

## General Description:

The BM1005 uses SGT technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications. The package form is SOT23, which accords with the ROHS standard and Halogen Free standard.

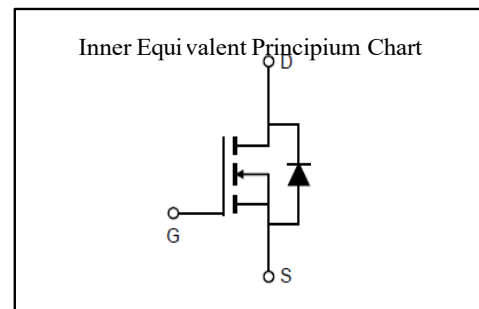
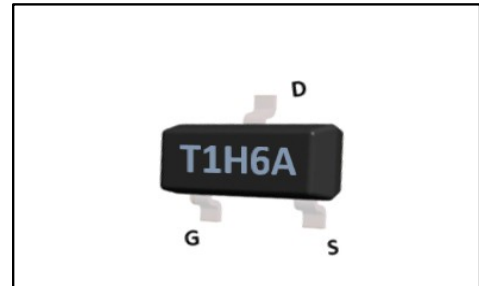
## Features:

- Fast Switching
- Low Gate Charge and  $R_{DS(ON)}$
- Low Reverse transfer capacitances

## Applications:

- DC-DC Converter
- Portable Equipment
- Power Management

$V_{DSS}$	100	V
$I_D$	4.0	A
$P_D$	1.5	W
$R_{DS(ON)}$ TYPE	100	m $\Omega$



## Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
$V_{DSS}$	Drain-to-Source Voltage		100	V
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	4.0	A
	Continuous Drain Current	$T_A=100^\circ\text{C}$	2.5	A
$I_{DM}^{a1}$	Pulsed Drain Current		12	A
$V_{GS}$	Gate-to-Source Voltage		$\pm 20$	V
$P_D$	Power Dissipation		1.5	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range		150, -55 to 150	$^\circ\text{C}$
$T_L$	Maximum Temperature for Soldering		260	$^\circ\text{C}$

## Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JA}^{a2}$	Thermal Resistance, Junction-to-Ambient	83	$^\circ\text{C}/\text{W}$

**Electrical Characteristic** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$V_{DSS}$	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$	--	--	1.0	$\mu A$
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V, V_{DS}=0V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V, V_{DS}=0V$	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.4	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=4.0A$	--	100	120	m $\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=4.5V, I_D=3.0A$	--	120	145	m $\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$	--	126	--	pF
$C_{oss}$	Output Capacitance	$V_{DS} = 50V$	--	41	--	
$C_{rss}$	Reverse Transfer Capacitance	$f = 1.0MHz$	--	2.0	--	
$R_G$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$	--	5.8	--	$\Omega$

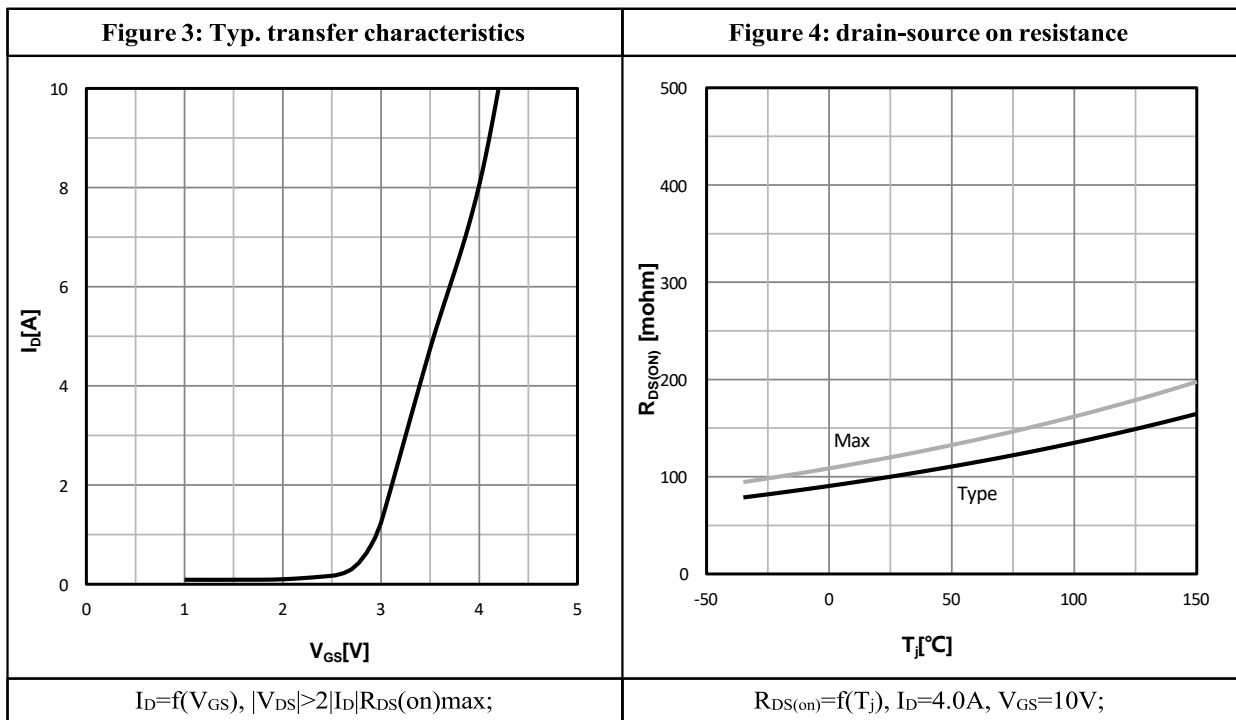
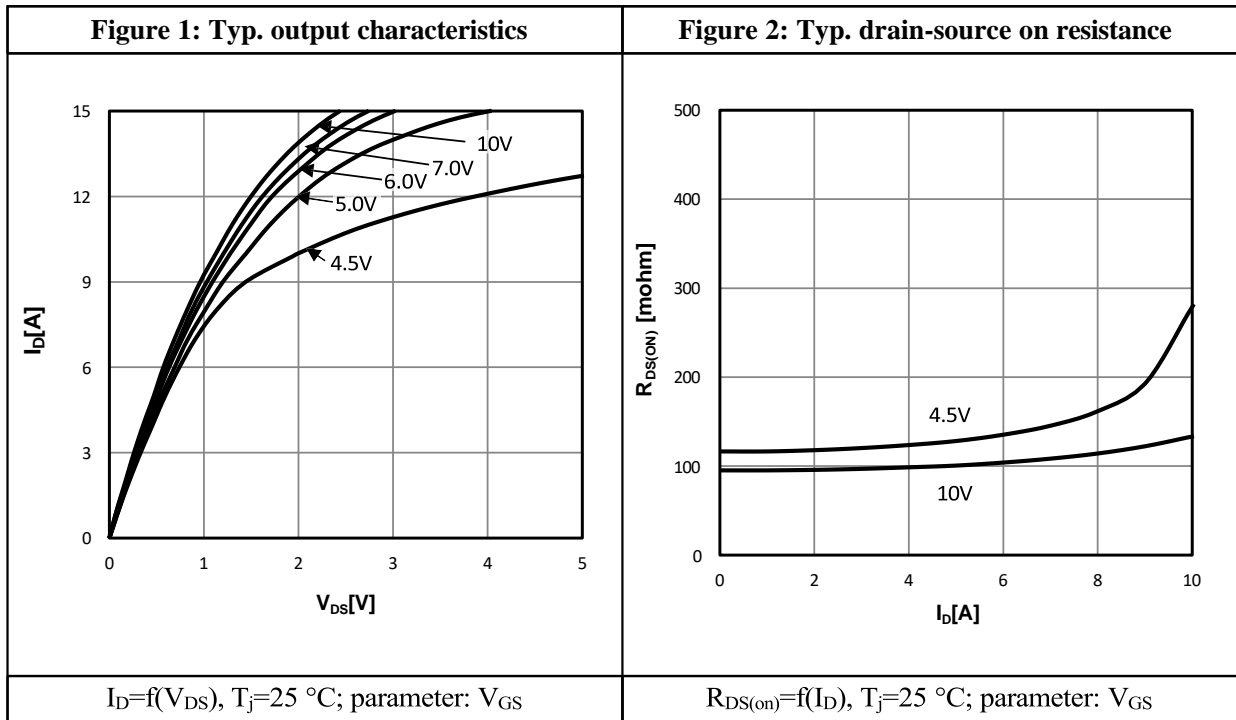
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D = 4.0A$ $V_{DS} = 50V$ $V_{GS} = 10V$ $R_G = 5.0\Omega$	--	4.5	--	ns
$t_r$	Rise Time		--	1.5	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	8.0	--	
$t_f$	Fall Time		--	3.4	--	
$Q_g$	Total Gate Charge	$V_{GS} = 10V$	--	4.0	--	nC
$Q_{gs}$	Gate Source Charge	$V_{DS} = 50V$	--	1.1	--	
$Q_{gd}$	Gate Drain Charge	$I_D = 4.0A$	--	0.8	--	

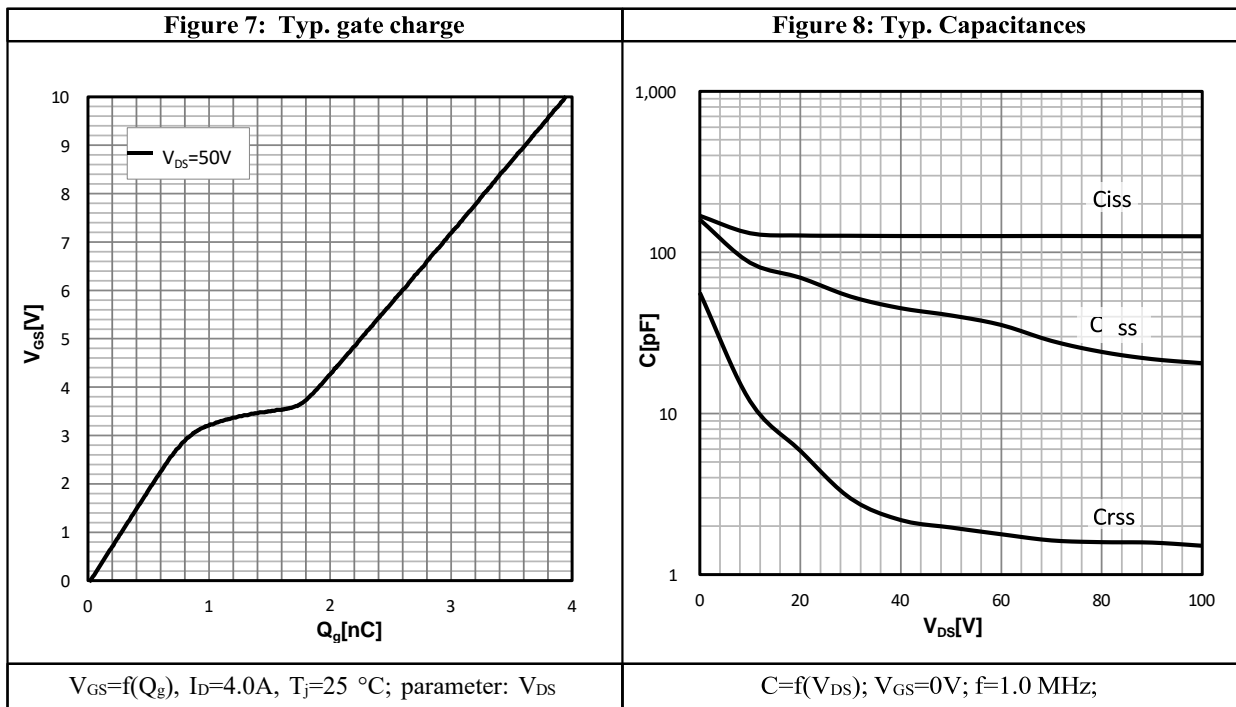
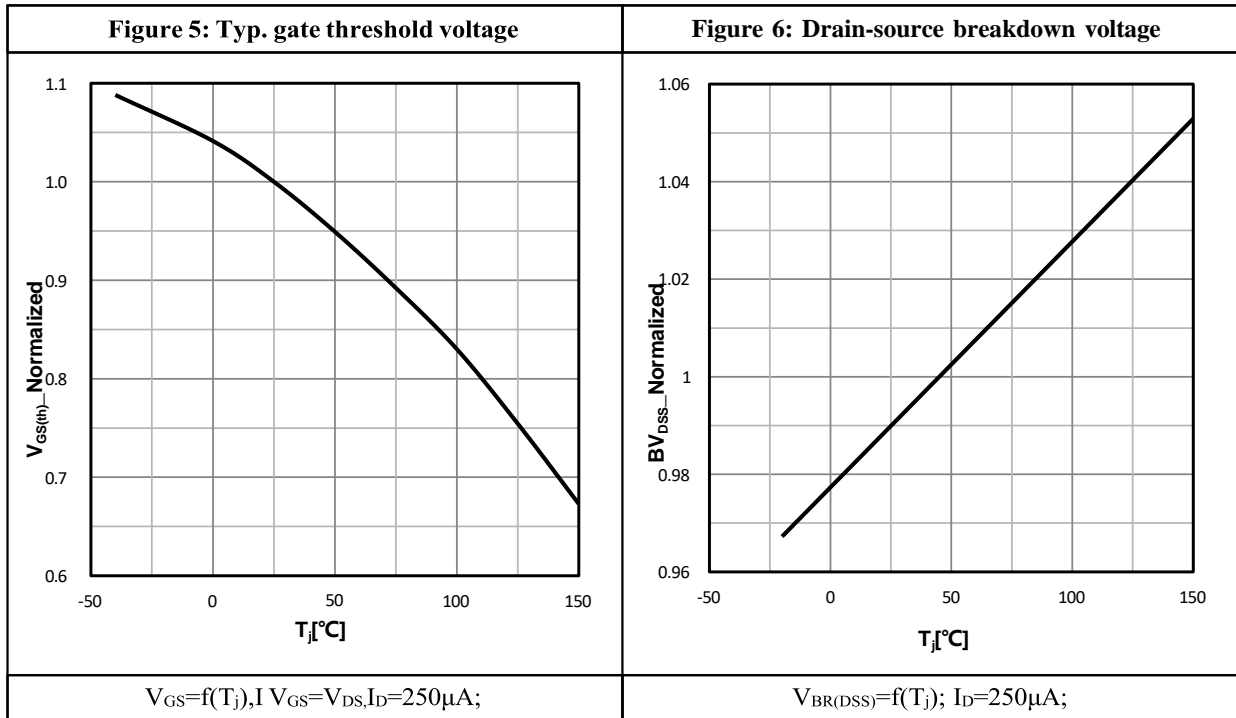
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
$I_S$	Diode Forward Current	$T_A = 25\text{ }^\circ\text{C}$	--	--	4.0	A
$V_{SD}$	Diode Forward Voltage	$I_S=4.0A, V_{GS}=0V$	--	--	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_S=4.0A, V_{DD}=50V$ $dI/dt=100A/\mu s$	--	26	--	ns
$Q_{rr}$	Reverse Recovery Charge		--	20	--	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature a2:

Surface Mounted on FR4 Board,  $t \leq 10$  sec.

## Characteristics Curve:





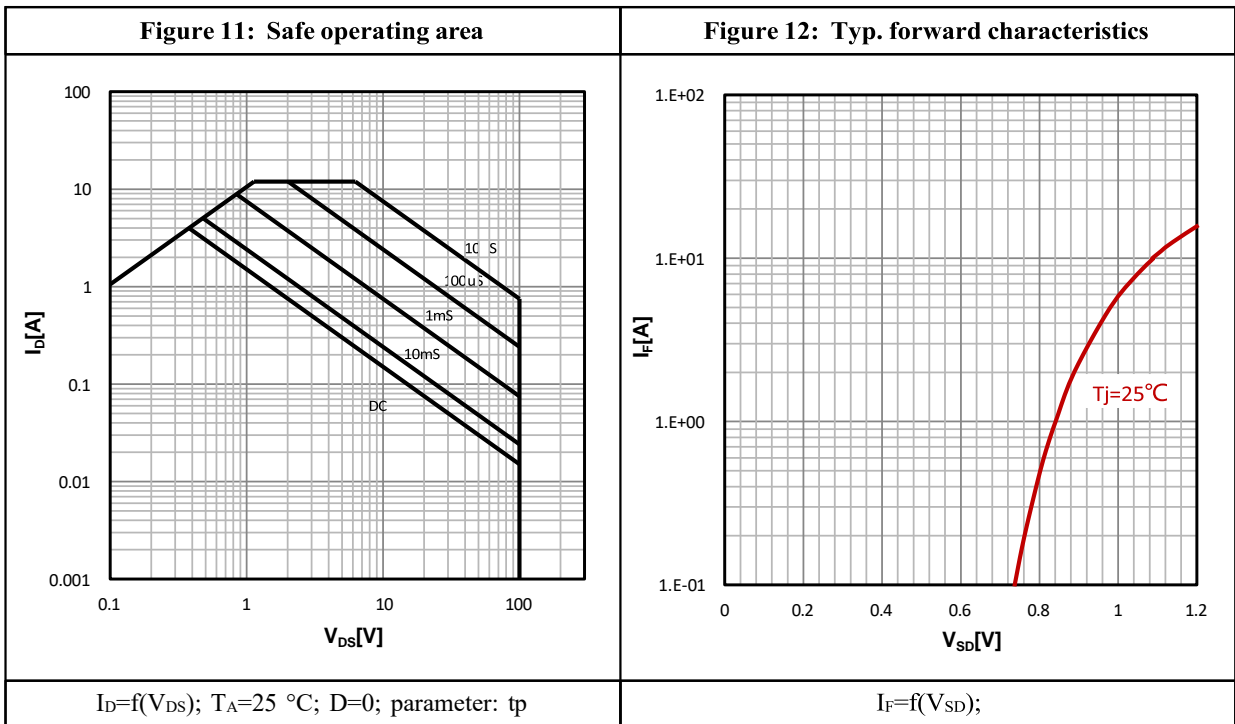
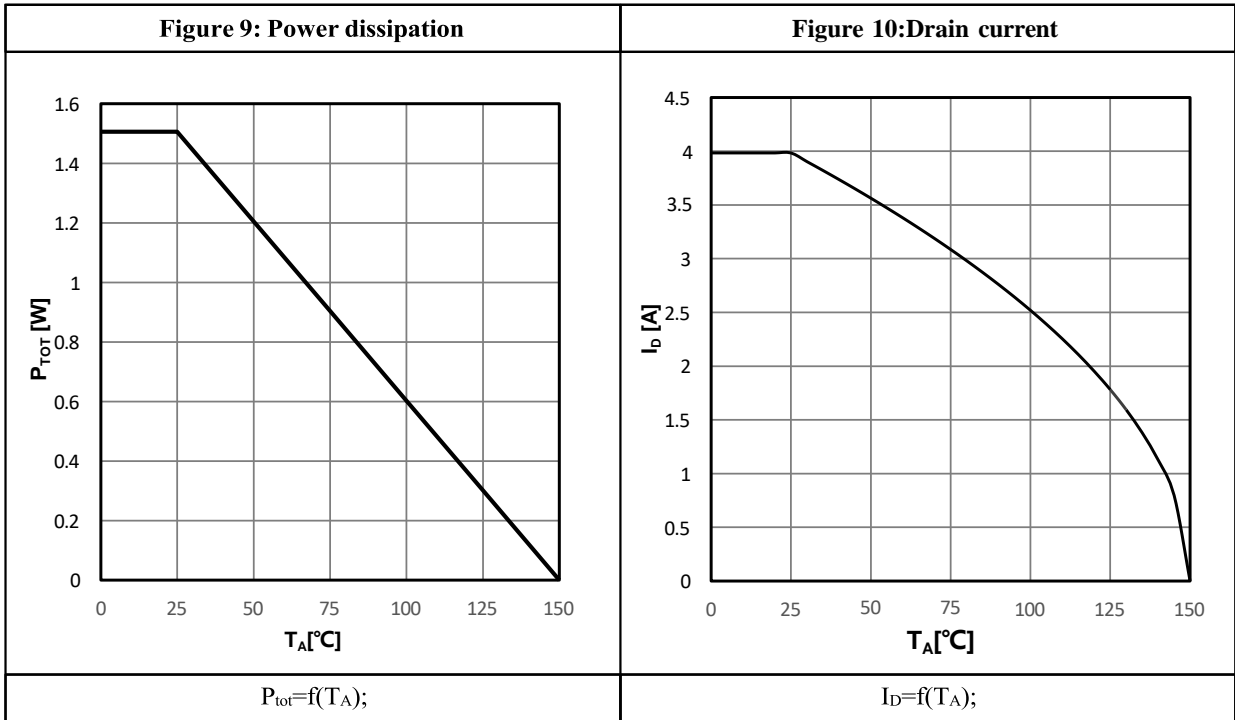
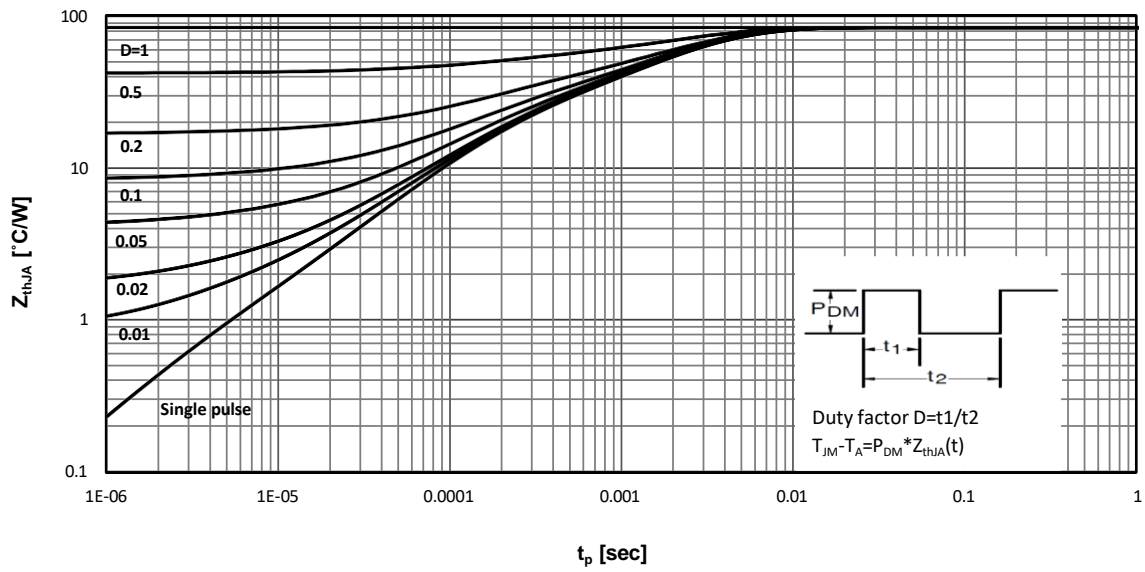


Figure 13: Max. Transient Thermal Impedance



$Z_{thJA} = f(t_p)$ ; parameter: D

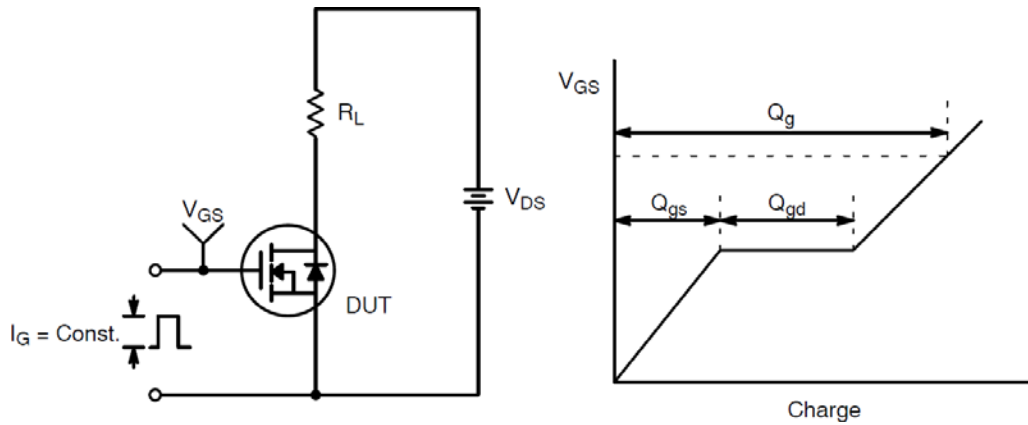


Figure 14: Gate Charge Test Circuit & Waveform

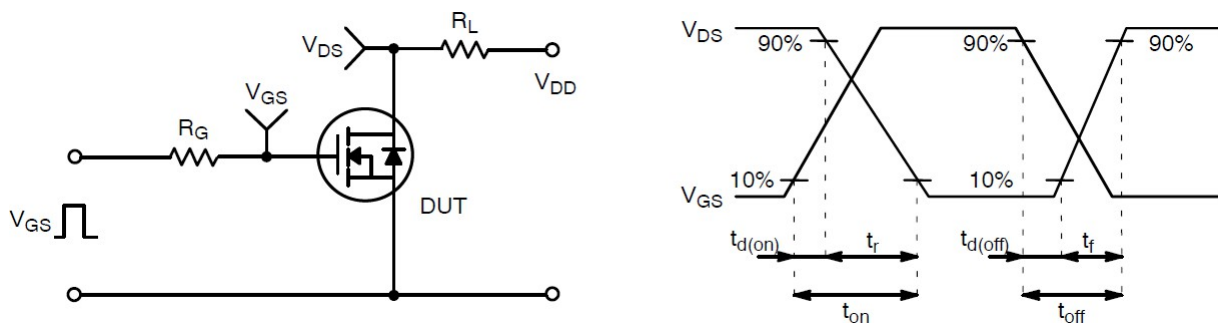


Figure 15: Resistive Switching Test Circuit & Waveforms

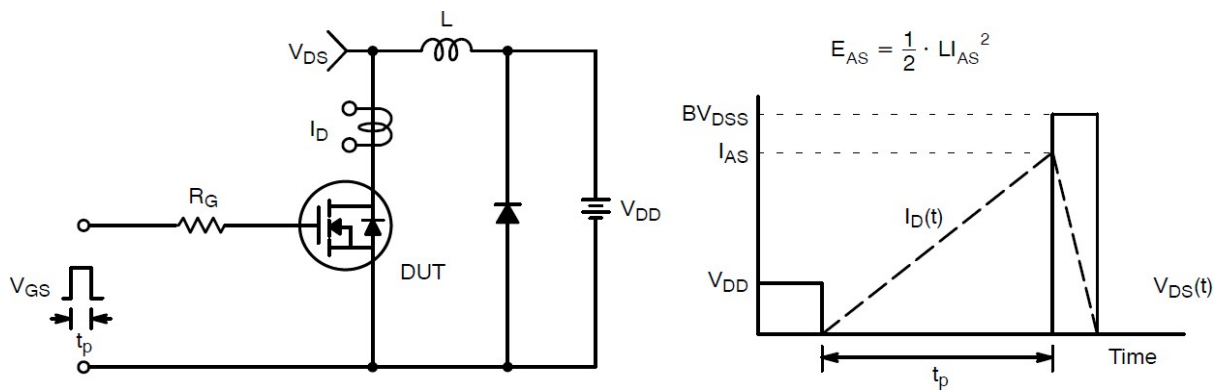
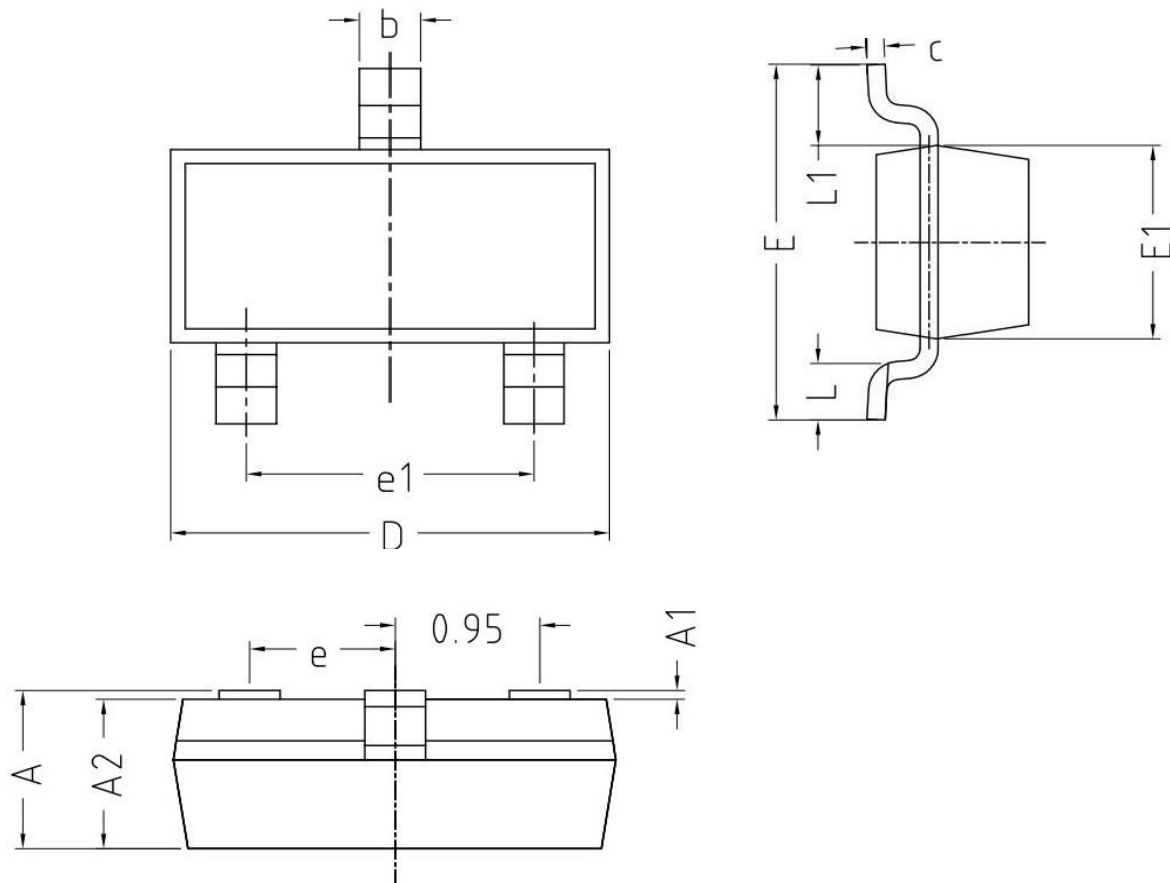


Figure 16: Unclamped Inductive Switching Test Circuit & Waveforms



COMMON IN DIMENSION (MM)			
Symbol	Min.	Nom.	Max.
<b>A</b>	0.900	1.050	1.150
<b>A1</b>	0.000	0.050	0.100
<b>A2</b>	0.900	1.000	1.050
<b>b</b>	0.300	0.400	0.500
<b>C</b>	0.100	0.175	0.250
<b>D</b>	2.800	2.900	3.000
<b>E</b>	2.250	2.400	2.550
<b>E1</b>	1.200	1.300	1.400
<b>e</b>	0.950 TYP		
<b>e1</b>	1.800	1.900	2.000
<b>L</b>	0.290	0.395	0.500
<b>L1</b>	0.550REF		