

N AND P-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

The SFS0306T4 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

FEATURES

◆ N-CHANNEL

$V_{DS}=30V, I_D=6.5A$

$R_{DS(ON)}=16.5m\Omega(TYP@V_{GS}=10V)$

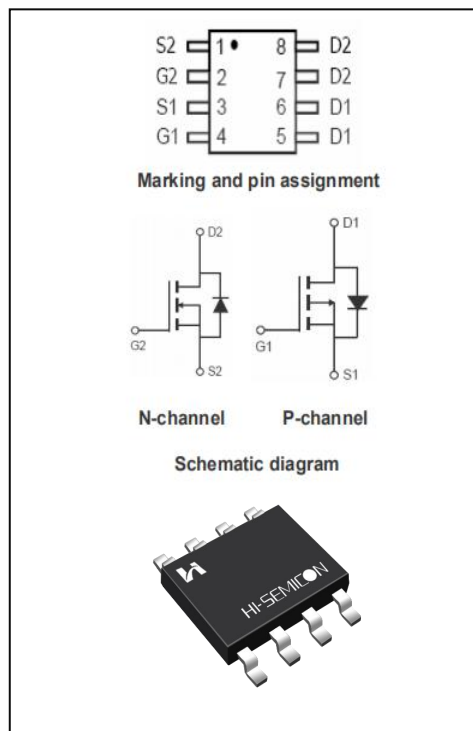
$R_{DS(ON)}=22.5m\Omega(TYP@V_{GS}=4.5V)$

◆ P-CHANNEL

$V_{DS}=-30V, I_D=-6A$

$R_{DS(ON)}=37.5m\Omega(TYP@V_{GS}=-10V)$

$R_{DS(ON)}=50.5m\Omega(TYP@V_{GS}=-4.5V)$



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFS0306T4	SOP8-8L	SFS0306T4	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	N-CHANNEL	P-CHANNEL	UNIT
Drain-Source Voltage		V _{DS}	30	-30	V
Gate-Source Voltage		V _{GS}	±20	±20	V
Drain Current	TC=25°C	I _D	6.5	-6	A
	TC=70°C		5.2	-4.8	A
Pulsed Drain Current(note1)		I _{DM}	26	-24	A
Power Dissipation	TC=25°C	P _D	2.0		W
Thermal Characteristics					
Maximum Junction-to-Lead		R _{θJL}	62.5		°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150		°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300		°C

N-CHANNEL ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDS}	V _{GS} =0V, I _D =250μA	30	--	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	--	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	-	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-20V, V _{DS} =0V	-	--	-100	
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =250μA	1.0	1.5	2.0	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A	-	16.5	20	mΩ
		V _{GS} =4.5V, I _D =3A	-	22.5	29	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =15V	-	440	-	pF
Output Capacitance	C _{oss}	V _{GS} =0V	-	65.0	-	
Reverse Transfer Capacitance	C _{riss}	f=1.0MHZ	-	58.0	-	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, V _{GS} =10V R _G =3.3Ω, I _D =3A (Note 2.3)	-	5.1	-	ns
Turn-on Rise Time	t _r		-	3.2	-	
Turn-off Delay Time	t _{d(off)}		-	13.6	-	
Turn-off Fall Time	t _f		-	3.7	-	
Total Gate Charge	Q _g	V _{DS} =15V, I _D =3A V _{GS} =10V (Note 2.3)	-	15.1	-	nC
Gate-Source Charge	Q _{gs}		-	2.2	-	
Gate-Drain Charge	Q _{gd}		-	3.5	-	

N-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	-	-	6.5	A
Pulsed Source Current	I_{SM}		-	-	26	
Diode Forward Voltage	V_{SD}	$I_S=4A, V_{GS}=0V$	-	0.85	1.2	V

P-CHANNEL ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=-20V, V_{DS}=0V$	-	-	-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.45	-2.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-3A$	-	37.5	45	$m\Omega$
		$V_{GS}=-4.5V, I_D=-3A$	-	50.5	60	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1.0MHz$	-	735	-	pF
Output Capacitance	C_{oss}		-	156	-	
Reverse Transfer Capacitance	C_{rss}		-	137	-	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V$ $R_G=3\Omega, I_D=-3A$ (Note 2.3)	-	7.2	-	ns
Turn-on Rise Time	t_r		-	5.1	-	
Turn-off Delay Time	$t_{d(off)}$		-	18.6	-	
Turn-off Fall Time	t_f		-	6.8	-	
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-3A$ $V_{GS}=-10V$ (Note 2.3)	-	15.8	-	nC
Gate-Source Charge	Q_{gs}		-	2.1	-	
Gate-Drain Charge	Q_{gd}		-	4.9	-	

P-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	-	-	-6	A
Pulsed Source Current	I_{SM}		-	-	-24	
Diode Forward Voltage	V_{SD}	$I_S=-4A, V_{GS}=0V$	-	-0.88	-1.2	V

- 1.Pulse width limited by maximum junction temperature
- 2.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- 3.Essentially independent of operating temperature

N-CHANNEL Typical Performance Characteristics

Figure 1. Output Characteristics

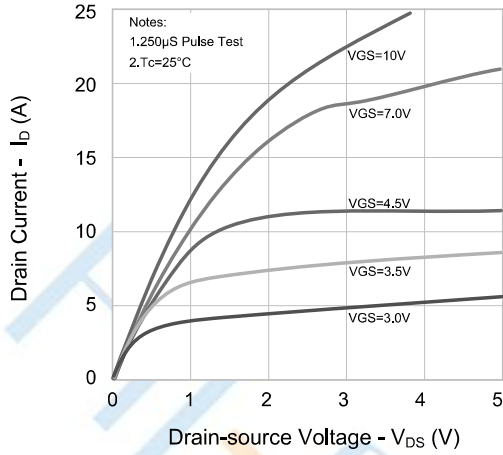


Figure 2. Transfer Characteristics

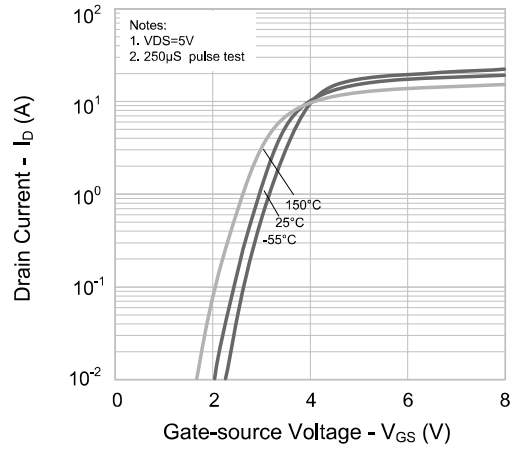


Figure 3. On-resistance vs. Drain Current

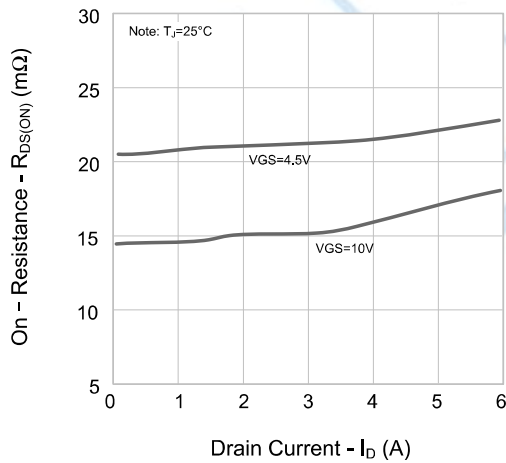


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

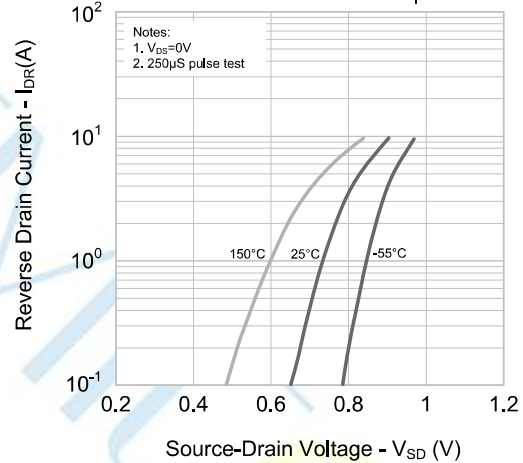


Figure 5. Capacitance Characteristics

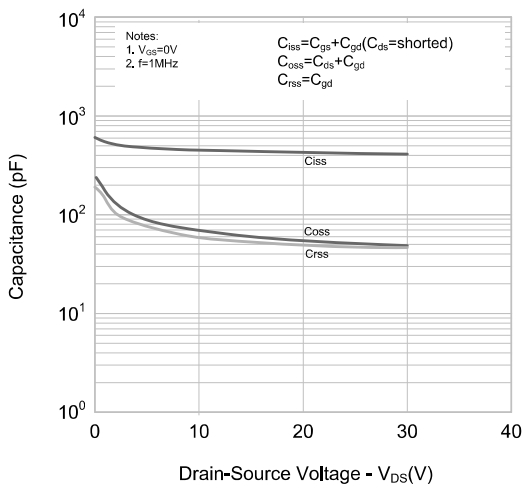
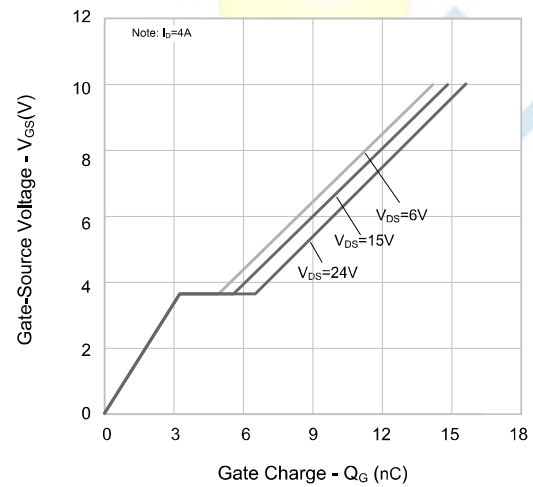


Figure 6. Gate Charge



P-CHANNEL Typical Performance Characteristics

Figure 1. Output Characteristics

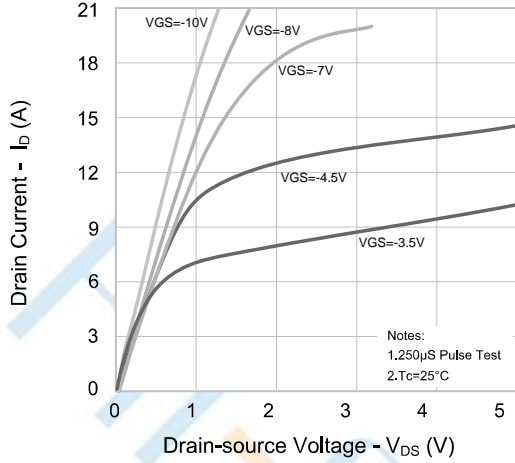


Figure 2. Transfer Characteristics

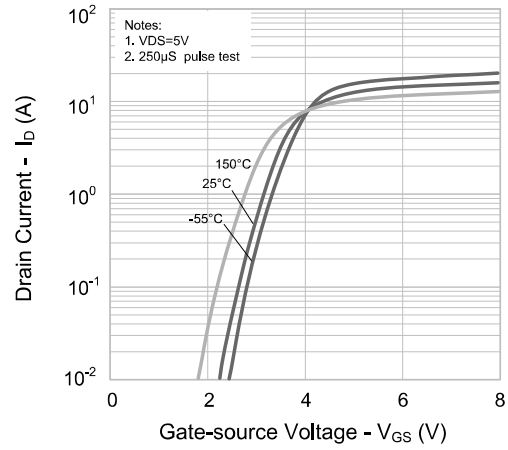


Figure 3. On-resistance vs. Drain Current

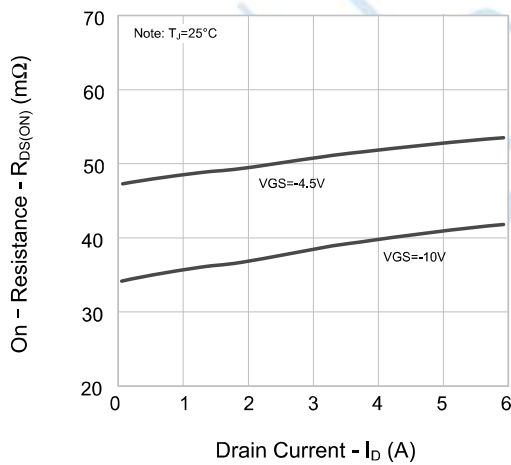


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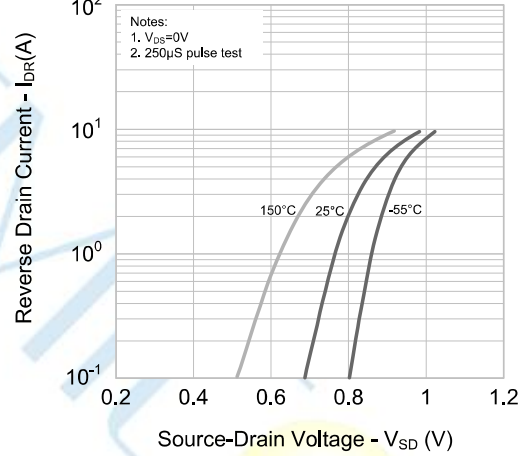


Figure 5. Capacitance Characteristics

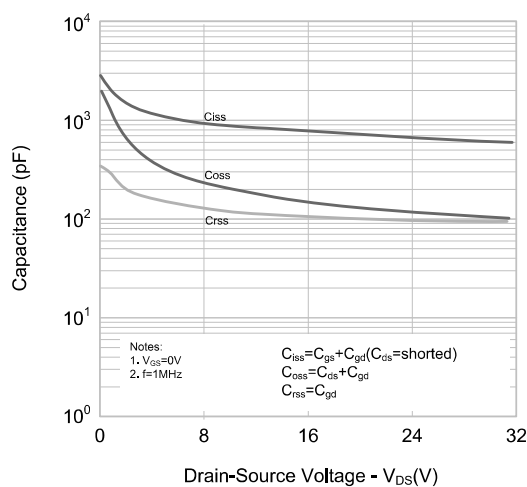
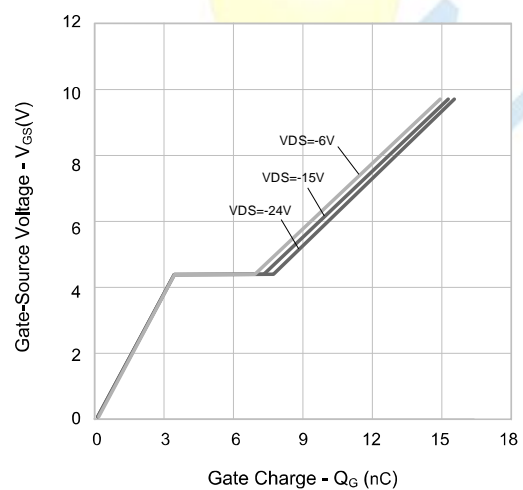
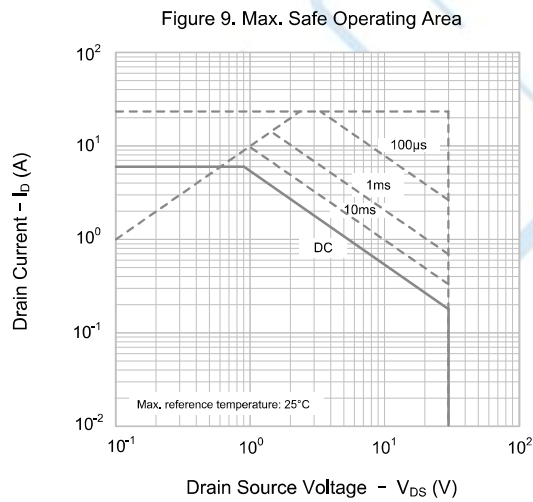
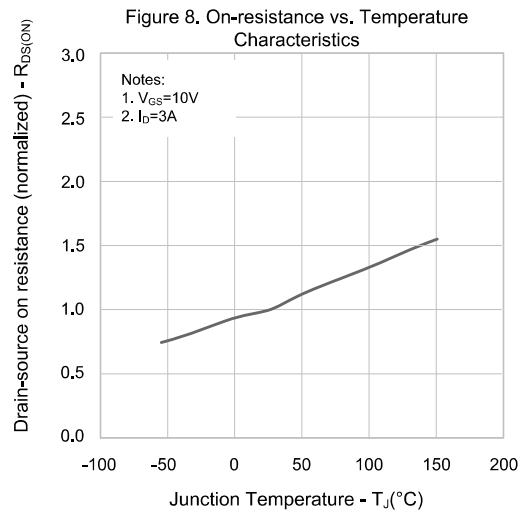
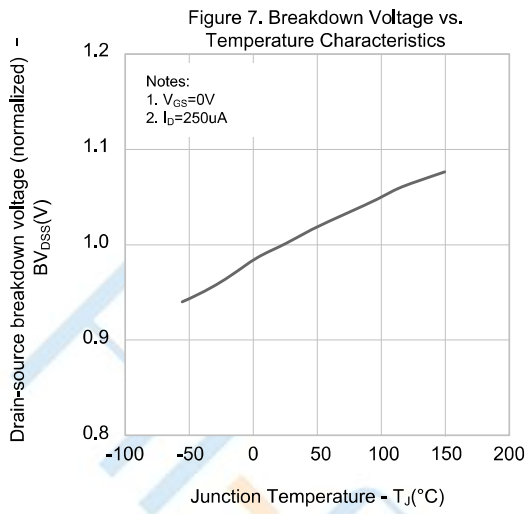


Figure 6. Gate Charge

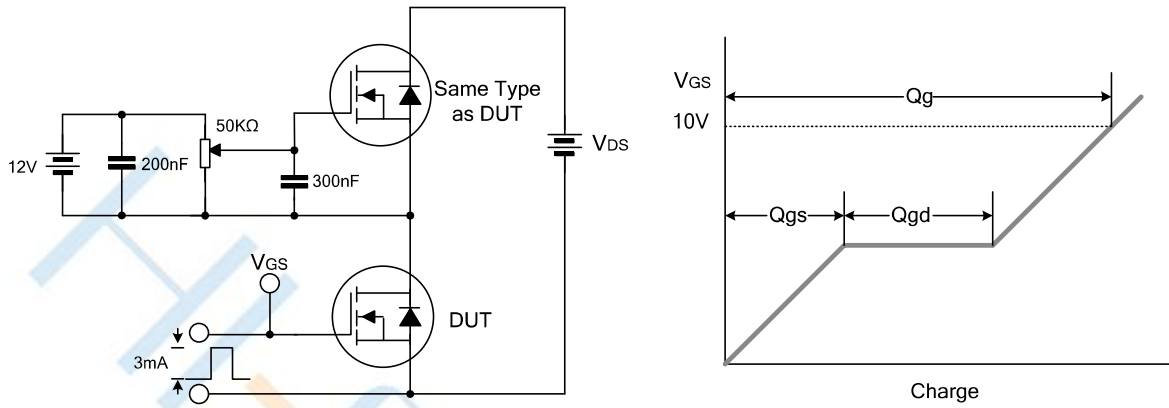


Typical Performance Characteristics

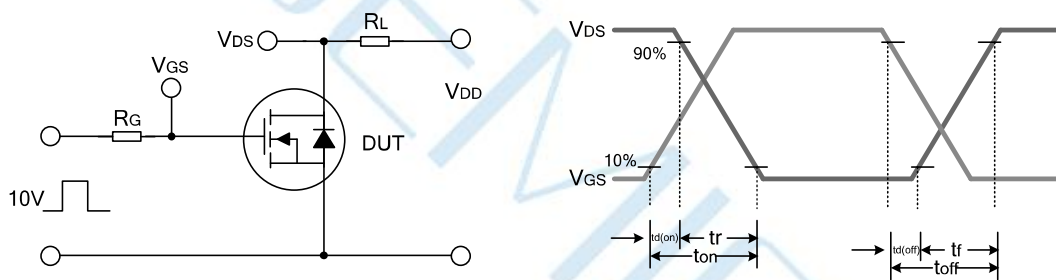


Test Circuit

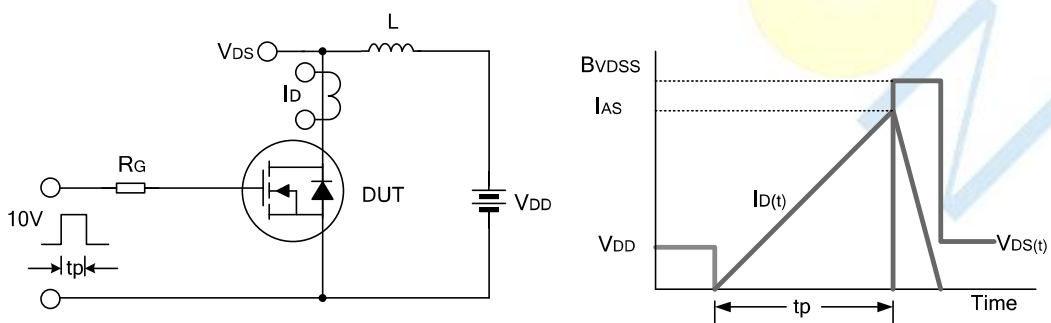
Gate Charge Test Circuit & Waveform



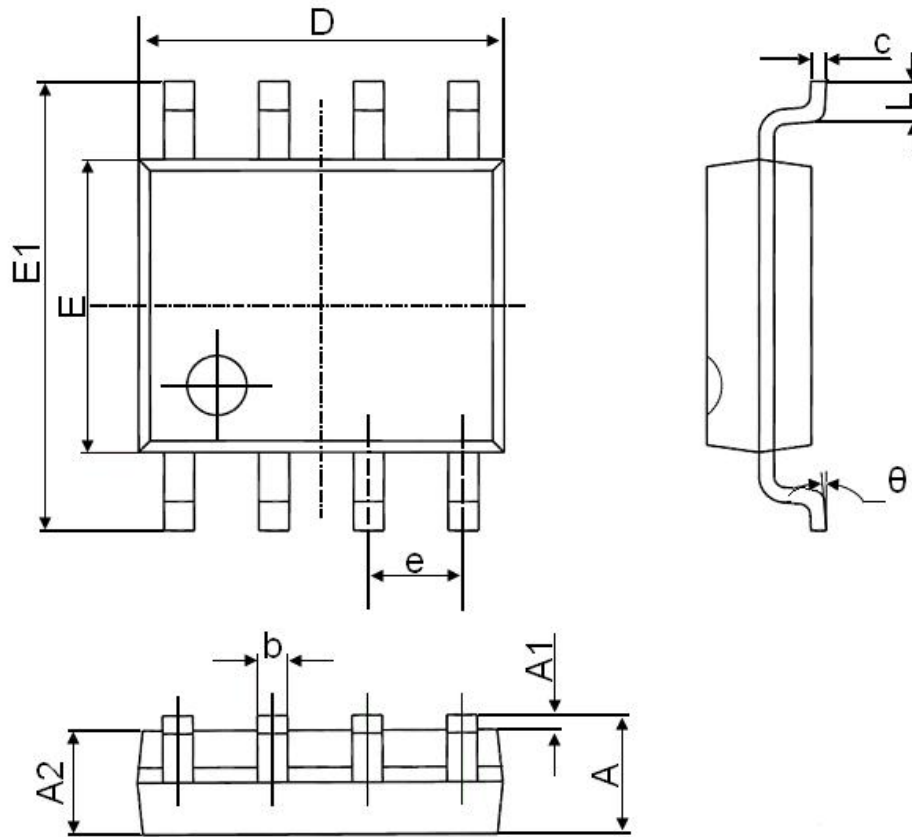
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of SOP8-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°

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