

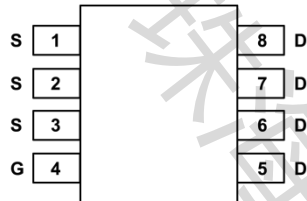
## FDS9945-HX Dual N-Channel 60-V (D-S) MOSFET

## PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
60	0.040 at V <sub>GS</sub> = 10 V	7
	0.055 at V <sub>GS</sub> = 4.5 V	



SOP-8



Top View

## FEATURES

- TrenchFET® Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested

Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V <sub>DS</sub>	60	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>AF</sup>	T <sub>A</sub> =25°C	I <sub>D</sub>	4.5	A
	T <sub>A</sub> =70°C		3.6	
Pulsed Drain Current <sup>B</sup>		I <sub>DM</sub>	20	
Power Dissipation	T <sub>A</sub> =25°C	P <sub>D</sub>	2	W
	T <sub>A</sub> =70°C		1.28	
Avalanche Current <sup>B</sup>		I <sub>AR</sub> , I <sub>AS</sub>	19	A
Repetitive avalanche energy 0.1mH <sup>B</sup>		E <sub>AR</sub> , E <sub>AS</sub>	18	mJ
Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

## Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	t ≤ 10s	R <sub>θJA</sub>	48	62.5	°C/W
Maximum Junction-to-Ambient <sup>A</sup>	Steady-State		74	110	°C/W
Maximum Junction-to-Lead <sup>C</sup>	Steady-State	R <sub>θJL</sub>	35	60	°C/W

Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	60			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			1 5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V			100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA	1	2.1	3	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =10V, V <sub>DS</sub> =5V	20			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A T <sub>J</sub> =125°C		46 80	56 100	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		64	77	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =4.5A		11		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.74	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				3	A
I <sub>SM</sub>	Pulsed Body Diode Current <sup>B</sup>				20	A
DYNAMIC PARAMETERS						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V,		450	540	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =30V,		60		pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1MHz		25		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	1.3	1.65	2	Ω
SWITCHING PARAMETERS						
Q <sub>g(10V)</sub>	Total Gate Charge	V <sub>GS</sub> =10V,		8.5	10.5	nC
Q <sub>g(4.5V)</sub>	Total Gate Charge	V <sub>DS</sub> =30V,		4.3	5.5	nC
Q <sub>gs</sub>	Gate Source Charge	I <sub>D</sub> =4.5A		1.6		nC
Q <sub>gd</sub>	Gate Drain Charge			2.2		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V,		4.7		ns
t <sub>r</sub>	Turn-On Rise Time	V <sub>DS</sub> =30V,		2.3		ns
t <sub>D(off)</sub>	Turn-Off DelayTime	R <sub>L</sub> =6.7Ω,		15.7		ns
t <sub>f</sub>	Turn-Off Fall Time	R <sub>GEN</sub> =3Ω		1.9		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =4.5A, dI/dt=100A/μs		27.5	35	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =4.5A, dI/dt=100A/μs		32		nC

**Notes**

A. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=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<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using

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<sub>A</sub>=25°C.

F. The current rating is based on the t<sub>s</sub> 10s junction to ambient thermal resistance rating.

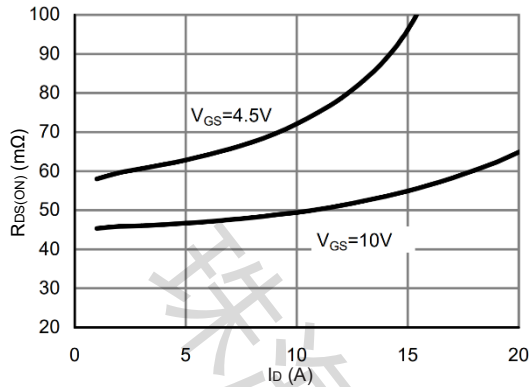


Fig 1. On-Resistance vs. Drain Current and Gate Voltage

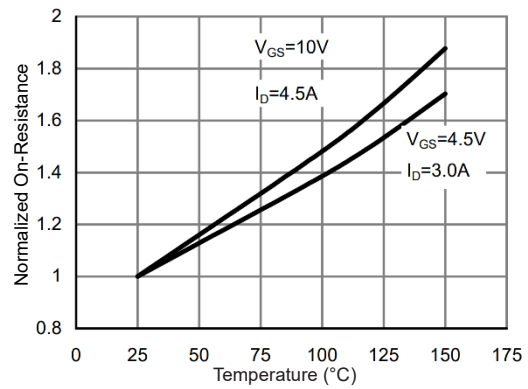


Fig 2. On-Resistance vs. Junction Temperature

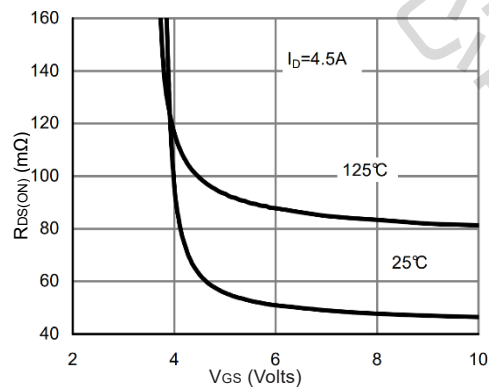


Fig 3. On-Resistance vs. Gate-Source Voltage

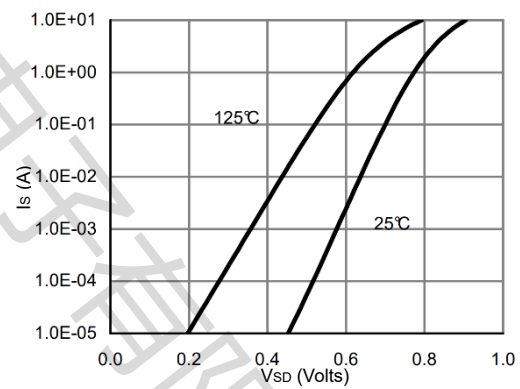


Fig 4. Body-Diode Characteristics

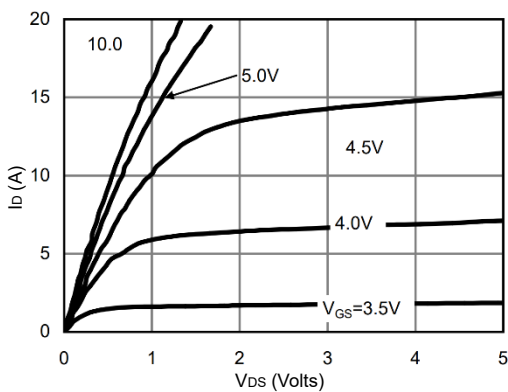


Fig 5. On-Region Characteristics

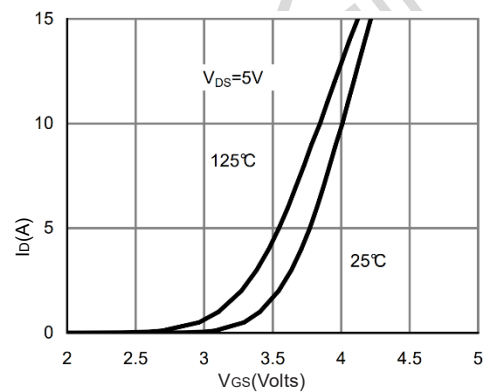
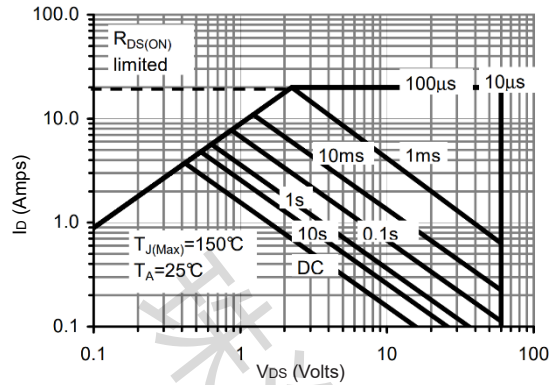
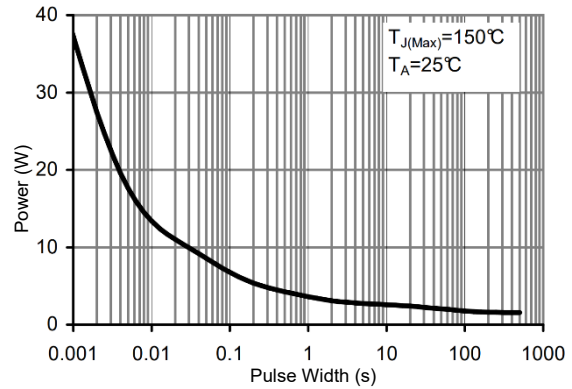


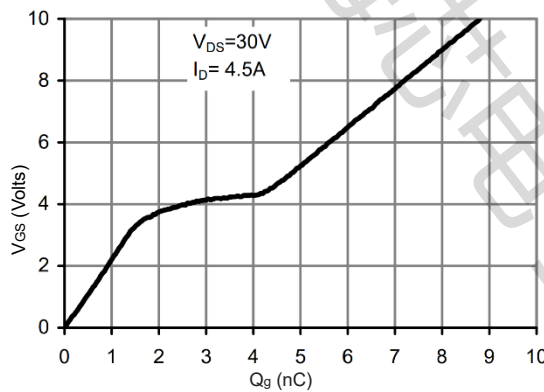
Fig 6. Transfer Characteristics



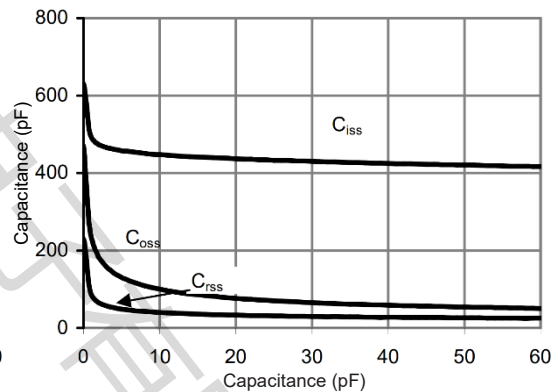
**Fig 7. Maximum Forward Biased Safe Operating Area (Note E)**



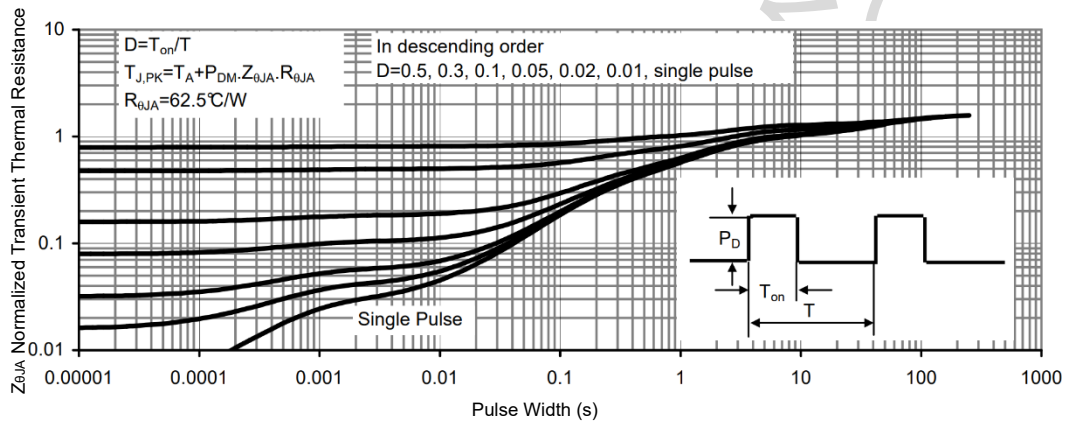
**Fig 8. Single Pulse Power Rating Junction-to-Ambient (Note E)**



**Fig 9. Gate-Charge Characteristics**



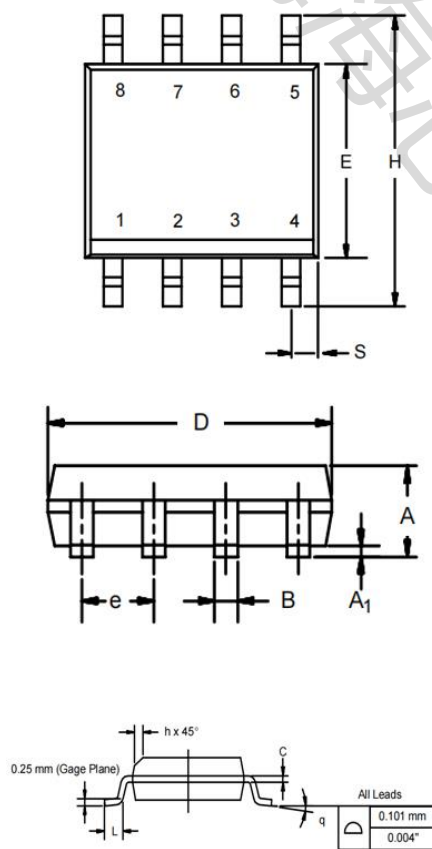
**Fig 10. Capacitance Characteristics**



**Fig 11. Normalized Maximum Transient Thermal Impedance**

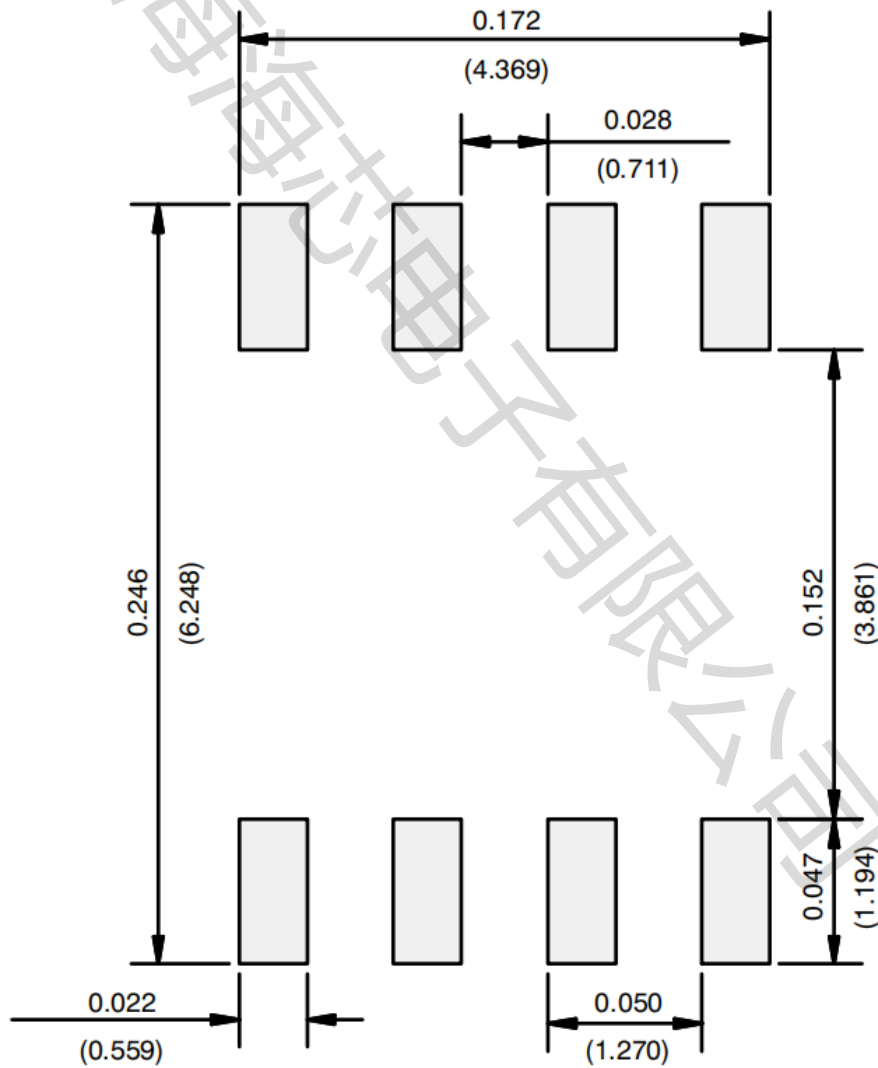
## SOP-8 Package Outline

Dimensions are shown in millimeters (inches)



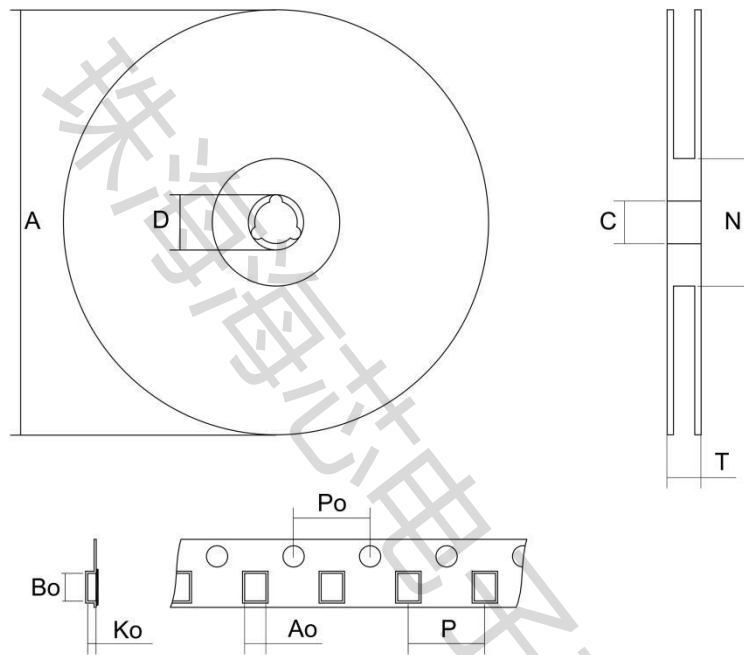
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.007 5	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026

**RECOMMENDED MINIMUM PADS FOR SOP-8**

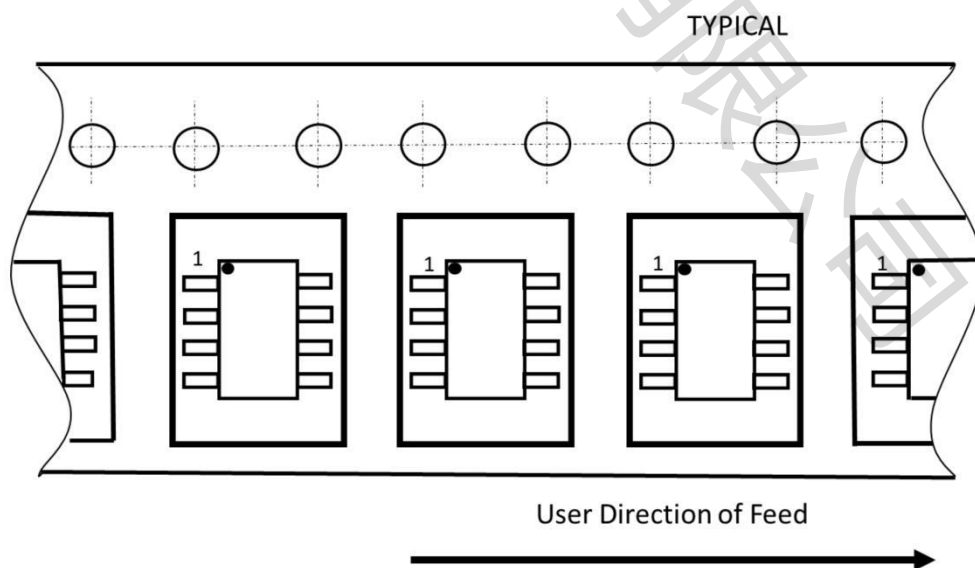


## SOP-8 packing information

### SO-8 tape and reel



### Tape orientation



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