

60V N-Channel Enhancement Mode MOSFET

Description

The NP8N06 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Conduction and switching losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and C_{rss} .

General Features

- ◆ $V_{DS} = 60V$ $I_D = 8A$
 $R_{DS(ON)}(Typ.) = 15m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 16.5m\Omega$ @ $V_{GS} = 4.5V$
- ◆ Lead free product is acquired
- ◆ Surface mount package

100% UIS TESTED!
100% ΔV_{ds} TESTED!

Application

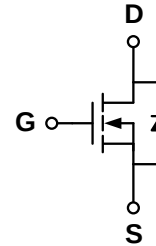
- ◆ High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- ◆ Networking DC-DC Power System
- ◆ Load switch

Package

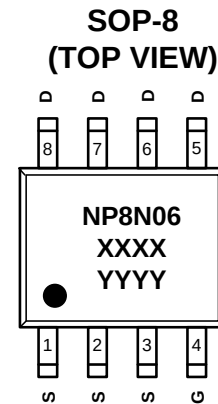
- ◆ SOP-8



Schematic diagram



Marking and pin assignment



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP8N06SF	-55°C to +150°C	SOP-8	4000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	TC=25°C	I_D	8	A
	TC=100°C		5.6	
Pulsed Drain Current		I_{DP}	32	A
Avalanche energy(L=0.1mH)		EAS	20	mJ
Maximum power dissipation	TC=25°C	P_D	2.5	W
Power Dissipation – Derate above 25°C	TC=25°C		2	
Operating junction Temperature range		T_j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.55	2.5	V
Drain-source on-state resistance ¹	R _{DS(ON)}	V _{GS} =10V, I _D =8A	-	15	18	mΩ
		V _{GS} =4.5V, I _D =8A		16.5	20	
On Status Drain Current	I _{D(ON)}	V _{DS} =10V, V _{GS} =10V	8	-	-	A
Diode Characteristics						
Diode Forward Voltage ¹	V _{SD}	I _{SD} =1A,V _{GS} =0V	-	0.8	1.1	V
Diode Continuous Forward Current	I _S		-	-	18	A
Reverse Recovery Time	t _{rr}	I _F =8A,	-	28	-	ns
Reverse Recovery Charge	Q _{rr}	dI/dt=100A/us	-	40	-	nC
Dynamic Characteristics ²						
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V,f=1MHz	-	3.3	-	Ω
Input capacitance	C _{ISS}	V _{GS} =0V ,V _{DS} =30V f=1.0MHz	-	1600	-	pF
Output capacitance	C _{OSS}		-	112	-	
Reverse transfer capacitance	C _{RSS}		-	98	-	
Turn-on delay time	t _{D(ON)}	V _{GS} =10V, V _{DD} =30V, R _L =1Ω, I _D =8A, R _G =3Ω	-	7	-	ns
Turn-on Rise time	t _r		-	5.5	-	
Turn-off delay time	t _{D(OFF)}		-	29	-	
Turn-off Fall time	t _f		-	45	-	
Total gate charge	Q _g	V _{GS} =10V,I _D =8A V _{DS} =30V	-	38.5		nC
Gate-source charge	Q _{gs}			4.7		
Gate-drain charge	Q _{gd}		-	10.3	-	
Drain-Source Diode Characteristics						
Diode forward voltage	V _{SD}	I _{SD} =8A,V _{GS} =0V	-	0.8	1.1	V

 Note: 1: Pulse test; pulse width $\leq 300ns$, duty cycle $\leq 2\%$.

2: Guaranteed by design, not subject to production testing.

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	$R_{\theta jc}$	1.7	$^\circ C/W$
Thermal Resistance junction-to ambient	$R_{\theta ja}$	62.5	

Typical Performance Characteristics

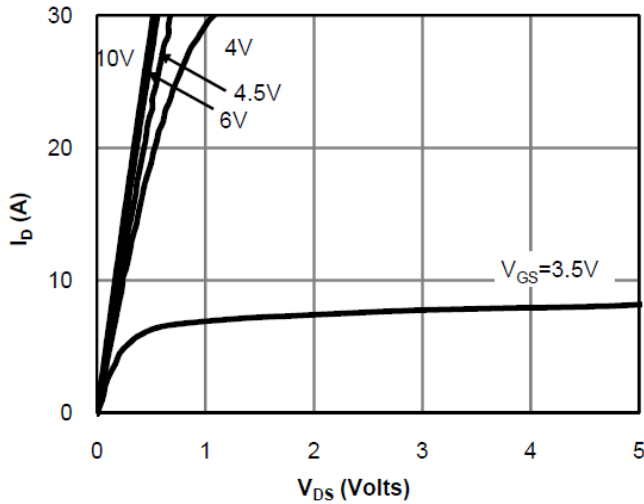


Fig 1: On-Region Characteristics

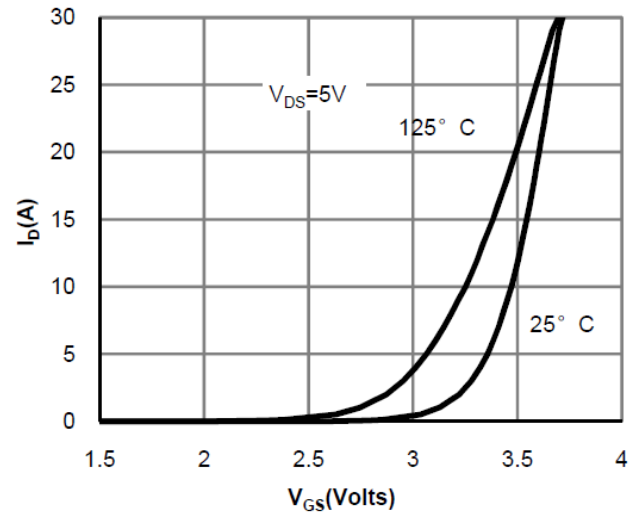


Figure 2: Transfer Characteristics

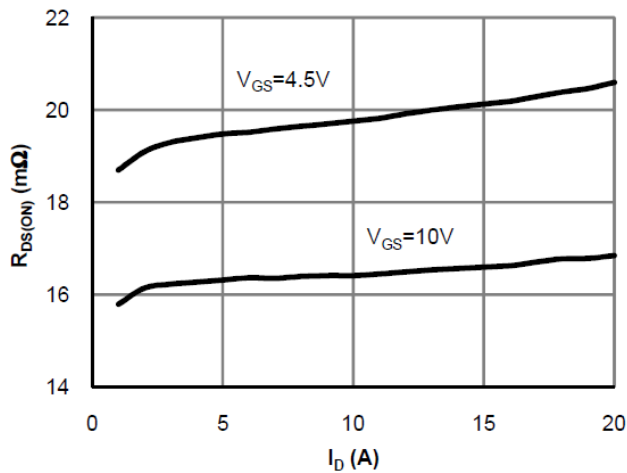


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

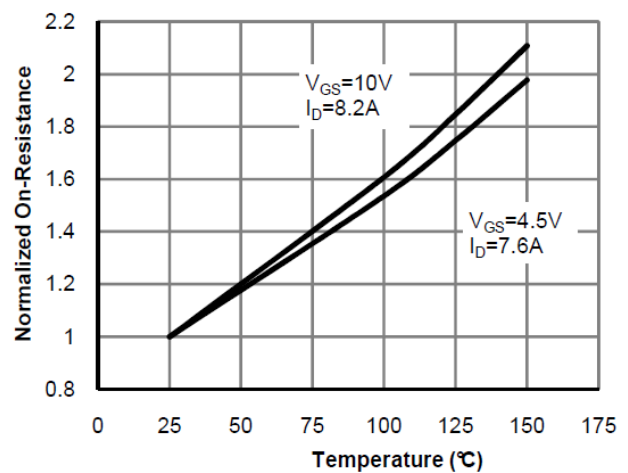


Figure 4: On-Resistance vs. Junction Temperature

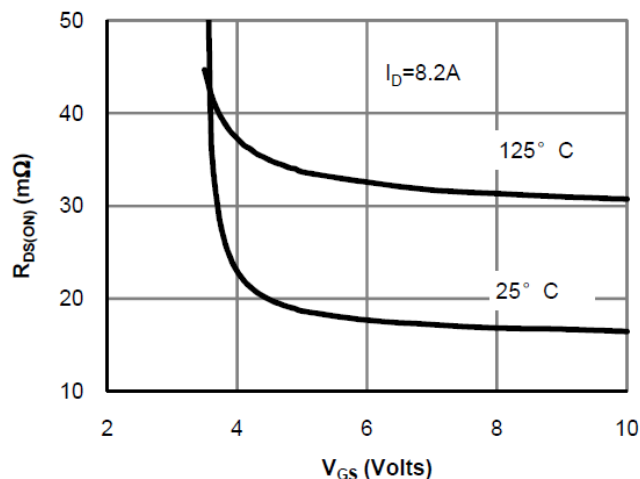


Figure 5: On-Resistance vs. Gate-Source Voltage

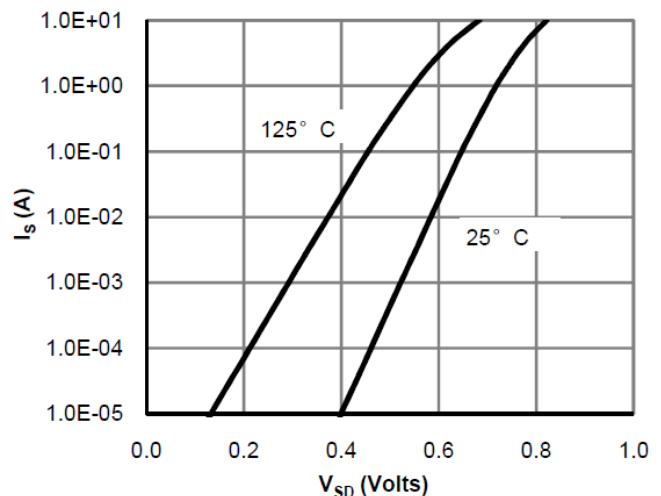


Figure 6: Body-Diode Characteristics

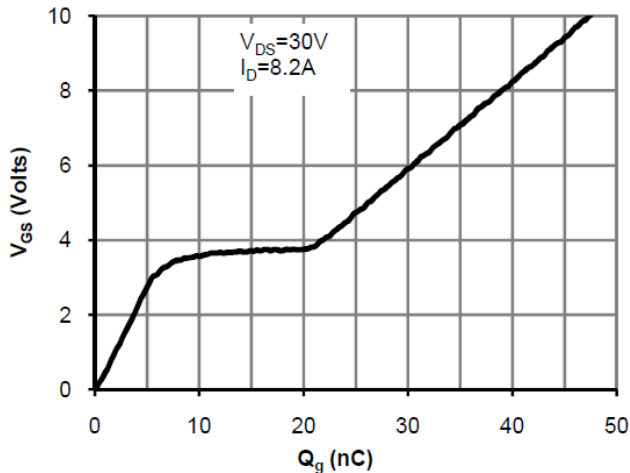


Figure 7: Gate-Charge Characteristics

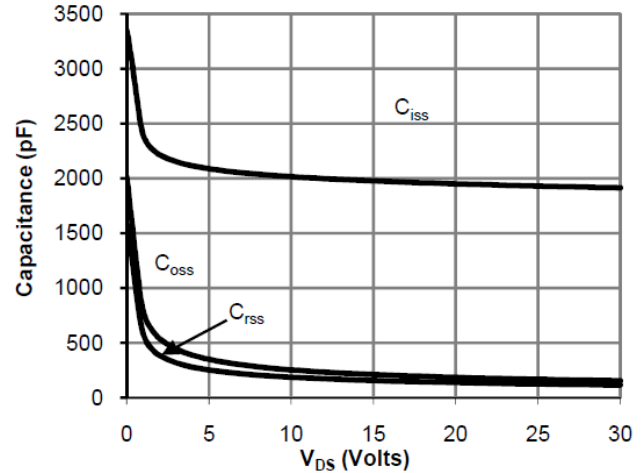


Figure 8: Capacitance Characteristics

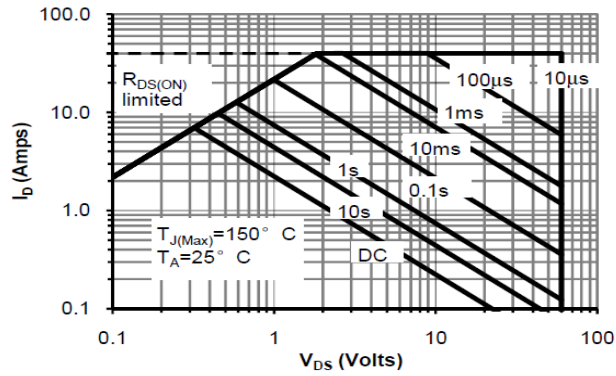


Figure 9: Maximum Forward Biased Safe Operating Area (FBSOA)

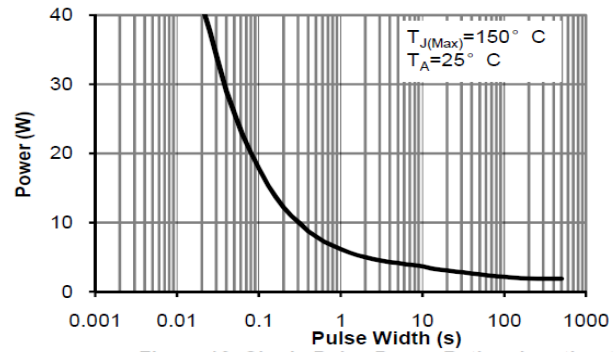


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Nc)

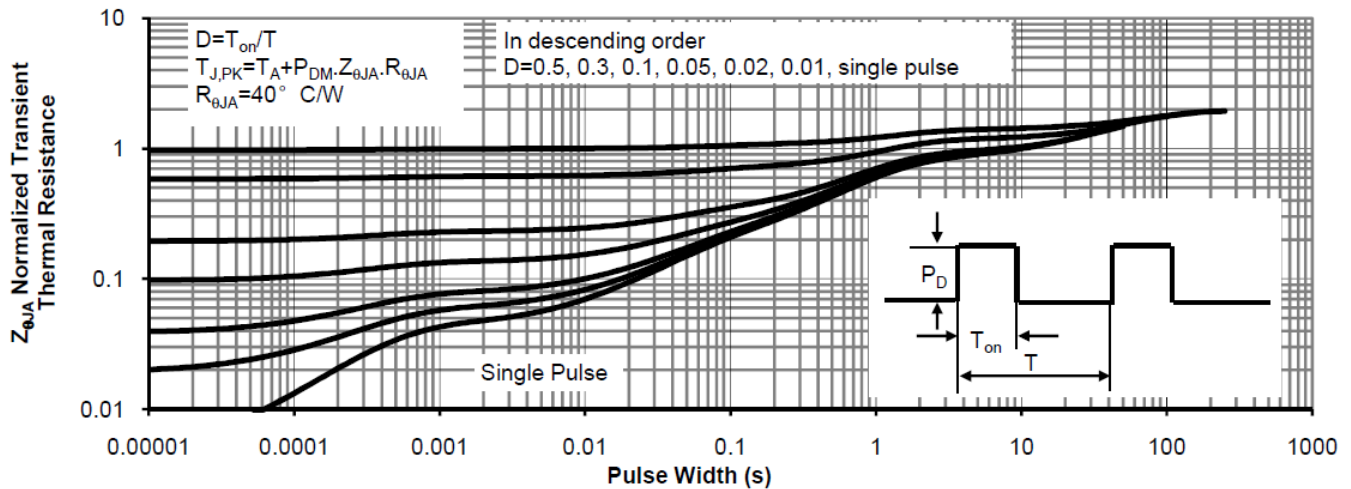
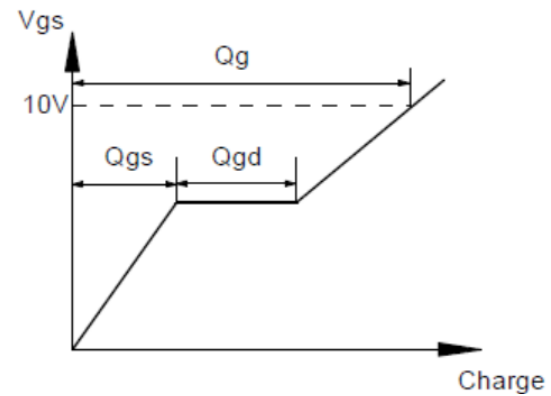
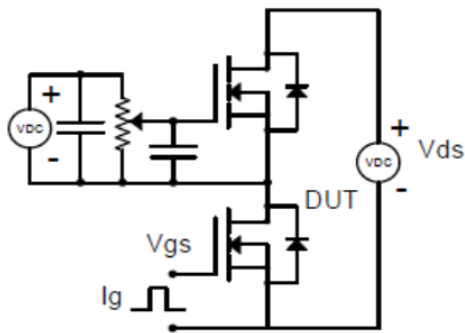
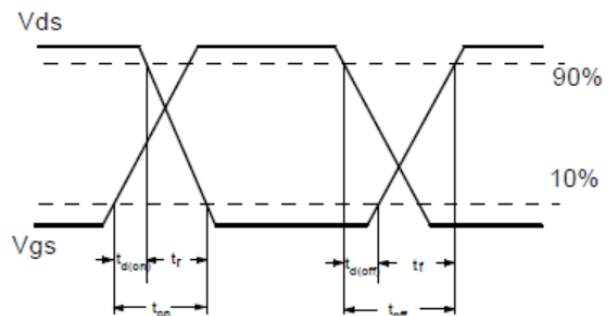
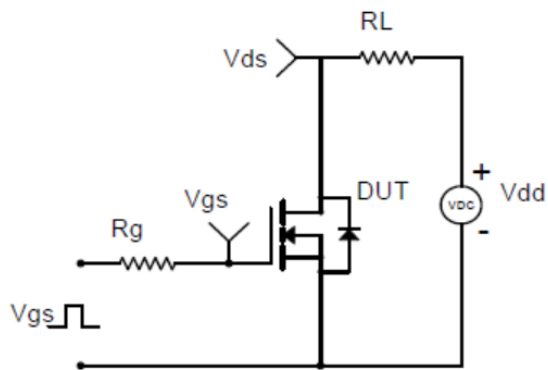


Figure 11: Normalized Maximum Transient Thermal Impedance

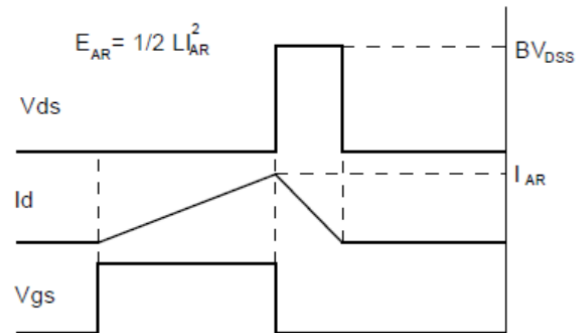
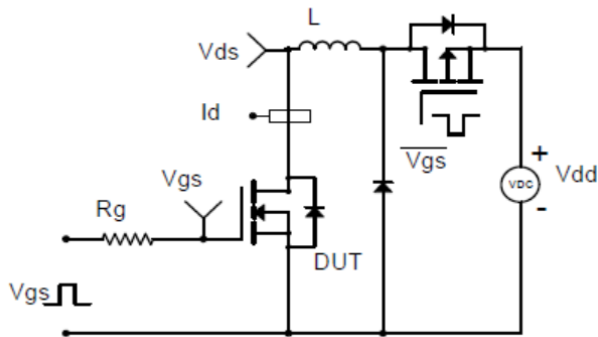
Gate Charge Test Circuit & Waveform



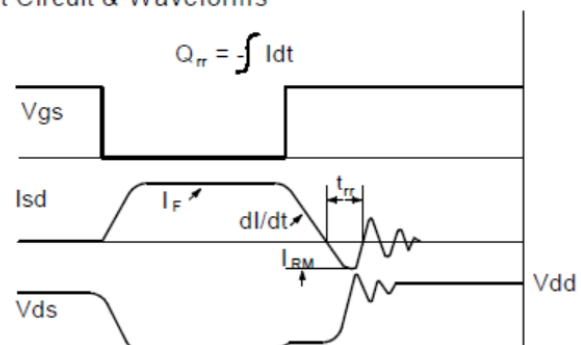
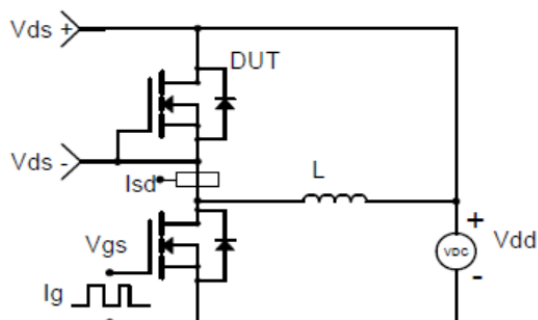
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

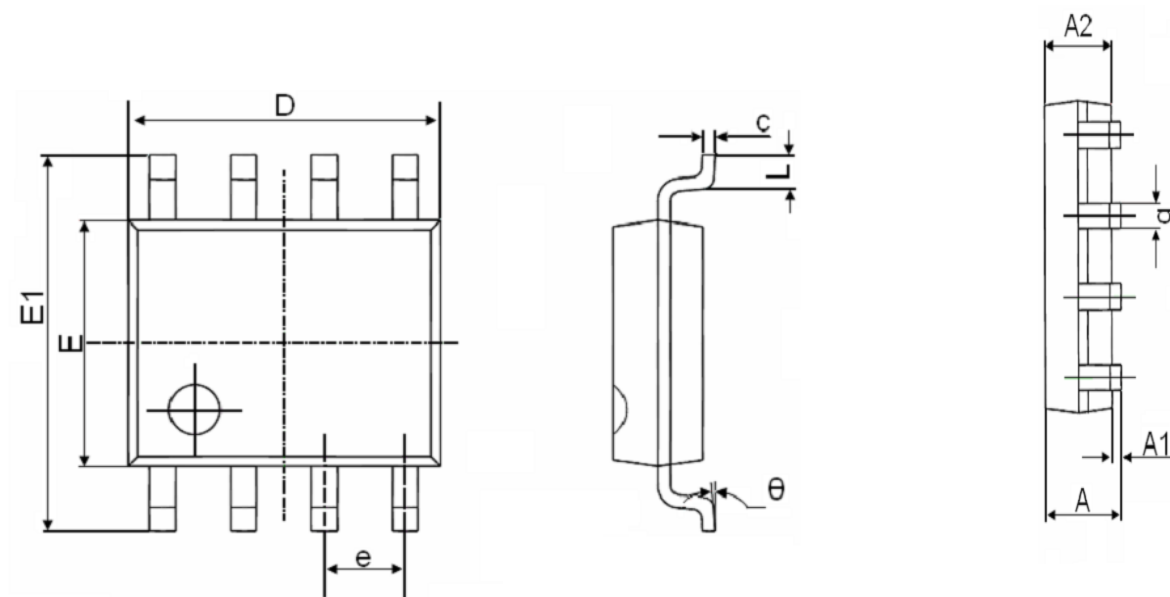


Diode Recovery Test Circuit & Waveforms



Package Information

- SOP-8



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
θ	0°	8°	0°	8°