
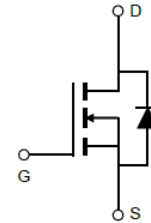
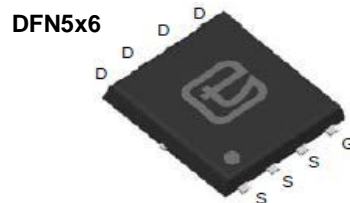


**45V N-Channel SGT MOSFET**

<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>● Trench Power SGT technology</li> <li>● Very low on-resistance <math>R_{DS(ON)}</math></li> <li>● Low Gate Charge</li> <li>● Excellent Gate Charge x <math>R_{DS(ON)}</math> Product</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>● High Frequency Switching and Synchronous Rectification</li> </ul>	<p><b>Product Summary</b></p> <table> <tr> <td><math>V_{DS}</math></td> <td>45V</td> </tr> <tr> <td><math>I_D</math> (at <math>V_{GS}=10V</math>)</td> <td>100A</td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=10V</math>)</td> <td>&lt; 1.7m<math>\Omega</math></td> </tr> <tr> <td><math>R_{DS(ON)}</math> (at <math>V_{GS}=4.5V</math>)</td> <td>&lt; 2.4m<math>\Omega</math></td> </tr> </table> <p>100% DVDS Tested 100% UIS Tested 100% Rg Tested</p> 	$V_{DS}$	45V	$I_D$ (at $V_{GS}=10V$ )	100A	$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 1.7m $\Omega$	$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	< 2.4m $\Omega$
$V_{DS}$	45V								
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$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	< 2.4m $\Omega$								



Part Number	Package Type	Form	Marking
TSG017N045AT	DFN5x6	Tape & Reel	TSG017N045AT

**Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	45	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>B</sup>	$I_D$	$T_C = 25^\circ\text{C}$	100 (package limited)
		$T_C = 100^\circ\text{C}$	100 (package limited)
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	400	A
Avalanche Current <sup>A</sup>	$I_{AS}$	58	A
Single Pulse Avalanche Energy	$E_{AS}$	504.6	mJ
Power Dissipation <sup>C</sup>	$P_D$	$T_C = 25^\circ\text{C}$	125
		$T_C = 100^\circ\text{C}$	50
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Case	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Ambient	$R_{\theta JA}$	50	



Electrical Characteristics( $T_J = 25^\circ\text{C}$ unless otherwise noted)						
Symbol	Parameter	Conditions	Value			Units
			Min	Typ	Max	
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	45			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 45\text{V}, V_{GS} = 0\text{V}$	$T_J = 25^\circ\text{C}$		1	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$		100	
$I_{GSS}$	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1	1.6	2.4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{V}, I_D = 30\text{A}$		1.5	1.7	$\text{m}\Omega$
		$V_{GS} = 4.5\text{V}, I_D = 30\text{A}$		2	2.4	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		56.8		S
$V_{SD}$	Diode Forward Voltage	$I_S = 30\text{A}, V_{GS} = 0\text{V}$			1	V
$I_S$	Maximum Body-Diode Continuous Current <sup>B</sup>				100	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		5096		$\text{pF}$
$C_{oss}$	Output Capacitance			1213		
$C_{rss}$	Reverse Transfer Capacitance			140		
$R_g$	Gate Resistance	$f = 1\text{MHz}$		3.4		$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS} = 10\text{V}, V_{DS} = 20\text{V}, I_D = 20\text{A}$		82		nC
$Q_g(4.5\text{V})$	Total Gate Charge			38		
$Q_{gs}$	Gate Source Charge			16		
$Q_{gd}$	Gate Drain Charge			12		
$Q_{oss}$	Output Charge	$V_{GS} = 0\text{V}, V_{DS} = 20\text{V}$		49.6		
$t_{D(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 20\text{V}, I_D = 20\text{A}, R_G = 1.6\Omega$		26		ns
$t_r$	Turn-On Rise Time			5		
$T_{D(off)}$	Turn-Off Delay Time			47		
$t_f$	Turn-Off Fall Time			10.5		
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$		35		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge			78		nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation  $P_D$  is based on  $T_{J(MAX)} = 150^\circ\text{C}$ , using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.



### TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

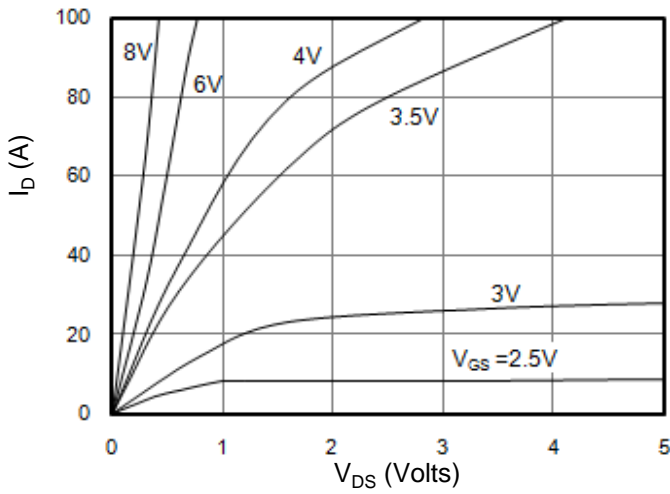


Figure 1: On-Region Characteristics

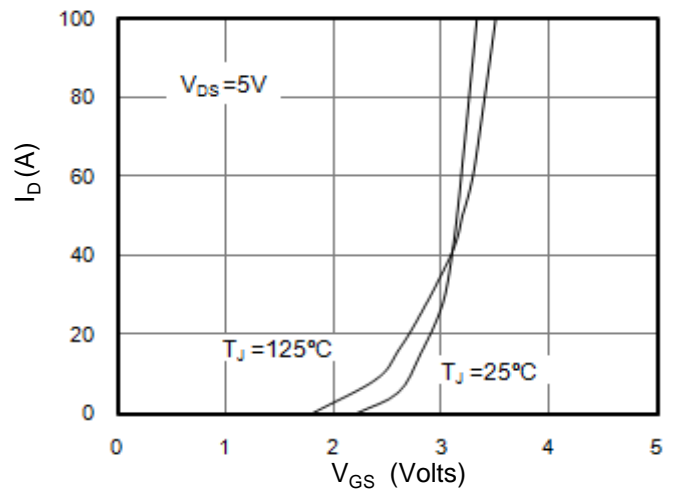


Figure 2: Transfer Characteristics

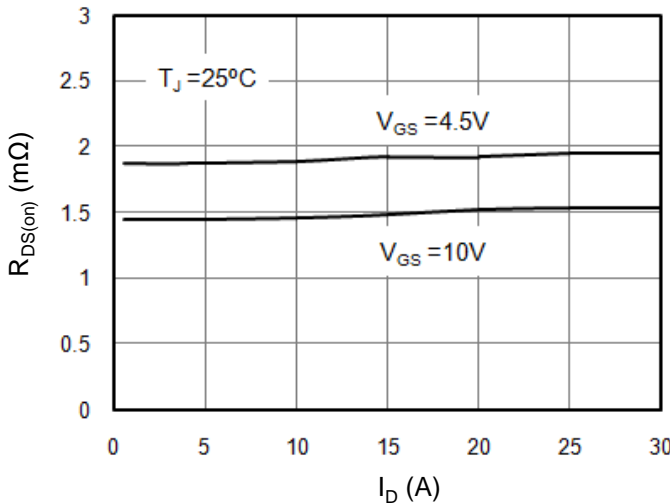


Figure 3: On-Resistance vs. Drain Current

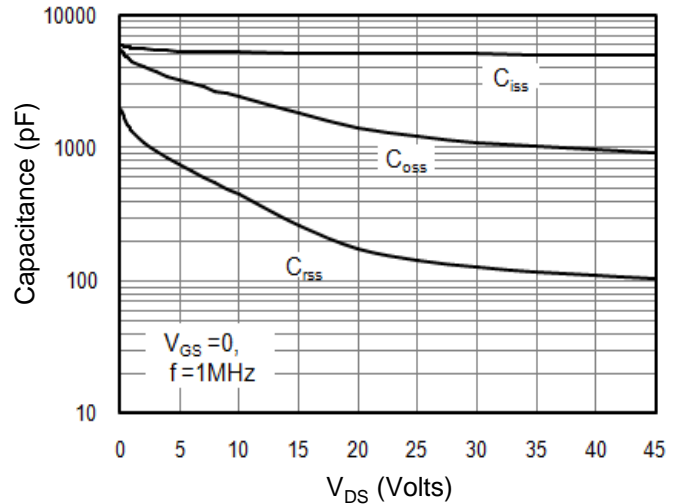


Figure 4: Capacitance Characteristics

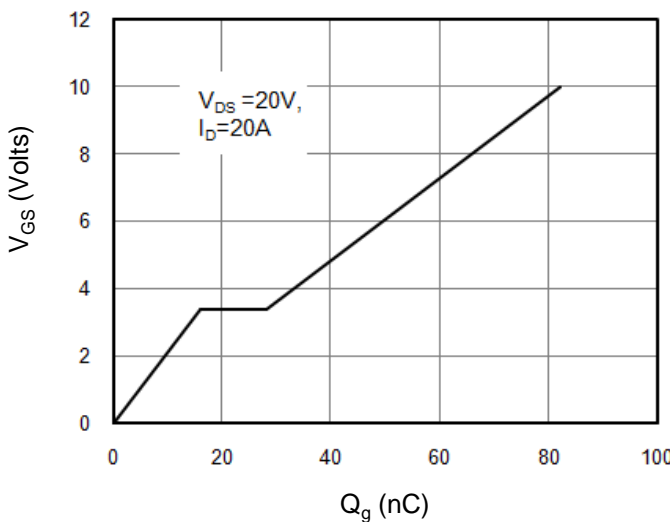


Figure 5: Gate Charge Characteristics

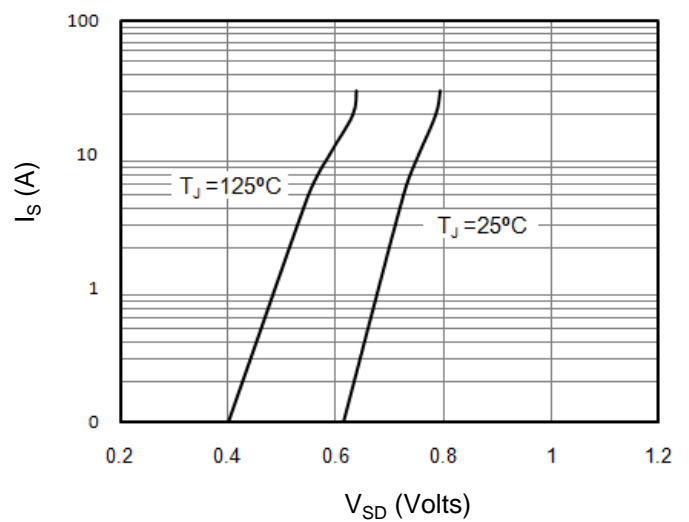


Figure 6: Body Diode Forward Voltage



### TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

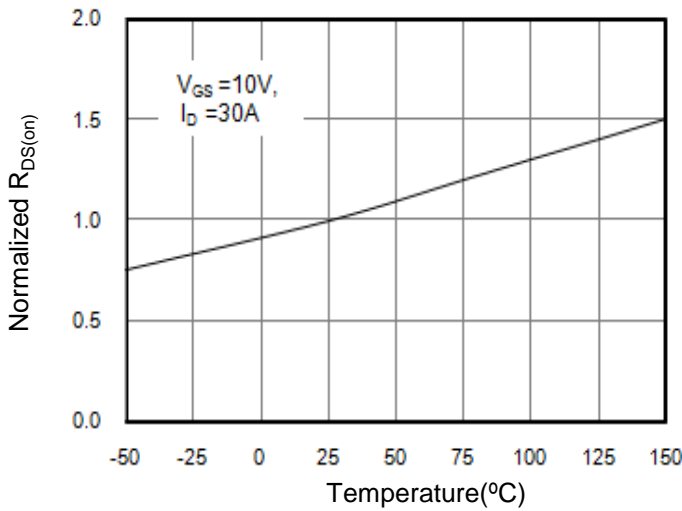


Figure 7: On-Resistance vs. Junction Temperature

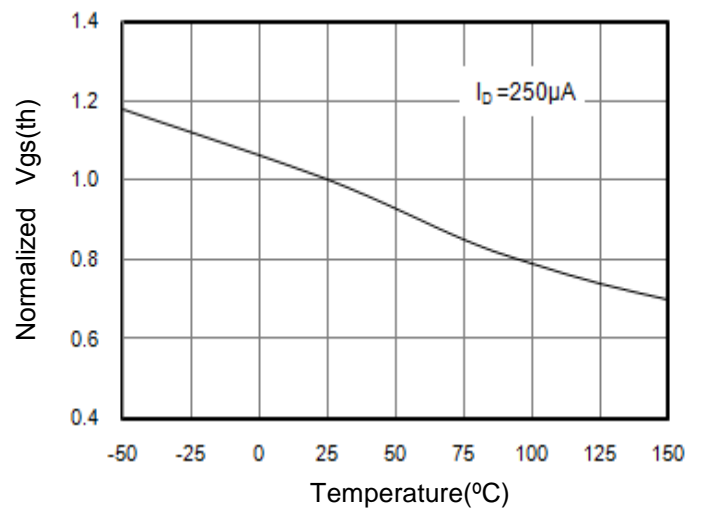


Figure 8: V\_GS(th) vs. Junction Temperature

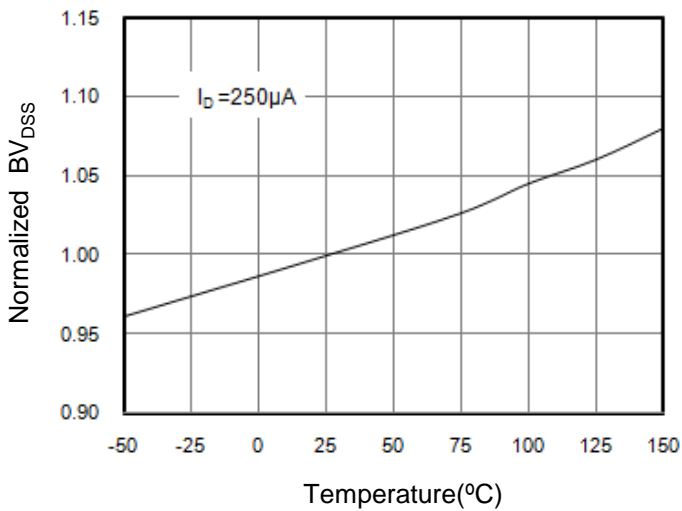


Figure 9: BV\_DSS vs. Junction Temperature

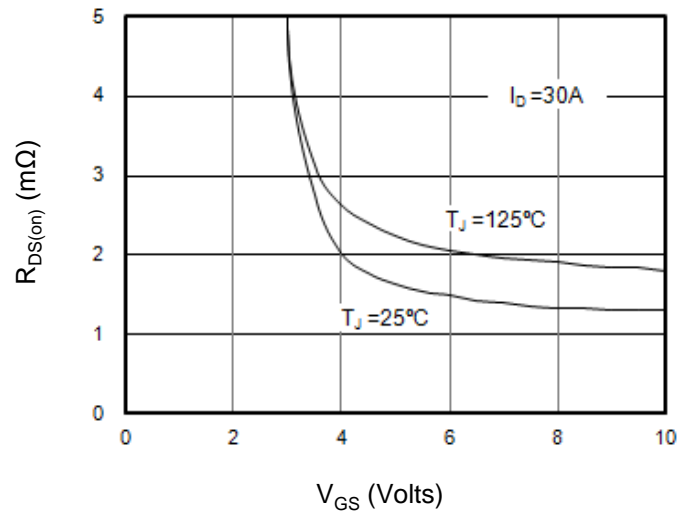


Figure 10: On-Resistance vs. Gate-Source Voltage

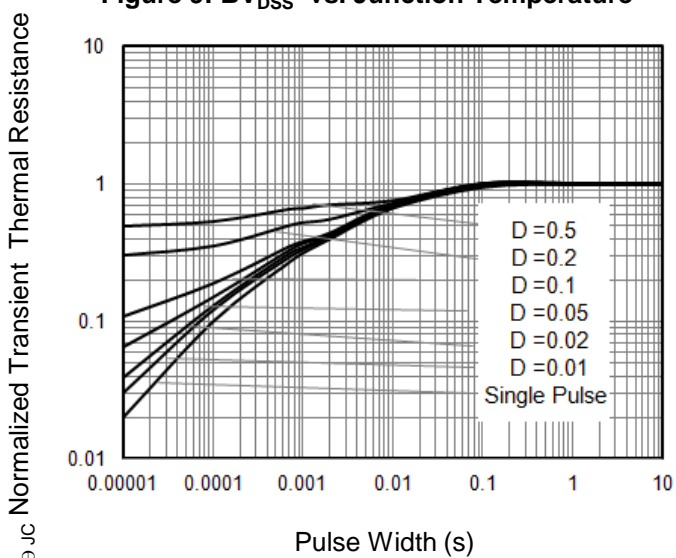


Figure 11: Normalized Transient Thermal Resistance

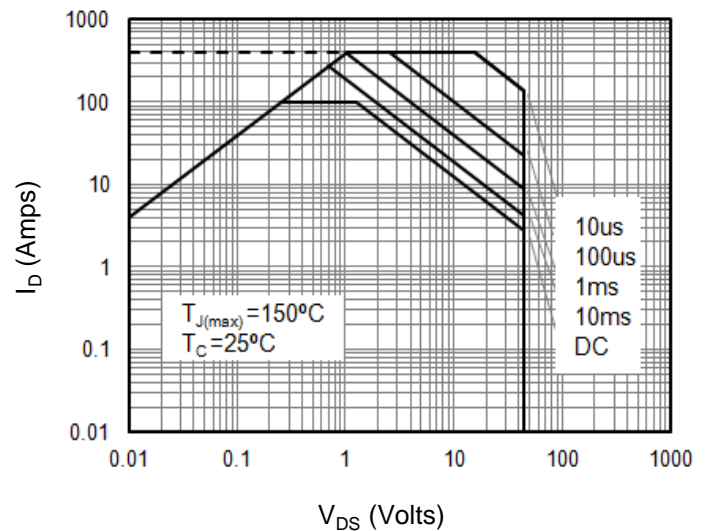


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveforms

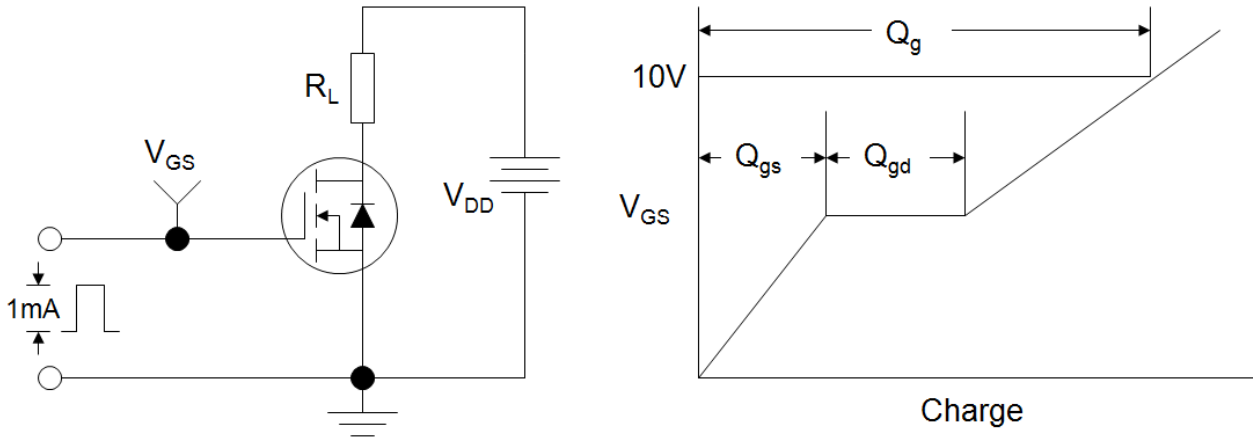


Figure B: Resistive Switching Test Circuit and Waveforms

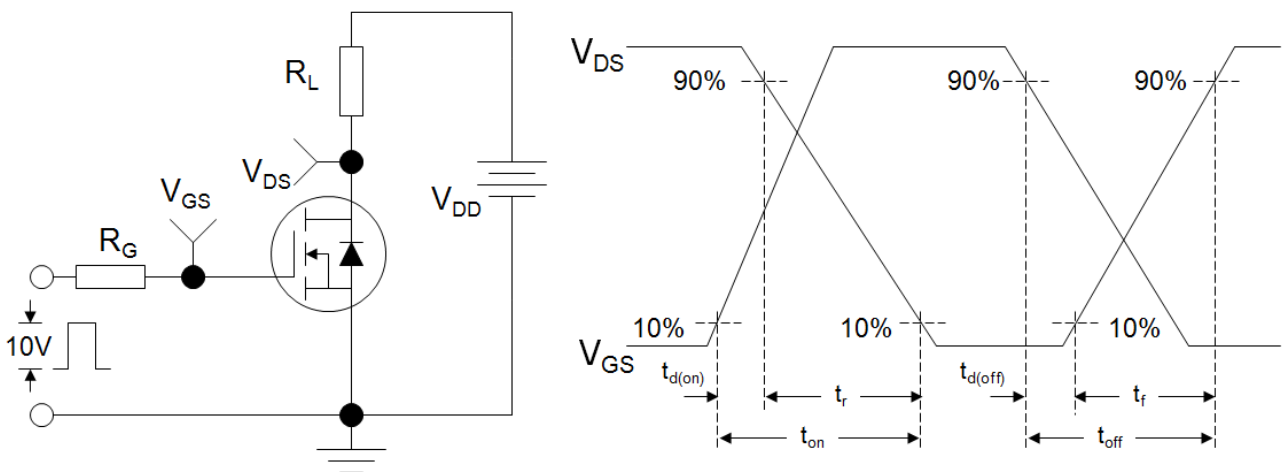
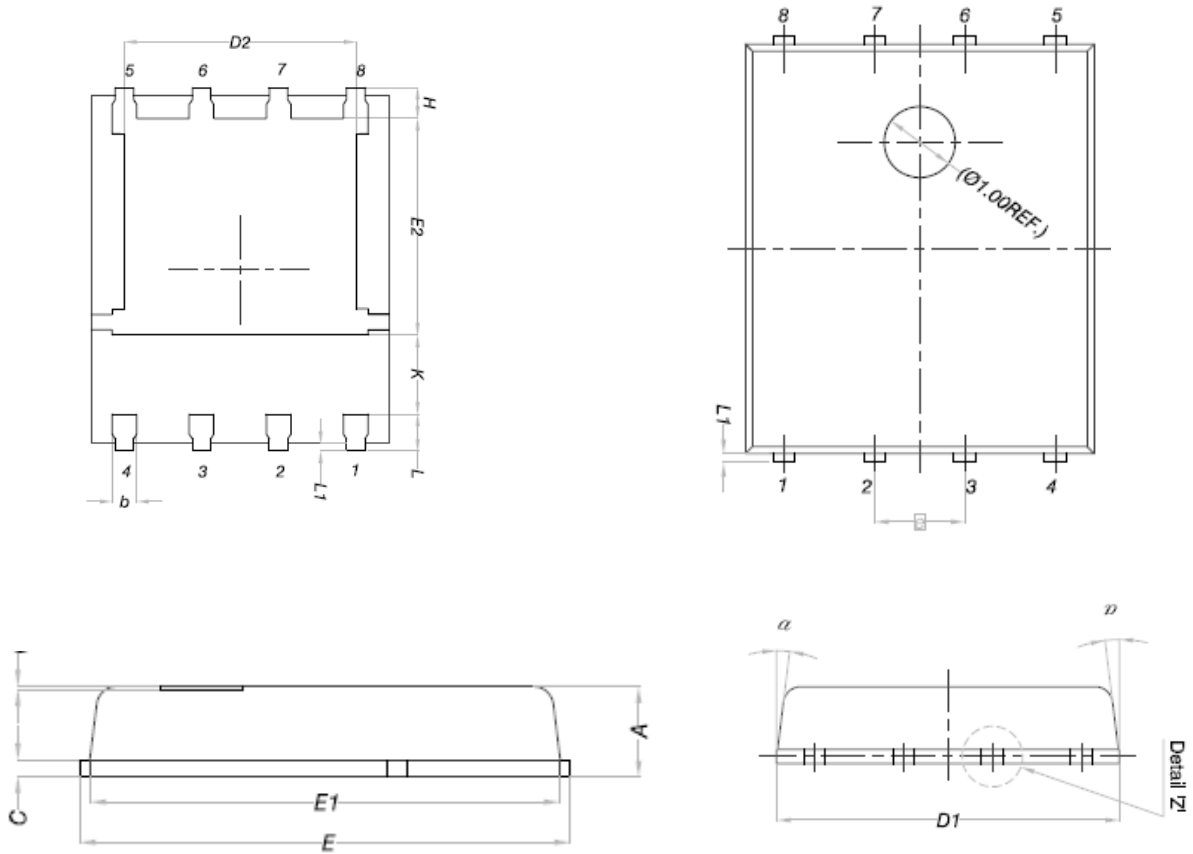


Figure C: Unclamped Inductive Switching (UIS) Test Circuit and Waveforms





## DFN5x6



DIM.	MILLIMETERS			DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.90	1.00	1.10	E	5.90	6.00	6.10
A1	0	-	0.05	E1	5.70	5.75	5.80
b	0.33	0.41	0.51	E2	3.38	3.58	3.78
C	0.20	0.25	0.30	e	1.27 BSC		
D1	4.80	4.90	5.00	H	0.41	0.51	0.61
D2	3.61	3.81	3.96	K	1.10	-	-
				L	0.51	0.61	0.71
				L1	0.06	0.13	0.20
				α	0°	-	12°



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