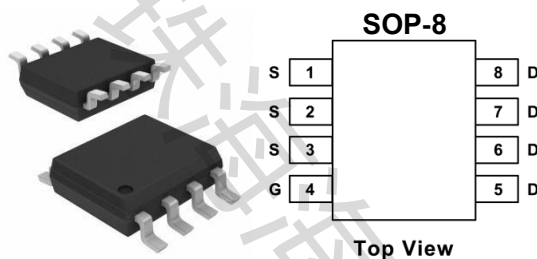


FDS8960C-HX N and P-Channel 30V (D-S) MOSFET

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	Q _g (Typ.)	I _D (A)
N-Channel	30	0.018 at V _{GS} = 10 V	6.2	8
		0.020 at V _{GS} = 8 V		8
		0.024 at V _{GS} = 4.5 V		8
P-Channel	-30	0.032 at V _{GS} = -10 V	18.5	-8
		0.034 at V _{GS} = -8 V		-8
		0.040 at V _{GS} = -4.5 V		-7.5



FEATURES

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

APPLICATIONS

- Motor Drive
- Mobile Power Bank

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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	30	- 30	V
Gate-Source Voltage	V _{GS}	± 20	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	8e	- 8e	A
	T _C = 70 °C	6.8	- 6.8	
	T _A = 25 °C	6.8b, c	- 6.6b, c	
	T _A = 70 °C	5.4b, c	- 5.3b, c	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	40	- 40	
Source-Drain Current Diode Current	T _C = 25 °C	2.6	- 2.6	
	T _A = 25 °C	1.6b, c	- 1.6b, c	
Pulsed Source-Drain Current	I _{SM}	40	- 40	
Single Pulse Avalanche Current	L = 0.1 mH	10	- 20	
Single Pulse Avalanche Energy		5	20	mJ
Maximum Power Dissipation	T _C = 25 °C	3.1	3.2	W
	T _C = 70 °C	2	2.1	
	T _A = 25 °C	2b, c	2b, c	
	T _A = 70 °C	1.28b, c	1.28b, c	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	N-Channel		P-Channel		Unit
			Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	50	62.5	47	62.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	30	40	29	38	

Notes

a. Based on T_C = 25 °C.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 s.

d. Maximum under steady state conditions is 120 °C/W (n-channel) and 110 °C/W (p-channel).

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit		
Static								
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} =0V, I _D =250μA	N-Ch	30		V		
		V _{GS} =0V, I _D =-250μA	P-Ch	-30				
V _{DS} Temperature Coefficient	V _{DS} /T _J	I _D =250μA	N-Ch		40	mV/°C		
		I _D =-250μA	P-Ch		-34			
V _{GS(th)} Temperature Coefficient	V _{GS(th)} /T _J	I _D =250μA	N-Ch		-4.1			
		I _D =-250μA	P-Ch		5			
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	N-Ch	1.0		2.0	V	
		V _{DS} =V _{GS} , I _D =-250μA	P-Ch	-1.0		-2.0		
Gate-Body Leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±12V	N-Ch			±100	nA	
		V _{DS} =0V, V _{GS} =±12V	P-Ch			±100		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	N-Ch			1	μA	
		V _{DS} =-30V, V _{GS} =0V	P-Ch			-1		
		V _{DS} =30V, V _{GS} =0V, T _J =55°C	N-Ch			10		
		V _{DS} =-30V, V _{GS} =0V, T _J =55°C	P-Ch			-10		
On-State Drain Current ^b	I _{D(on)}	V _{DS} =5V, V _{GS} =10V	N-Ch	20			A	
		V _{DS} =-5V, V _{GS} =-10V	P-Ch	-20				
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} =10V, I _D =6.8A	N-Ch		0.018		Ω	
		V _{GS} =-10V, I _D =-8A	P-Ch		0.040			
		V _{GS} =8V, I _D =6.7A	N-Ch		0.020			
		V _{GS} =-8V, I _D =-6.5A	P-Ch		0.044			
		V _{GS} =4.5V, I _D =6.6A	N-Ch		0.024			
		V _{GS} =-4.5V, I _D =-5A	P-Ch		0.050			
Forward Transconductance ^b	g _{fs}	V _{DS} =15V, I _D =6.8A	N-Ch		27		S	
		V _{DS} =-15V, I _D =-6.7A	P-Ch		25			
Dynamic ^a								
Input Capacitance	C _{iss}	N-Channel V _{DS} =20V, V _{GS} =0V, f=1MHz P-Channel V _{DS} =-20V, V _{GS} =0V, f=1MHz	N-Ch		510		pF	
			P-Ch		620			
Output Capacitance	C _{oss}		N-Ch		95			
			P-Ch		115			
Reverse Transfer Capacitance	C _{rss}		N-Ch		33			
			P-Ch		57			
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =10A	N-Ch		6	10	nC	
		V _{DS} =-20V, V _{GS} =-10V, I _D =-10	P-Ch		41.5	63		
		N-Channel V _{DS} =20V, V _{GS} =4.5V, I _D =10A	N-Ch		5.8	7		
			P-Ch		16	22		
Gate-Source Charge	Q _{gs}	P-Channel V _{DS} =-20V, V _{GS} =-4.5V, I _D =-10A	N-Ch		1.6			
			P-Ch		4.3			
Gate-Drain Charge	Q _{gd}		N-Ch		1.4			
			P-Ch		7			
Gate Resistance	R _g	f=1MHz	N-Ch	0.3	1.1	2.3	Ω	
			P-Ch	1.2	5.7	9.6		

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test		Min.	Typ. ^a	Max.	Unit
Dynamic ^a							
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} =20V,R _L =3.7Ω I _D =5.4A,V _{GEN} =10V,R _g =1Ω	N-Ch		4	8	ns
			P-Ch		10	16	
Rise Time	t _r	P-Channel V _{DD} =-20V,R _L =2Ω I _D ≐-10A,V _{GEN} =-10V,R _g =1Ω	N-Ch		10	17	
			P-Ch		9	15	
Turn-Off Delay Time	t _{d(off)}	N-Channel V _{DD} =20V,R _L =3.7Ω I _D =5.4A,V _{GEN} =4.5V,R _g =1Ω	N-Ch		16	22	
			P-Ch		23	26	
Fall Time	t _f	P-Channel V _{DD} =-20V,R _L =2Ω I _D ≐-10A,V _{GEN} =-4.5V,R _g =1Ω	N-Ch		5	9	
			P-Ch		10	16	
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} =20V,R _L =3.7Ω I _D =5.4A,V _{GEN} =4.5V,R _g =1Ω	N-Ch		10	16	
			P-Ch		26	35	
Rise Time	t _r	P-Channel V _{DD} =-20V,R _L =2Ω I _D ≐-10A,V _{GEN} =-4.5V,R _g =1Ω	N-Ch		11	20	
			P-Ch		16	26	
Turn-Off Delay Time	t _{d(off)}		N-Ch		13	22	
			P-Ch		16	26	
Fall Time	t _f		N-Ch		5	9	
			P-Ch		16	26	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C =25°C	N-Ch			2.6	A
			P-Ch			- 2.6	
Pulse Diode Forward Current ^a	I _{SM}		N-Ch			40	
			P-Ch			- 40	
Body Diode Voltage	V _{SD}	I _S =5.4A	N-Ch		0.81	1.2	V
		I _S =-2A	P-Ch		- 0.77	- 1.2	
Body Diode Reverse Recovery Time	t _{rr}	N-Channel I _F =5A, dI/dt=100A/μs,T _J =25°C	N-Ch		12	25	ns
			P-Ch		31	57	
Body Diode Reverse Recovery Charge	Q _{rr}	P-Channel I _F =-5A, dI/dt=-100A/μs,T _J =25°C	N-Ch		10	17	nC
			P-Ch		29	47	
Reverse Recovery Fall Time	t _a		N-Ch		10		ns
			P-Ch		13		
Reverse Recovery Rise Time	t _b		N-Ch		7		
			P-Ch		23		

Notes

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

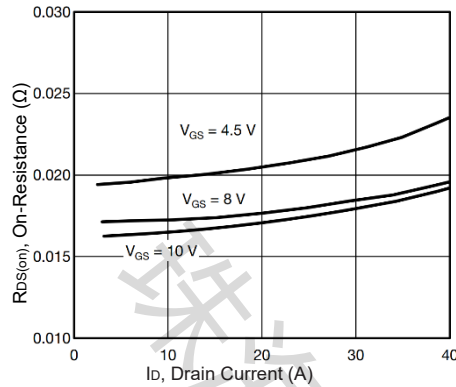


Fig 1. On-Resistance vs. Drain Current and Gate Voltage

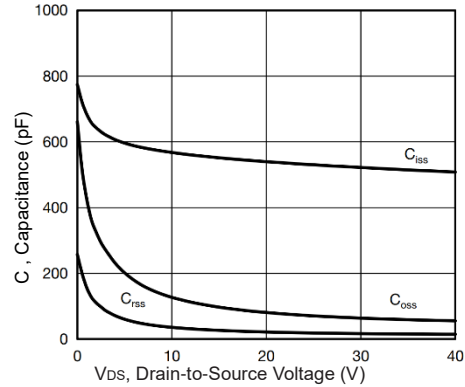


Fig 2. Capacitance

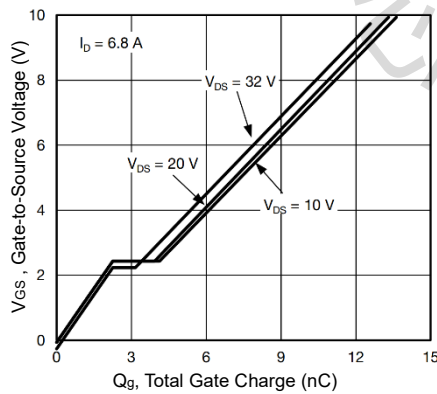


Fig 3. Gate Charge

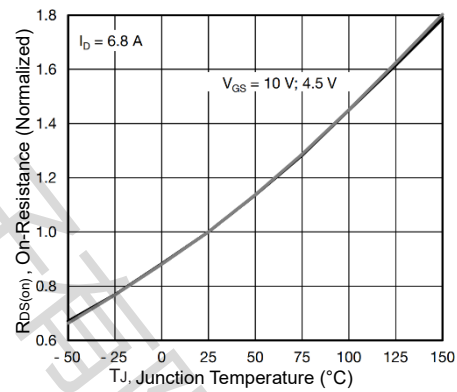


Fig 4. On-Resistance vs. Junction Temperature

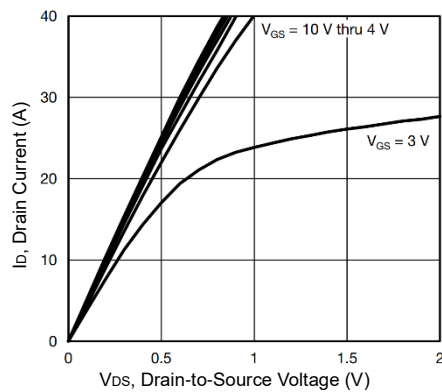


Fig 5. Output Characteristics

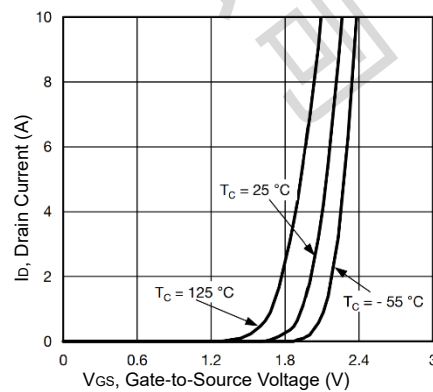


Fig 6. Transfer Characteristics

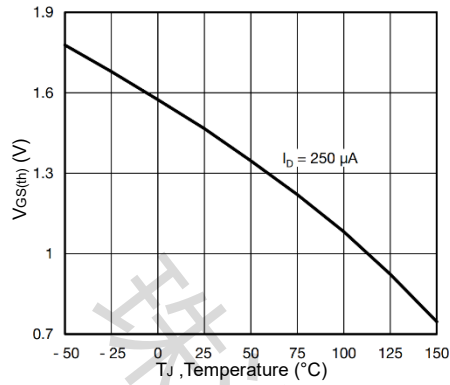


Fig 7. Threshold Voltage

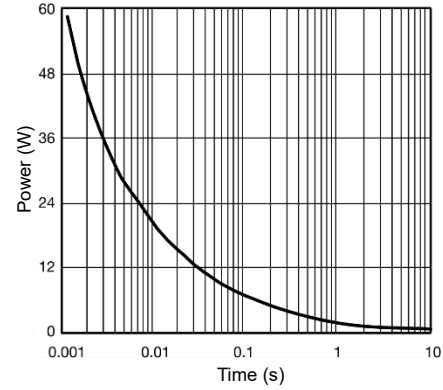


Fig 8. Single Pulse Power, Junction-to-Ambient

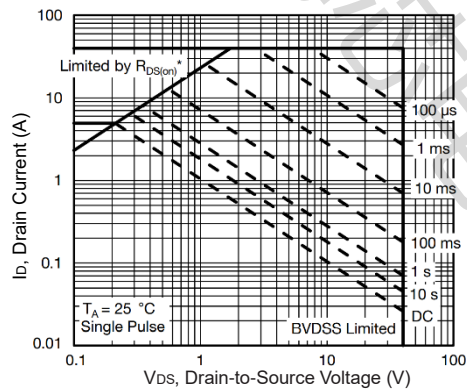


Fig 9. Safe Operating Area, Junction-to-Ambient

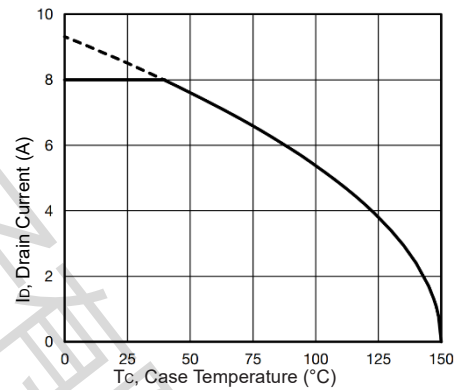


Fig 10. Current Derating

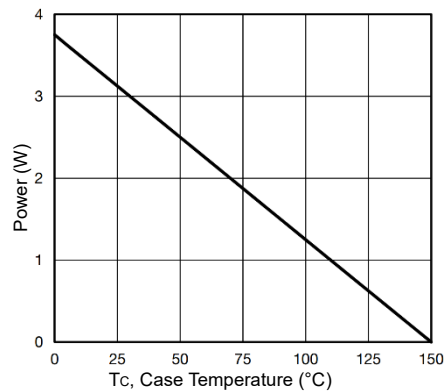


Fig 11. Power, Junction-to-Case

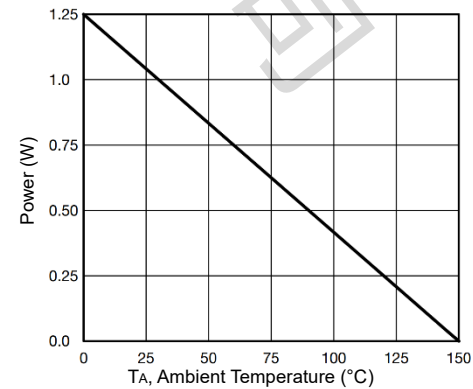


Fig 12. Power, Junction-to-Ambient

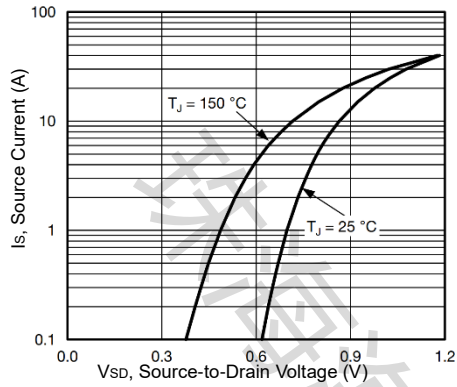


Fig 13. Source-Drain Diode Forward Voltage

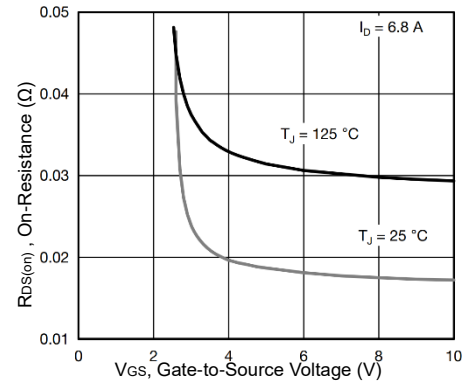


Fig 14. On-Resistance vs. Gate-to-Source Voltage

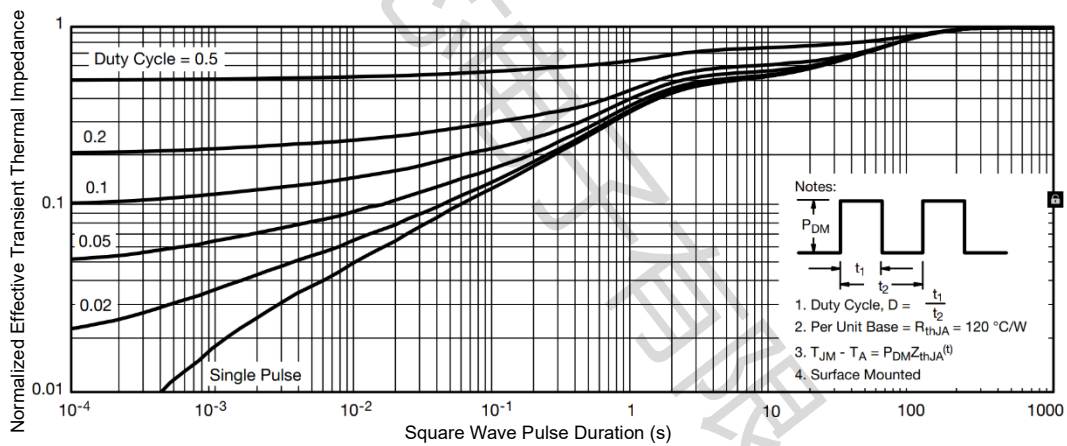


Fig 15. Normalized Thermal Transient Impedance, Junction-to-Ambient

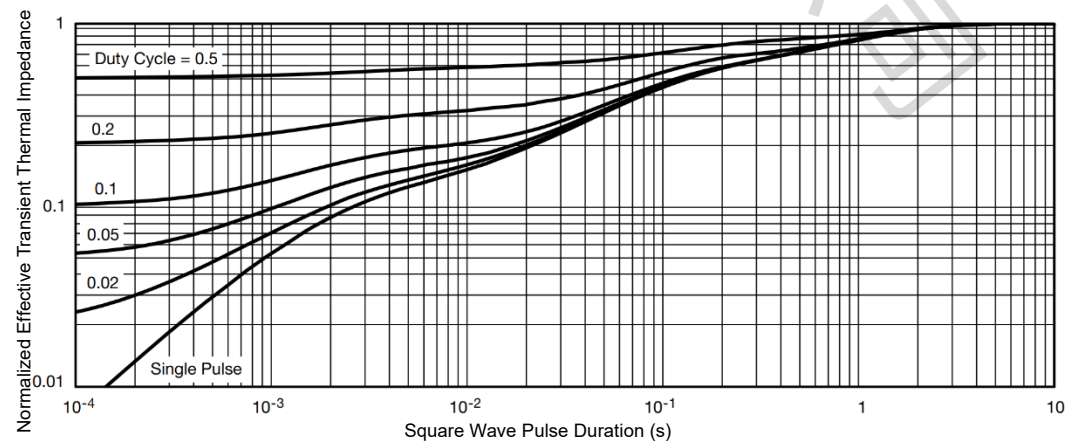


Fig 16. Normalized Thermal Transient Impedance, Junction-to-Foot

P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

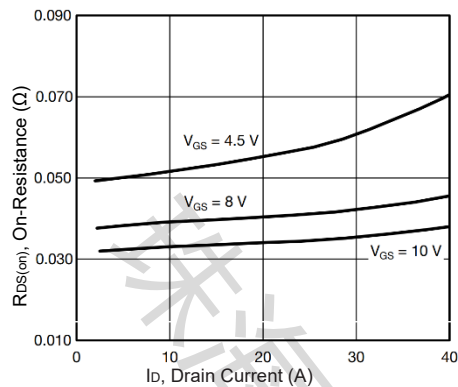


Fig 1. On-Resistance vs. Drain Current and Gate Voltage

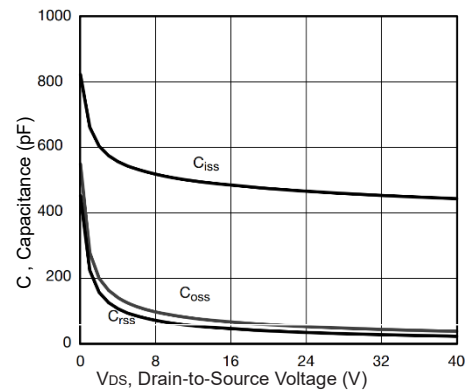


Fig 2. Capacitance

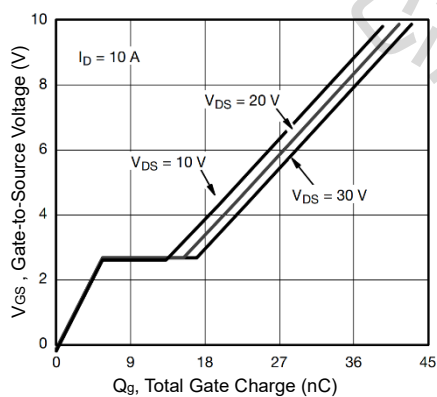


Fig 3. Gate Charge

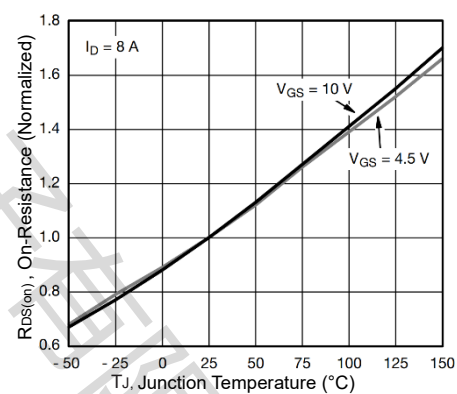


Fig 4. On-Resistance vs. Junction Temperature

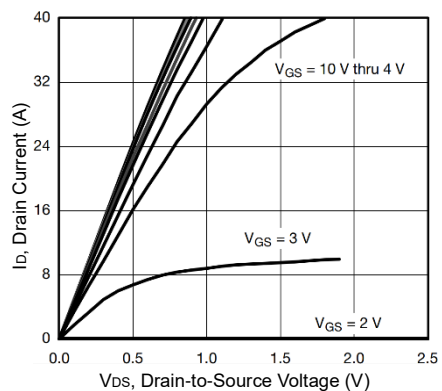


Fig 5. Output Characteristics

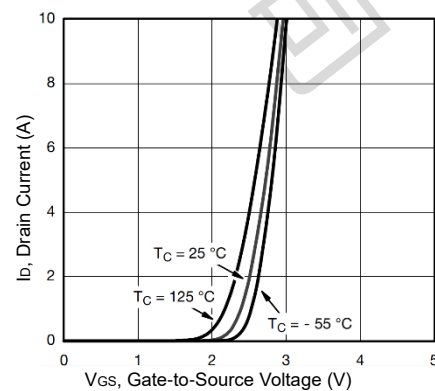


Fig 6. Transfer Characteristics

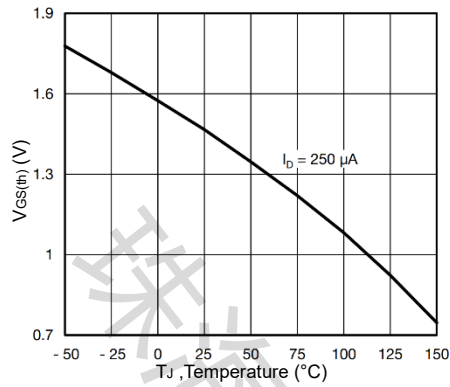


Fig 7. Threshold Voltage

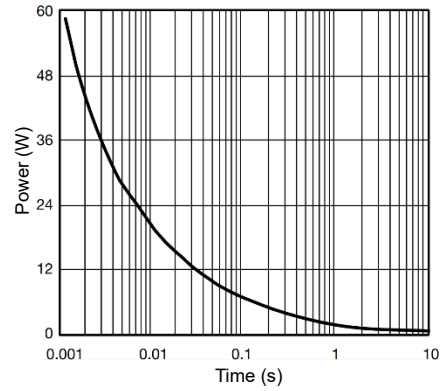


Fig 8. Single Pulse Power, Junction-to-Ambient

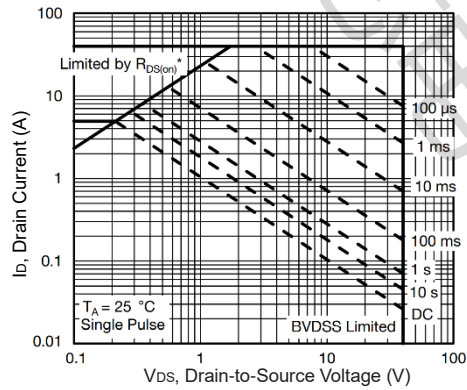


Fig 9. Safe Operating Area, Junction-to-Ambient

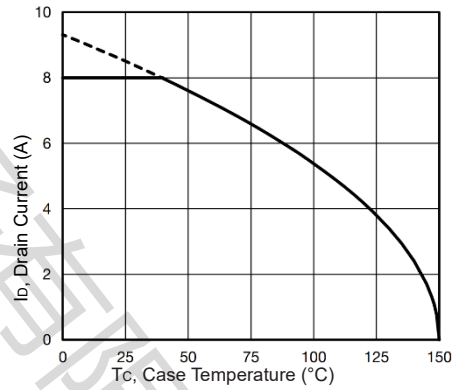


Fig 10. Current Derating

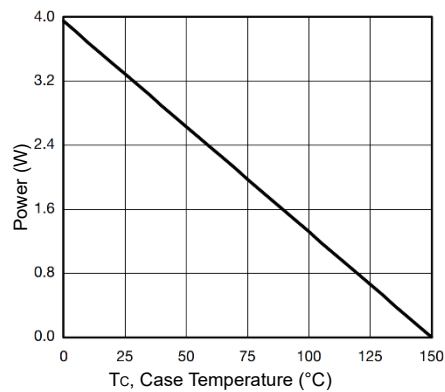


Fig 11. Power Derating, Junction-to-Foot

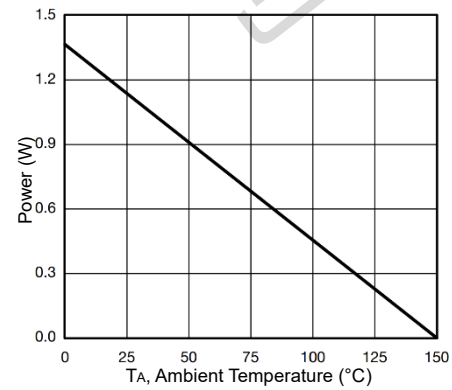


Fig 12. Power, Junction-to-Ambient

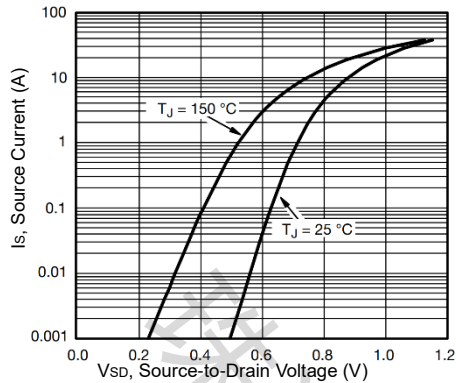


Fig 13. Source-Drain Diode Forward Voltage

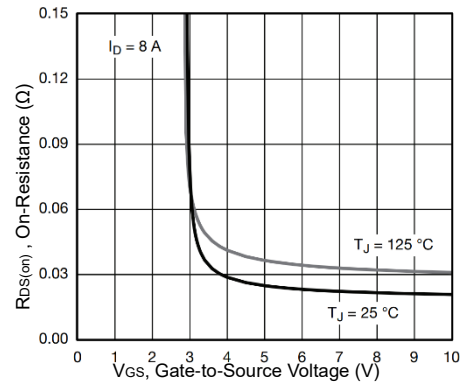


Fig 14. On-Resistance vs. Gate-to-Source Voltage

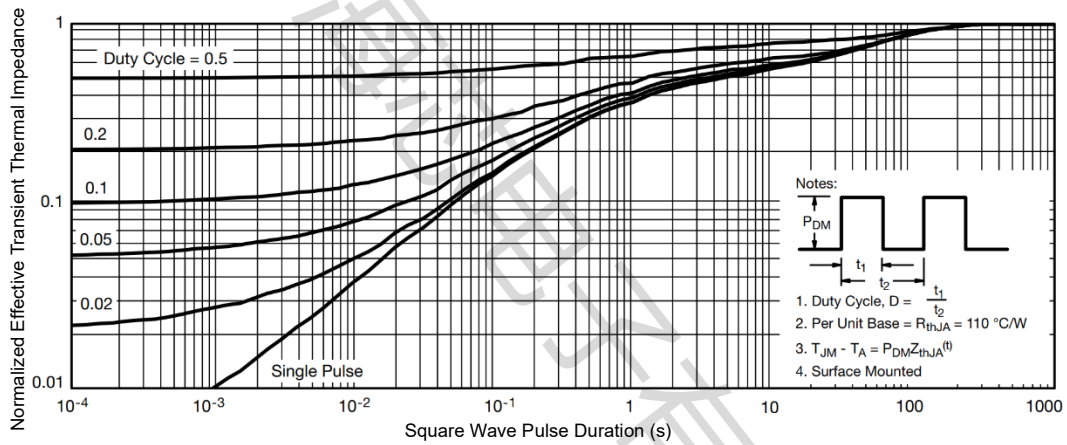


Fig 15. Normalized Thermal Transient Impedance, Junction-to-Ambient

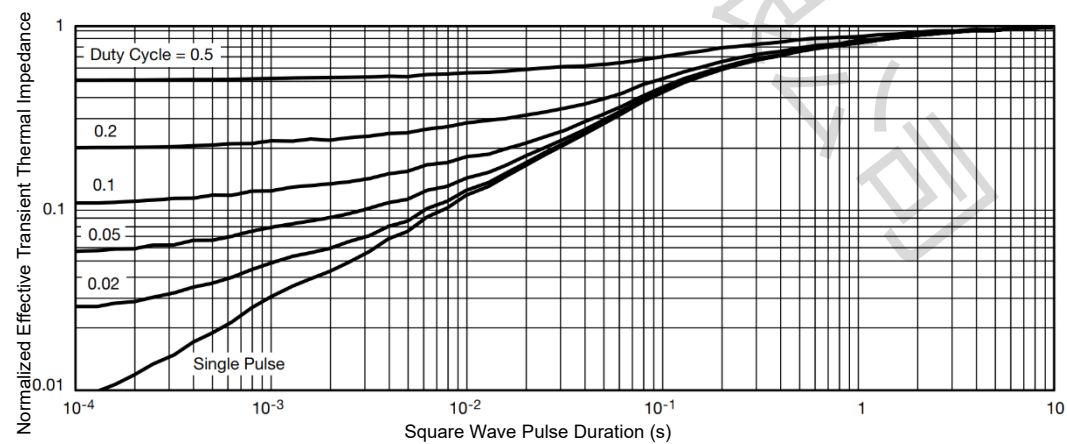
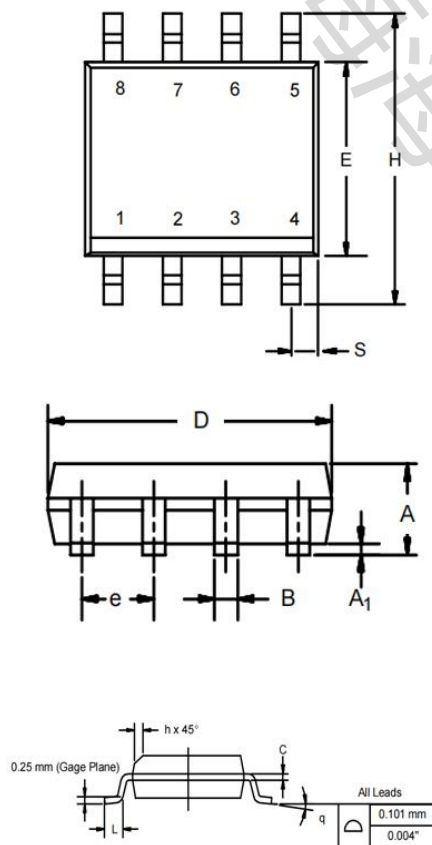


Fig 16. Normalized Thermal Transient Impedance, Junction-to-Foot

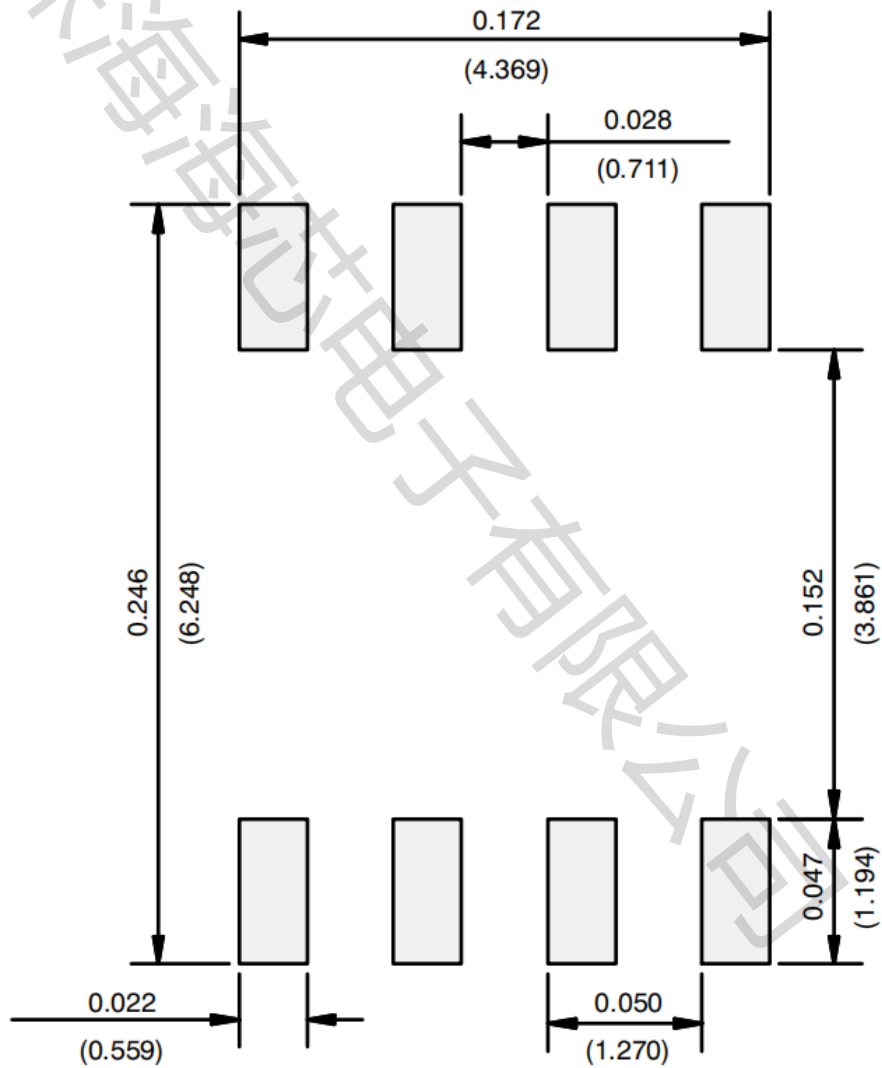
SOP-8 Package Outline

Dimensions are shown in millimeters (inches)



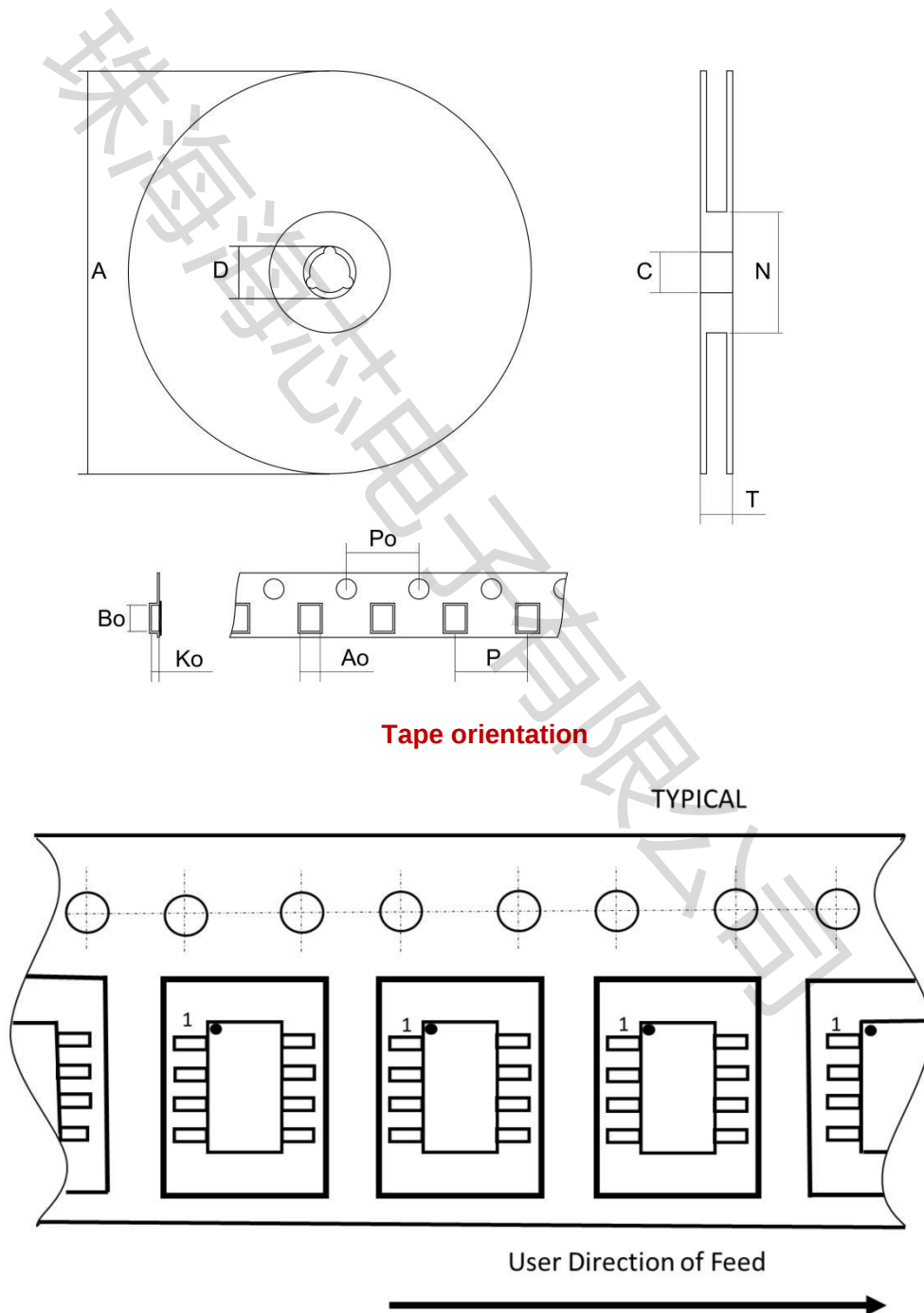
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026

RECOMMENDED MINIMUM PADS FOR SOP-8



SOP-8 packing information

SOP-8 tape and reel



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