

SE4606S

N+P Channel Enhancement-Mode MOSFET

Revision: A

General Description

Advanced trench technology to provide excellent RDS(ON), low gate charge and low operation voltage. This device is suitable for using as a load switch or in PWM applications.

- Low RDS(on)
- Small Package Outline
- ESD protected

Features

For N-Channel MOSFET

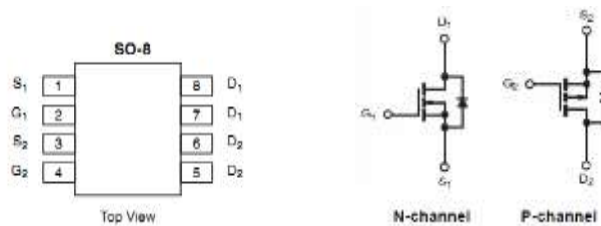
- V_{DS} = 30V
- R_{DS(ON)} = 24mΩ @ V_{GS}=10V
- R_{DS(ON)} = 39mΩ @ V_{GS}=4.5V

For P-Channel MOSFET

- V_{DS} = -30V
- R_{DS(ON)} = 37mΩ @ V_{GS}=-10V
- R_{DS(ON)} = 47mΩ @ V_{GS}=-4.5V

Pin configurations

See Diagram below



Absolute Maximum Ratings

Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		V _{DS}	30	-30	V
Gate-Source Voltage		V _{GS}	±20	±20	V
Drain Current	Continuous	I _D	5	-5	A
	Pulsed		70	-70	
Total Power Dissipation	@TA=25°C	P _D	1	1	W
Operating Junction Temperature Range		T _J	-55 to 150		°C

Thermal Resistance

Parameter	Symbol	N-Channel		P-Channel		Units
		Typ	Max	Typ	Max	
Thermal Resistance from Junction to Ambient	R _{θJA}	48	62.5	48	62.5	°C/W

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N-Channel Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA,	30			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =24V, V _{GS} =0V			1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	0.6	1.0	1.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =3.6A		24	30	mΩ
		V _{GS} =4.5V, I _D =3.0A		39	48	mΩ
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		400		pF
C _{oss}	Output Capacitance			45		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =10V, V _{DD} =15V, I _D =3A		5.2		nC
Q _{gs}	Gate Source Charge			0.8		nC
Q _{gd}	Gate Drain Charge			1.3		nC
t _{d(on)}	Turn-On Delay Time	V _{DD} =15V, R _{GEN} =3.0Ω		4.5		ns
t _{d(off)}	Turn-Off Delay Time			14.5		ns
t _{d(r)}	Turn-On Rise Time			2.5		ns
t _{d(f)}	Turn-Off Fall Time			3.5		ns
Source-Drain Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =1A		0.7	1.0	V

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P-Channel Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
B _V DSS	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =-30V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	-0.6	-1.0	-1.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-4.1A	-	37	47	mΩ
		V _{GS} =-4.5V, I _D =-3.5A		47	60	mΩ
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		1000		pF
C _{oss}	Output Capacitance			175		pF
C _{rss}	Reverse Transfer Capacitance			105		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =-4.5V, V _{DS} =-15V, I _D =-3A		18		nC
Q _{gs}	Gate Source Charge			3.2		nC
Q _{gd}	Gate Drain Charge			4.4		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _{GEN} =3Ω		10		ns
t _{d(off)}	Turn-Off Delay Time			24		ns
t _{d(r)}	Turn-On Rise Time			31		ns
t _{d(f)}	Turn-Off Fall Time			28		ns
Source-Drain Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =-1A		-0.7	-1.2	V

Typical Characteristics(N-Channel)

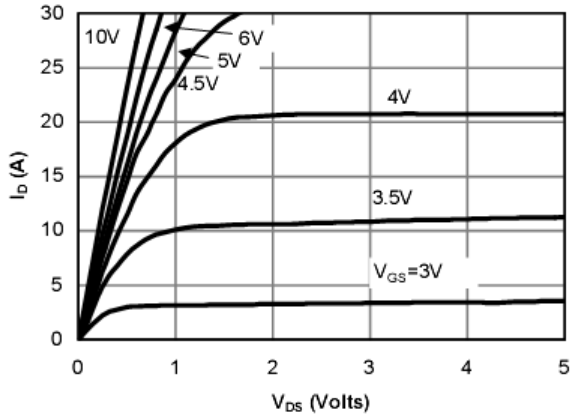


Fig 1: On-Region Characteristics

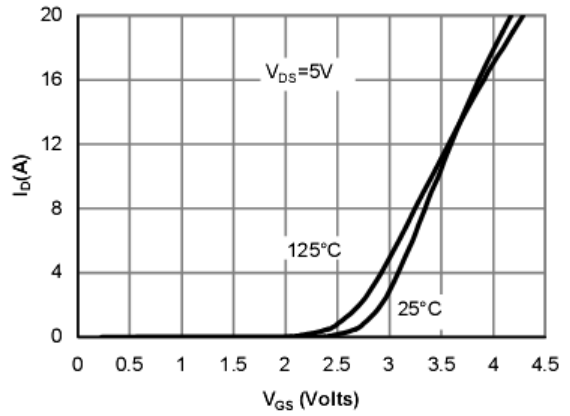


Figure 2: Transfer Characteristics

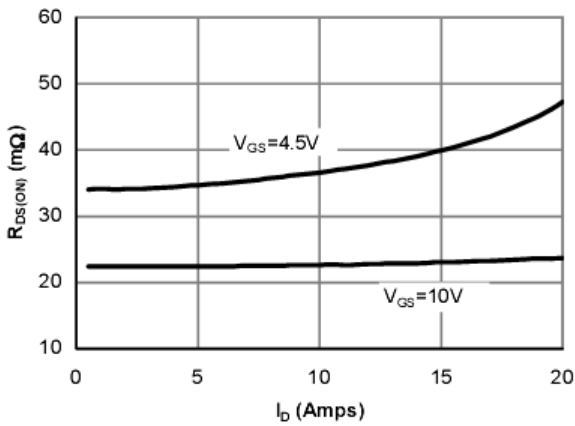


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

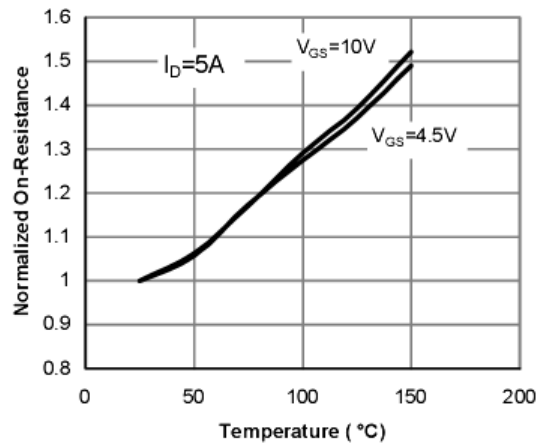


Figure 4: On-Resistance vs. Junction Temperature

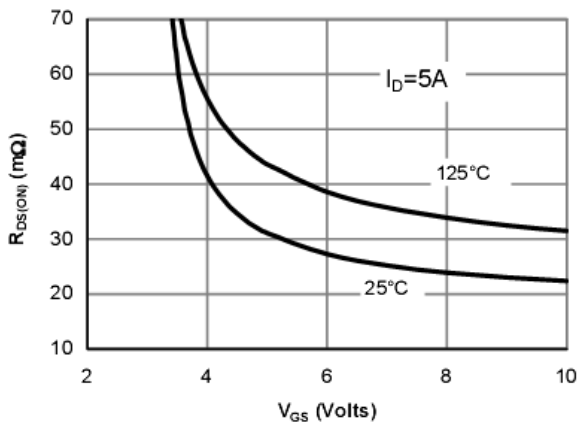


Figure 5: On-Resistance vs. Gate-Source Voltage

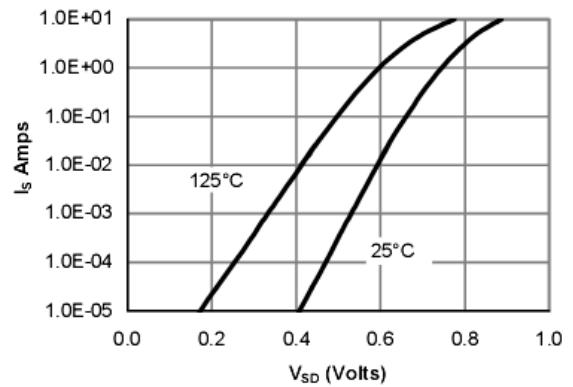


Figure 6: Body diode characteristics

Typical Characteristics(N-Channel)

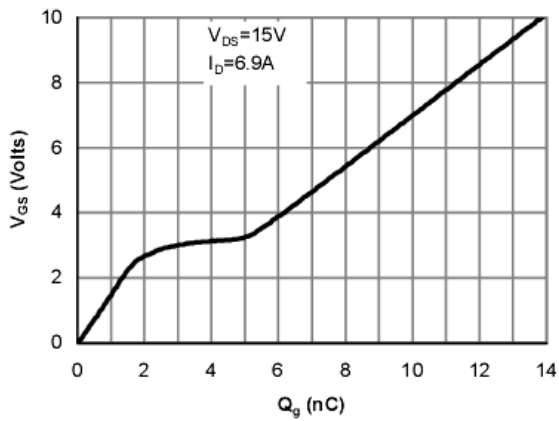


Figure 7: Gate-Charge characteristics

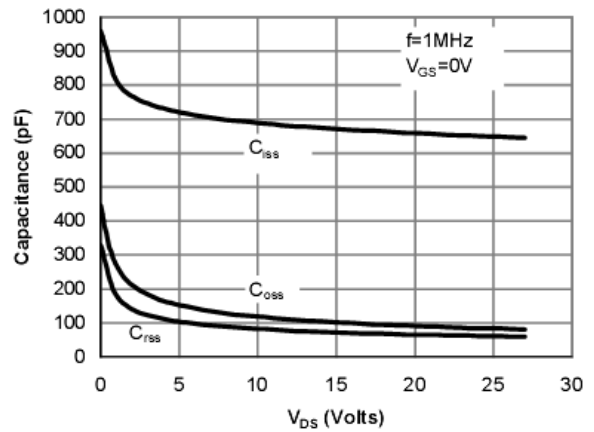


Figure 8: Capacitance Characteristics

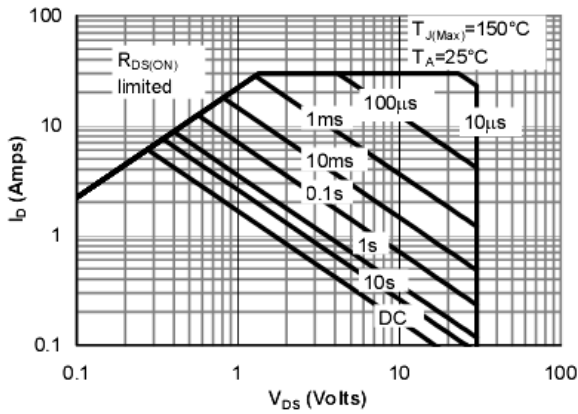


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

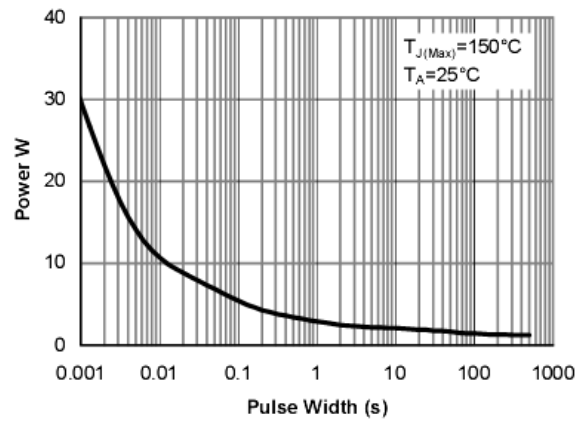


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

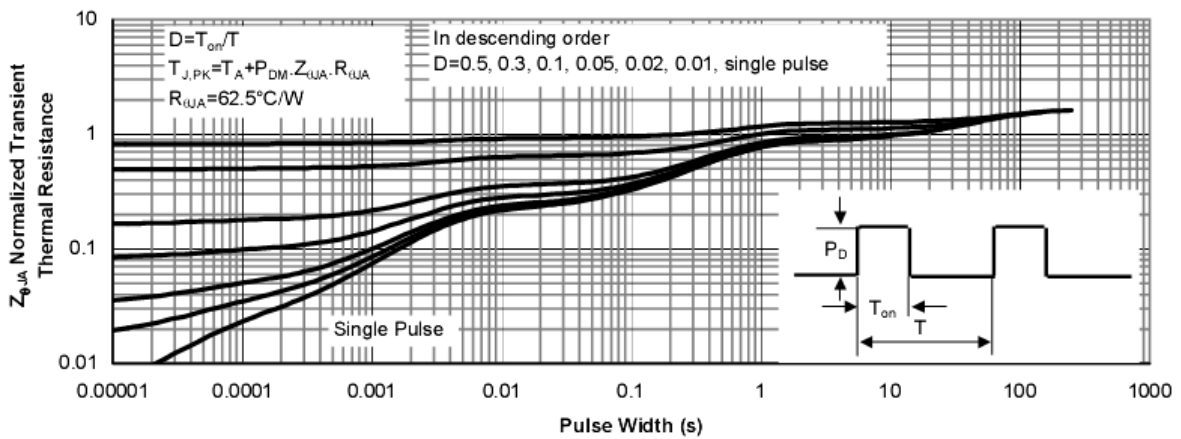


Figure 11: Normalized Maximum Transient Thermal Impedance

Typical Characteristics(P-Channel)

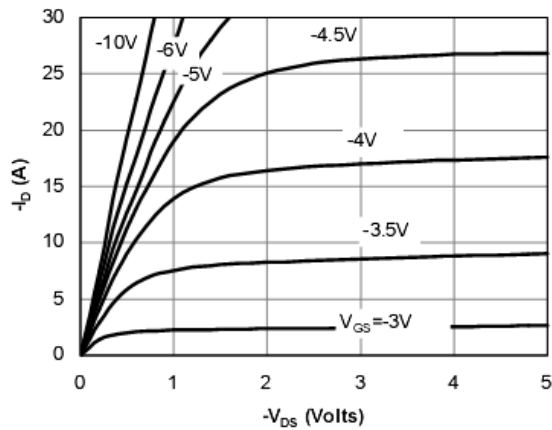


Fig 1: On-Region Characteristics

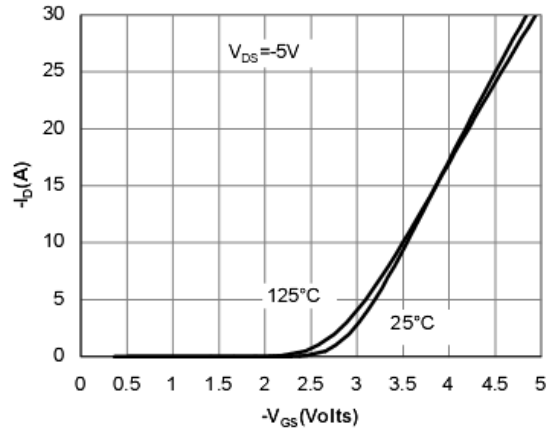


Figure 2: Transfer Characteristics

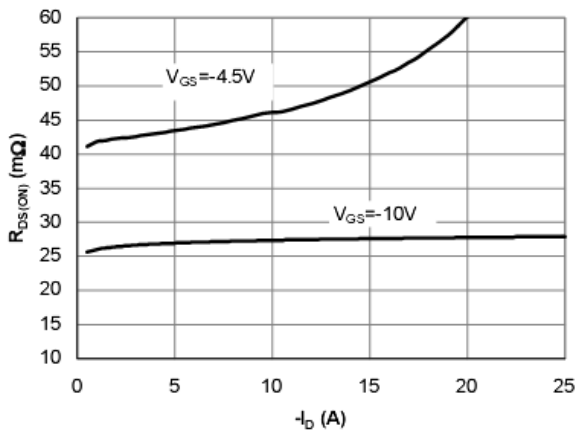


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

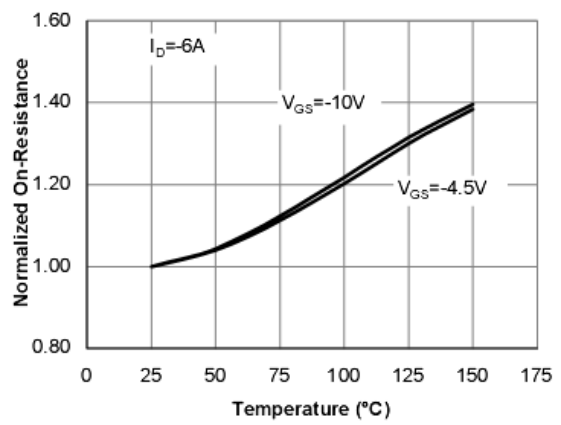


Figure 4: On-Resistance vs. Junction Temperature

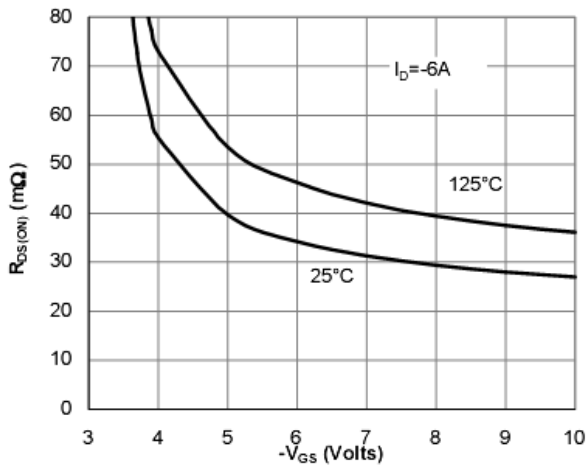


Figure 5: On-Resistance vs. Gate-Source Voltage

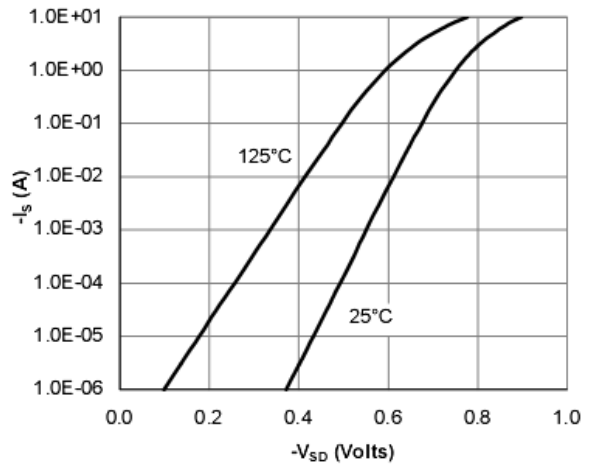


Figure 6: Body-Diode Characteristics

Typical Characteristics(P-Channel)

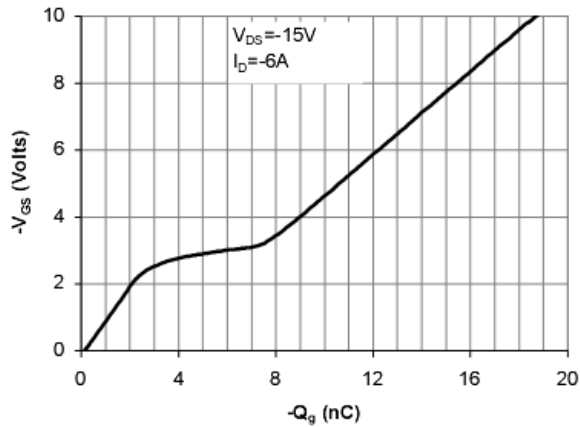


Figure 7: Gate-Charge Characteristics

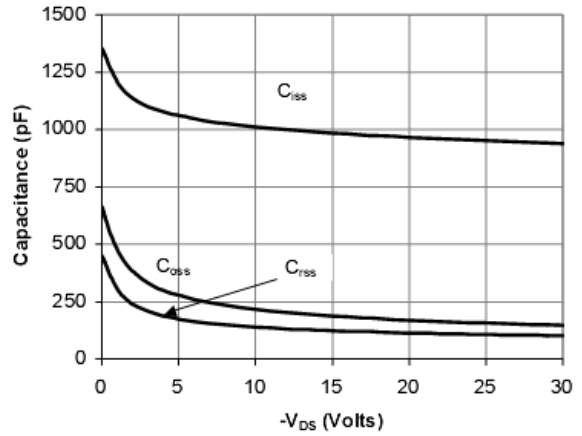


Figure 8: Capacitance Characteristics

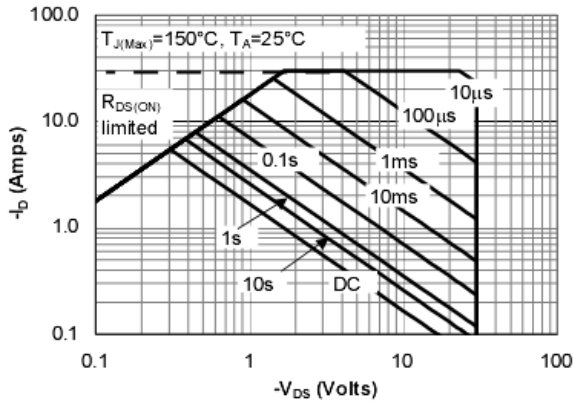


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

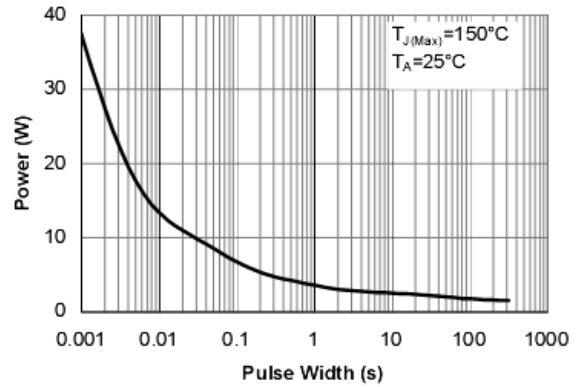


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

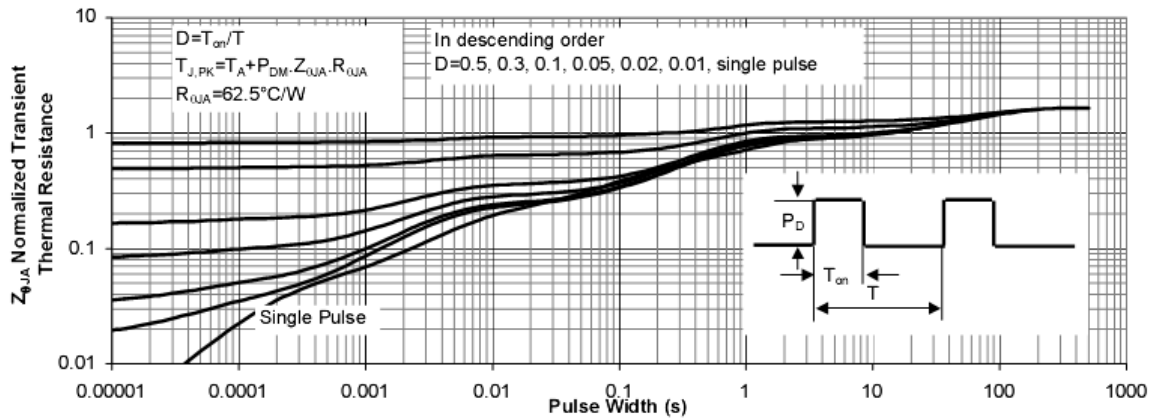
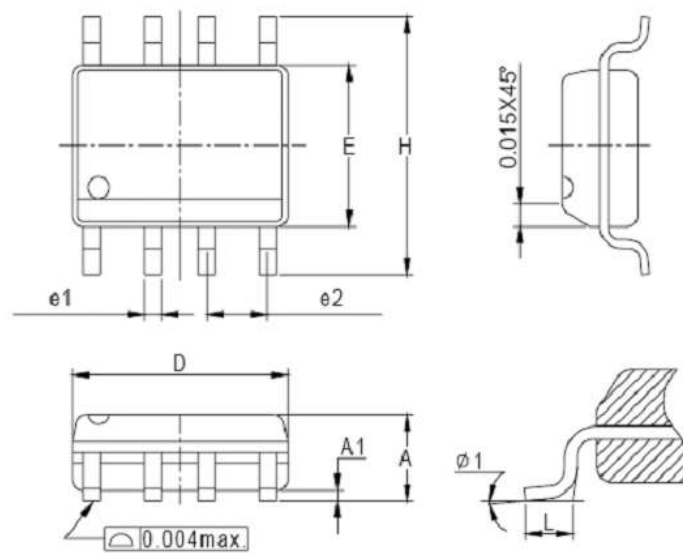


Figure 11: Normalized Maximum Transient Thermal Impedance

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Package Outline Dimension

SOP-8



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
φ 1	8°		8°	