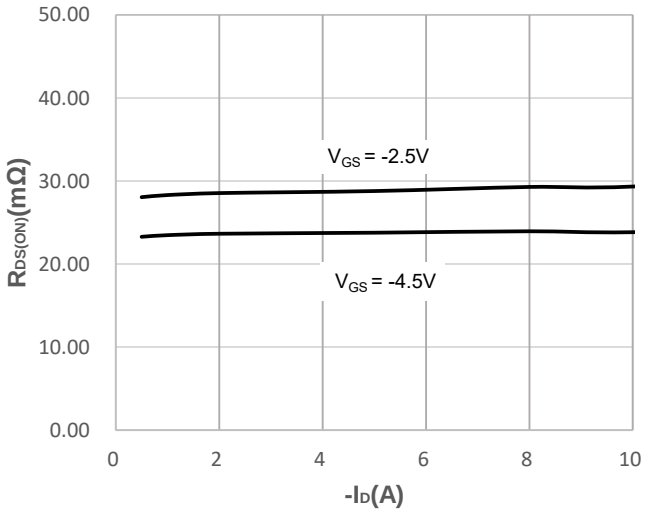


Figure 8: Body Diode Characteristics

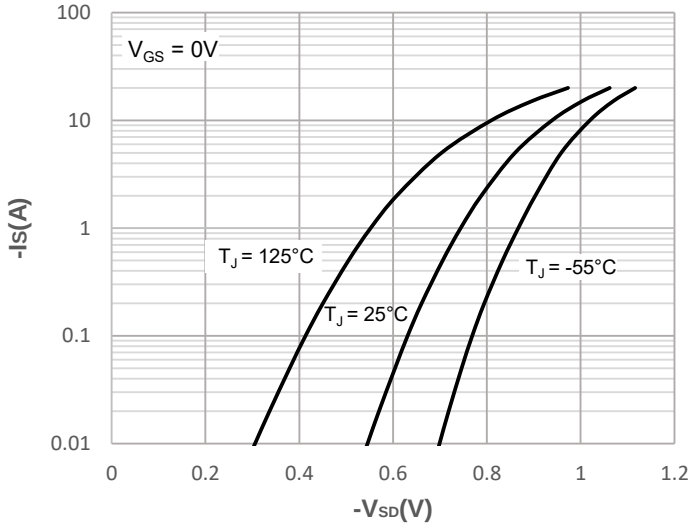


Figure 9: Gate Charge Characteristics

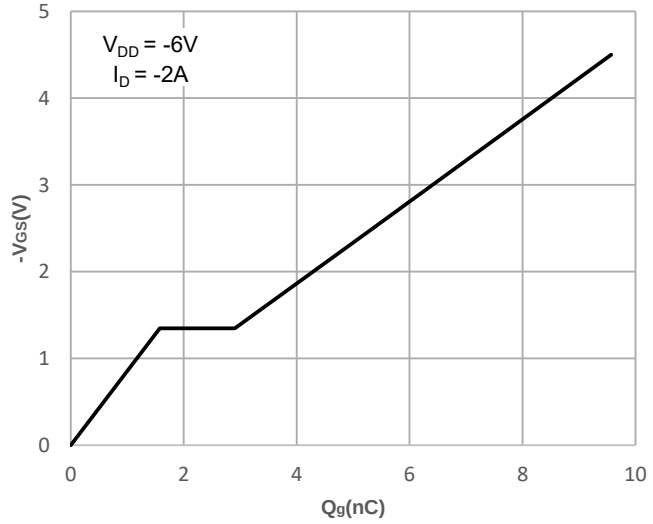
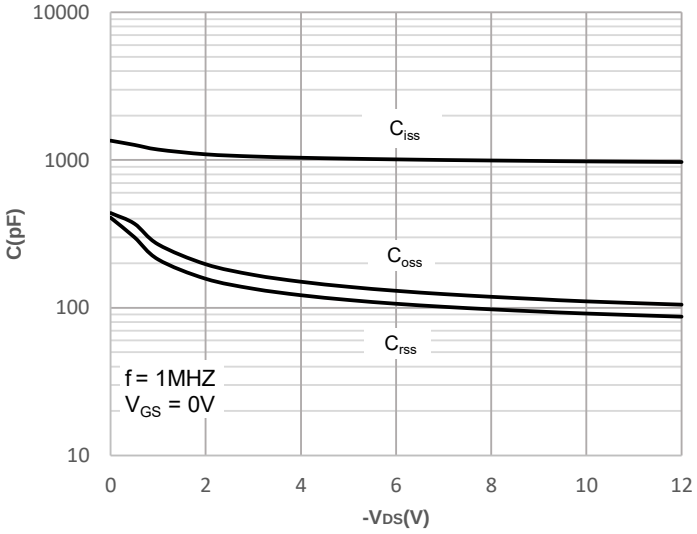


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

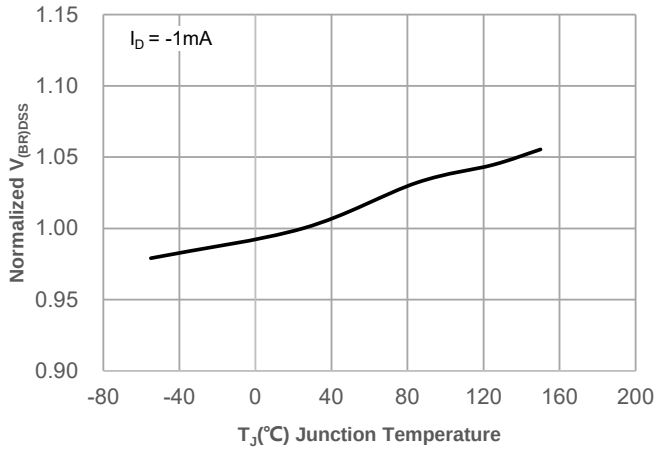


Figure 12: Normalized on Resistance vs. Junction Temperature

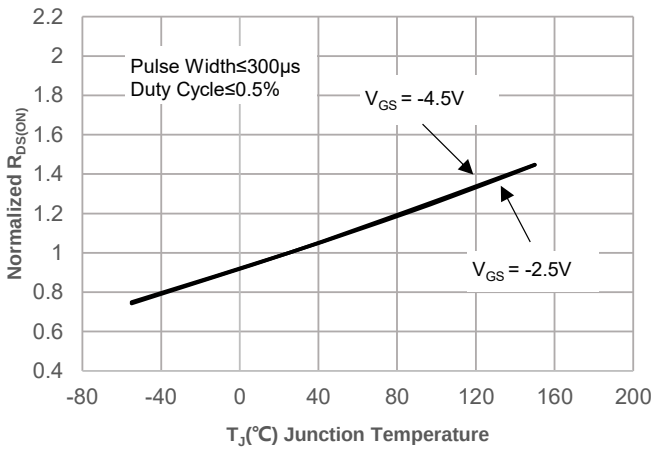


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

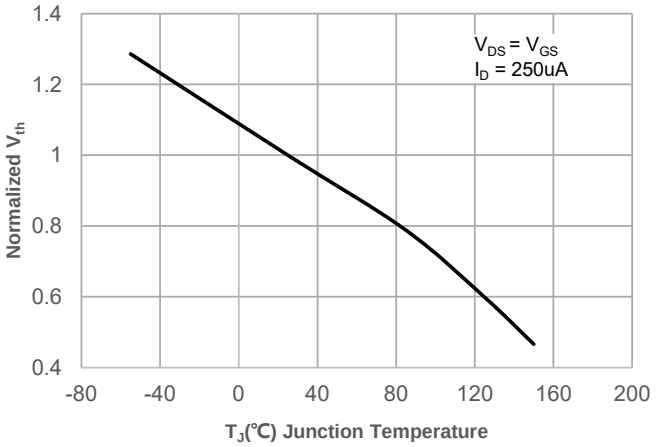


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

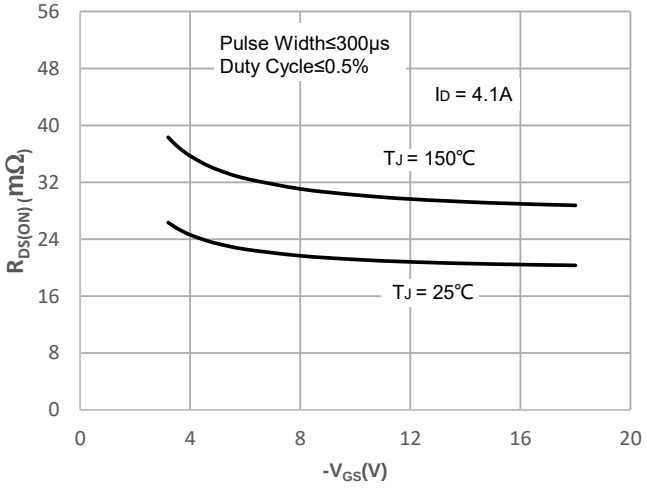
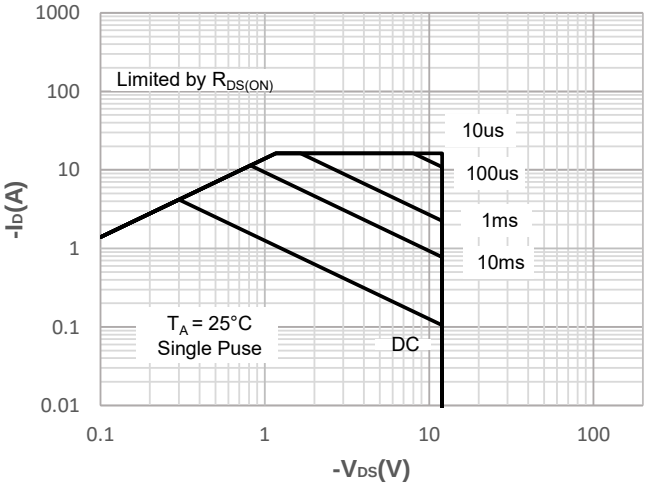


Figure 15: Maximum Safe Operating Area



Test Circuit

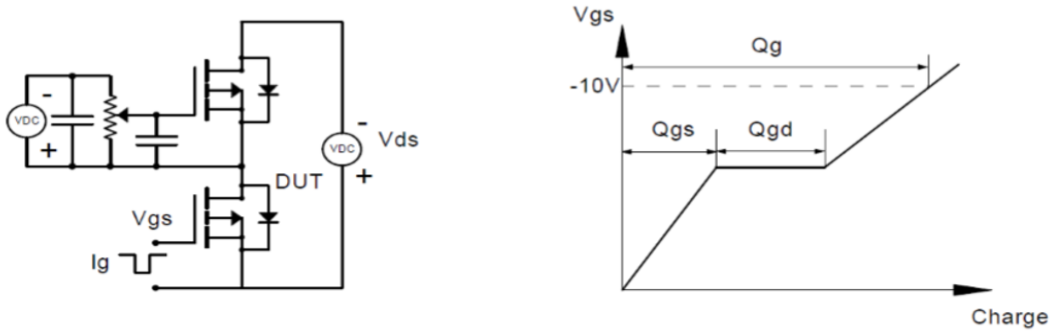


Figure 1: Gate Charge Test Circuit & Waveform

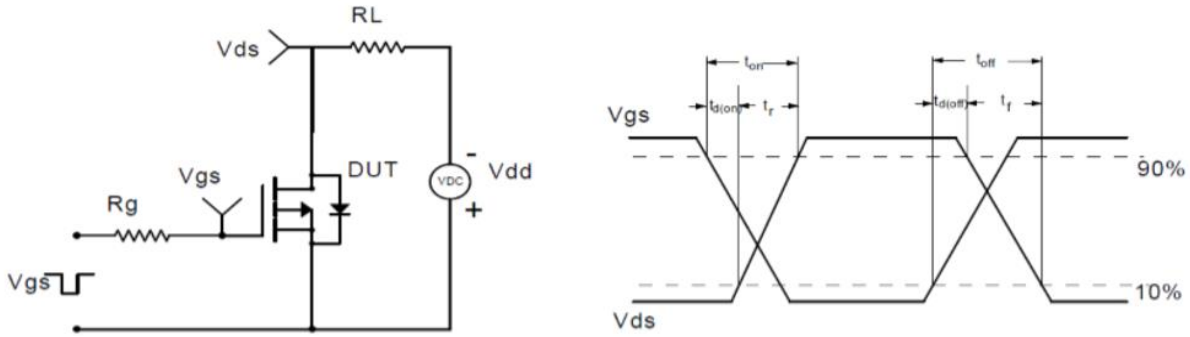


Figure 2: Resistive Switching Test Circuit & Waveform

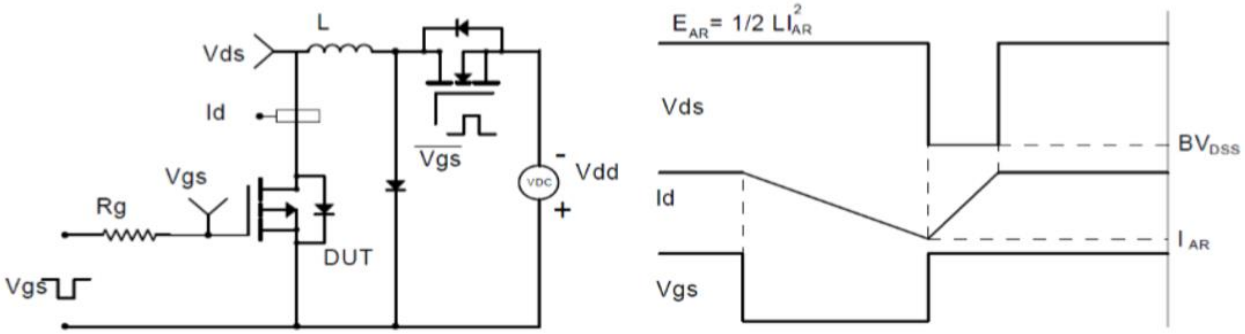


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

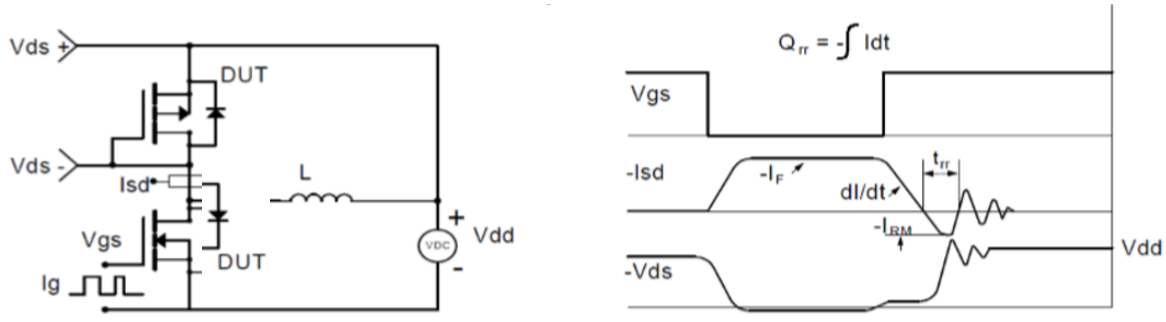
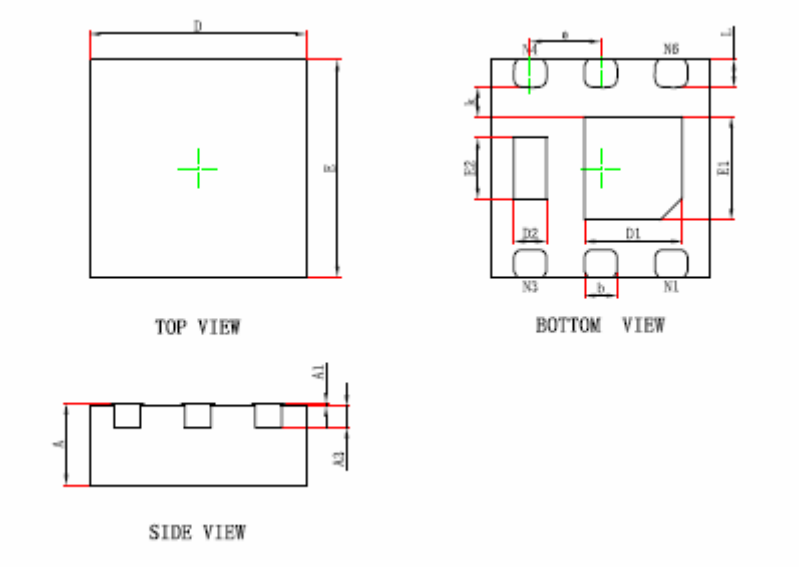


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN2x2-6L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013