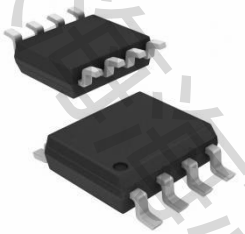
SI9945BDY-T1-GE3-HX

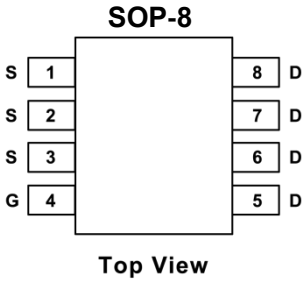
Dual N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.040
$R_{DS(on)}$ (Ω) at V_{GS} = 4.5 V	0.055
I_D (A) per leg	7
Configuration	Dual

FEATURES

- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [AF]	T_A=25°C	I_D	4.5	A
	T_A=70°C		3.6	
Pulsed Drain Current [B]		I_{DM}	20	
Power Dissipation	T_A=25°C	P_D	2	W
	T_A=70°C		1.28	
Avalanche Current [B]		I_{AR}, I_{AS}	19	A
Repetitive avalanche energy 0.1mH [B]		E_{AR}, E_{AS}	18	mJ
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		74	110	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	35	60	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Units**
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250μA	1	2.1	3	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	20			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=4.5A		46	56	mΩ
		T_J=125°C		80	100	
		V_{GS}=4.5V, I_D=3A		64	77	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=4.5A		11		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.74	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
I_{SM}	Pulsed Body Diode Current [B]				20	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz		450	540	pF
C_{oss}	Output Capacitance			60		pF
C_{rss}	Reverse Transfer Capacitance			25		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	1.3	1.65	2	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=4.5A		8.5	10.5	nC
Q_g(4.5V)	Total Gate Charge			4.3	5.5	nC
Q_{gs}	Gate Source Charge			1.6		nC
Q_{gd}	Gate Drain Charge			2.2		nC
tD(on)	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=6.7Ω, R_{GEN}=3Ω		4.7		ns
t_r	Turn-On Rise Time			2.3		ns
tD(off)	Turn-Off DelayTime			15.7		ns
t_f	Turn-Off Fall Time			1.9		ns
trr	Body Diode Reverse Recovery Time	I_F=4.5A, dI/dt=100A/μs		27.5	35	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=4.5A, dI/dt=100A/μs		32		nC

NOTES

A.The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B. Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

F. The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

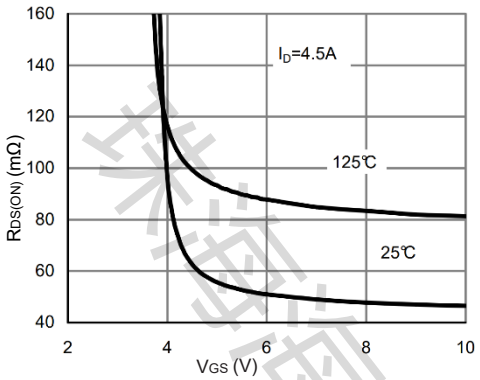


Fig 1. On-Resistance vs. Gate-Source Voltage

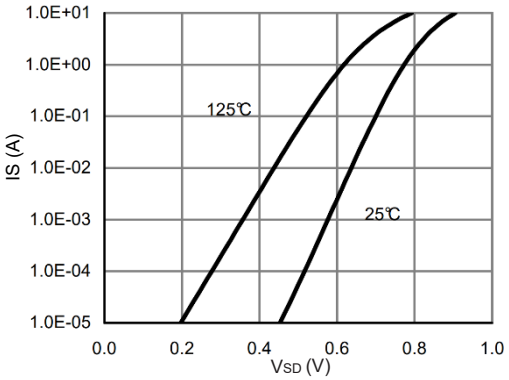


Fig 2. Body-Diode Characteristics

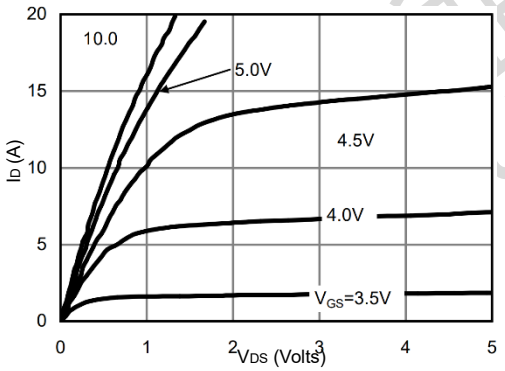


Fig 3. On-Region Characteristics

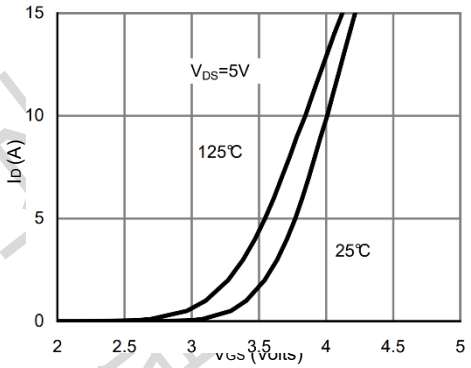


Fig 4. Transfer Characteristics

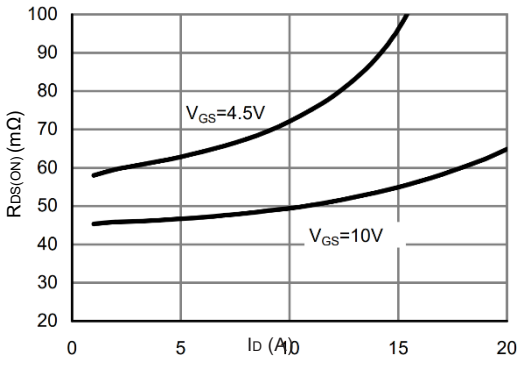


Fig 5. On-Resistance vs. Drain Current and Gate Voltage

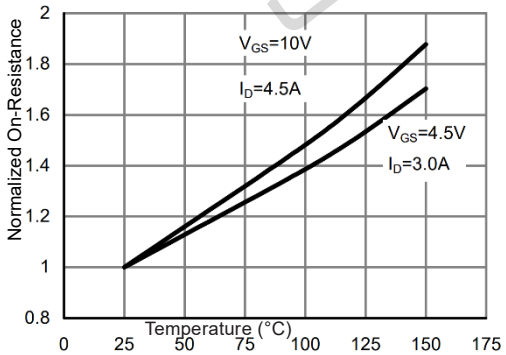


Fig 6. On-Resistance vs. Junction Temperature

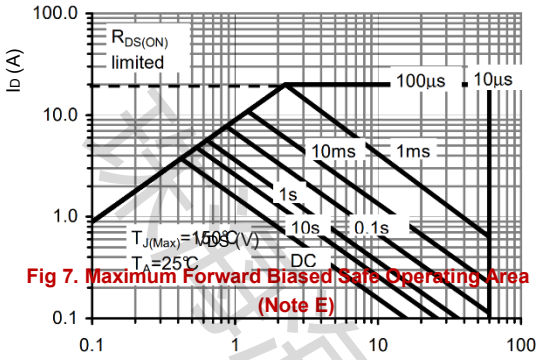


Fig 7. Maximum Forward Biased Safe Operating Area (Note E)

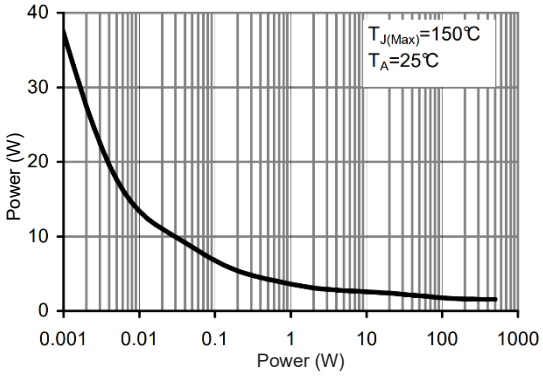


Fig 8. Single Pulse Power Rating Junction-to Ambient (Note E)

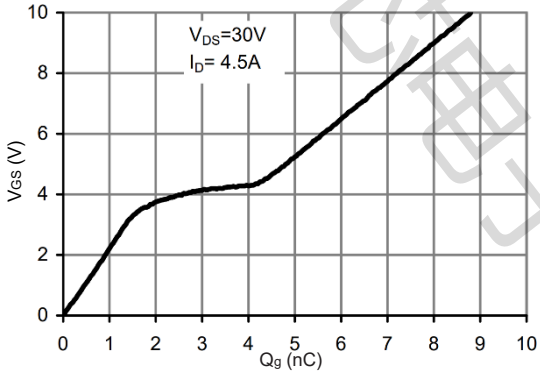


Fig 9. Gate-Charge Characteristics

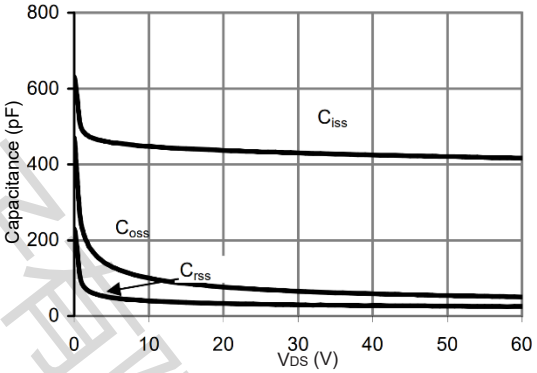


Fig 10. Capacitance Characteristics

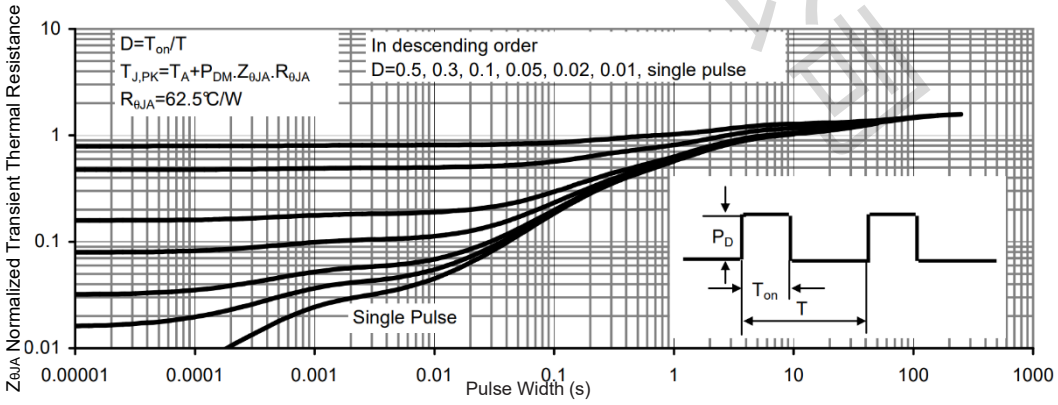
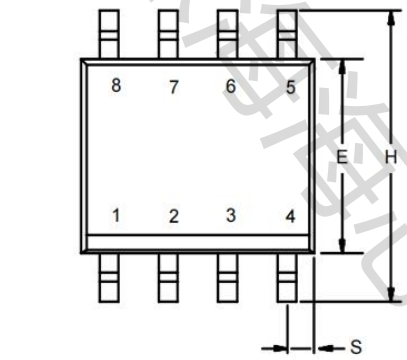
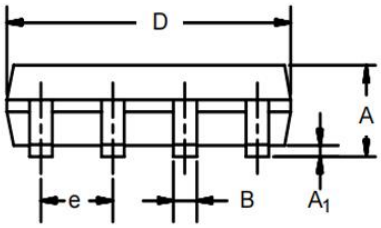


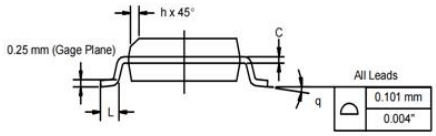
Fig 11. Normalized Maximum Transient Thermal Impedance

SOP-8 Package Outline

Dimensions are shown in millimeters (inches)

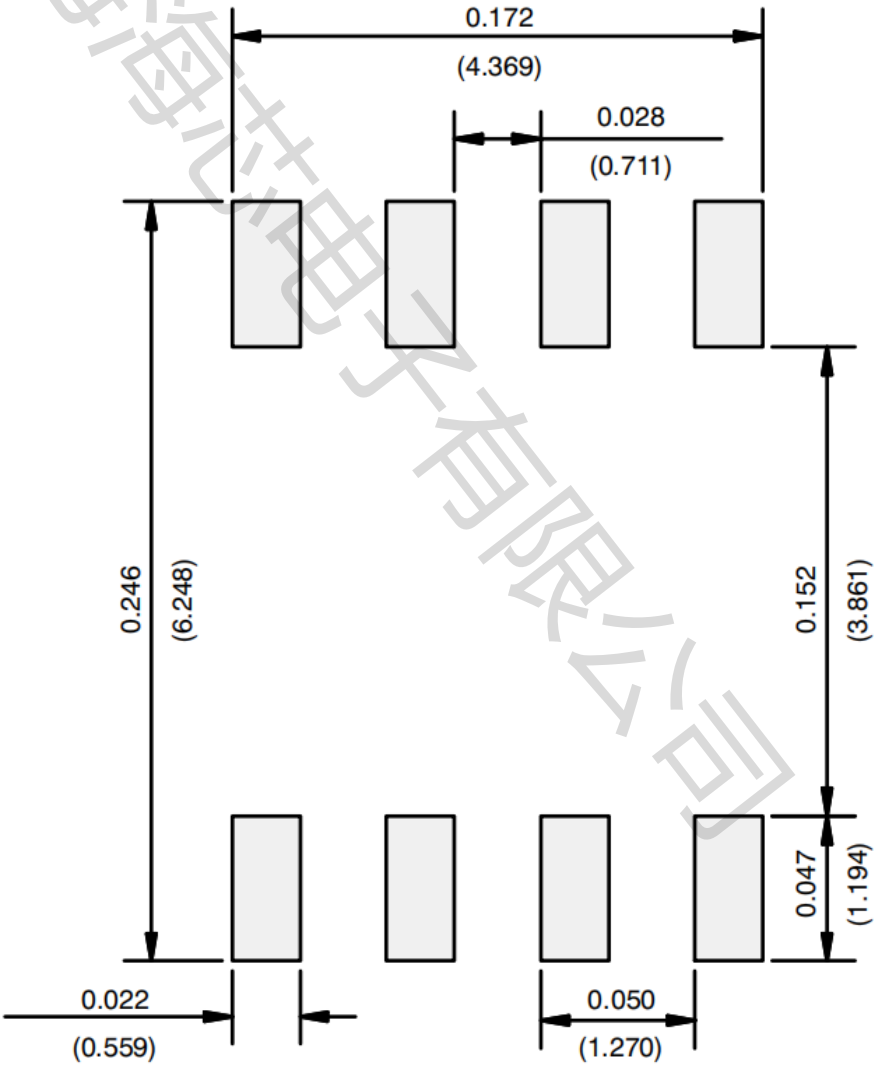






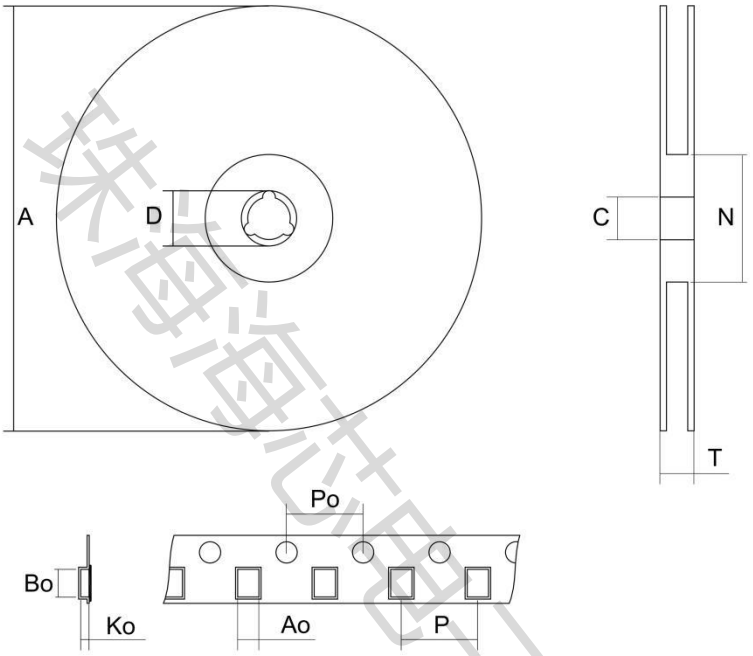
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026

RECOMMENDED MINIMUM PADS FOR SOP-8

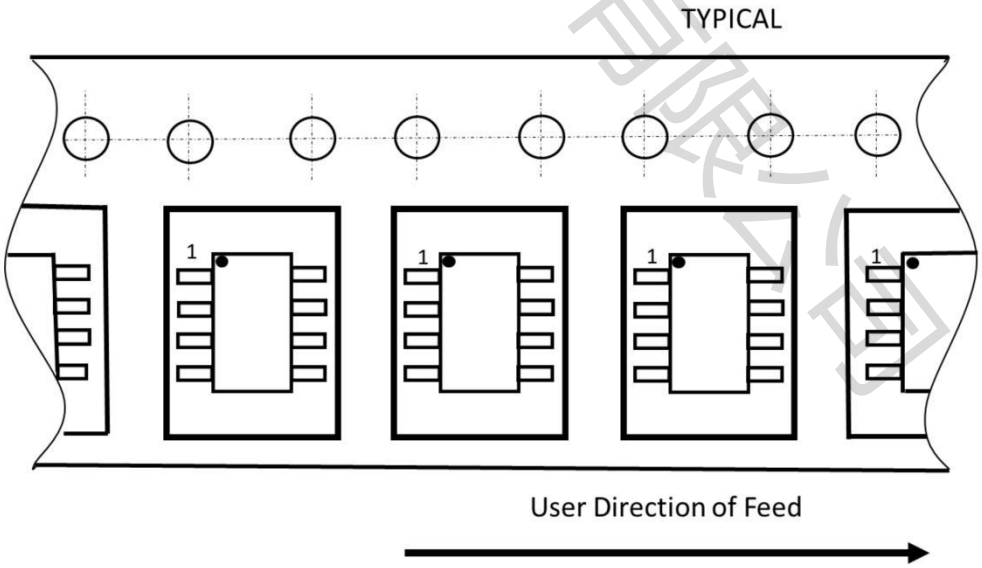


SOP-8 packing information

SOP-8 tape and reel



Tape orientation



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