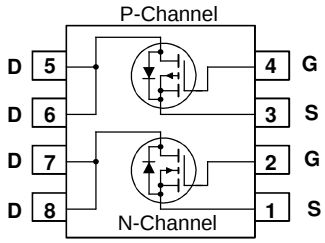
General Description

These devices are well suited for low voltage and battery powered applications where low in-line power loss and fast switching are required.



SOP-8

Features

N-Channel

- V_{DS} (V) = 30V
- I_D = 7A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 28mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 40mΩ (V_{GS} = 4.5V)

P-Channel

- V_{DS} (V) = -30V
- I_D = 5A (V_{GS} = -10V)
- $R_{DS(ON)}$ < 52mΩ (V_{GS} = -10V)
- $R_{DS(ON)}$ < 80mΩ (V_{GS} = -4.5V)

Absolute Maximum Ratings T_A = 25℃ unless otherwise noted

Symbol	Parameter		N-Channel	P-Channel	Units
V_{DSS}	Drain-Source Voltage		30	30	V
V_{GSS}	Gate-Source Voltage		±20	±20	V
I_D	Drain Current - Continuous	(Note 1a)	7	-5	A
	- Pulsed		20	-20	
P_D	Power Dissipation for Dual Operation		2	2	W
	Power Dissipation for Single Operation	(Note 1a)	1.6	1.6	
		(Note 1c)	0.9	0.9	
E_{AS}	Single Pulse Avalanche Energy	(Note 3)	54	13	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to +150		°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	(Note 1a)	78	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	(Note 1)	40	°C/W

Electrical Characteristics

T_A = 25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
Off Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA V_{GS} = 0 V, I_D = -250 μA	N-Ch P-Ch	30 -30			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C I_D = -250 μA, Referenced to 25°C	N-Ch P-Ch		25 -23		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V V_{DS} = -24 V, V_{GS} = 0 V	N-Ch P-Ch			1 -1	μA
I_{GSSF}	Gate-Body Leakage, Forward	V_{GS} = 20 V, V_{DS} = 0 V	All			100	nA
I_{GSSR}	Gate-Body Leakage, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	All			-100	nA
On Characteristics (Note 2)							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA V_{DS} = V_{GS}, I_D = -250 μA	N-Ch P-Ch	1 -1	1.9 -1.7	3 -3	V
$\Delta V_{GS(th)}$ / ΔT_J	Gate Threshold Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C I_D = -250 μA, Referenced to 25°C	N-Ch P-Ch		-4.5 4.5		mV/°C
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 7 A V_{GS} = 4.5 V, I_D = 6 A	N-Ch		19 24	28 40	mΩ
		V_{GS} = -10 V, I_D = -5 A V_{GS} = -4.5 V, I_D = -4 A	P-Ch		42 65	52 80	
$I_{D(on)}$	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 5 V V_{GS} = -10 V, V_{DS} = -5 V	N-Ch P-Ch	20 -20			A
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 7 A V_{DS} = -5 V, I_D =-5 A	N-Ch P-Ch		25 10		S
Dynamic Characteristics							
C_{iss}	Input Capacitance	N-Ch V_{DS} = 15 V, V_{GS} = 0 V, f = 1.0 MHz	N-Ch P-Ch		575 528		pF
C_{oss}	Output Capacitance	P-Ch V_{DS} = -15 V, V_{GS} = 0 V, f = 1.0 MHz	N-Ch P-Ch		145 132		pF
C_{rss}	Reverse Transfer Capacitance		N-Ch P-Ch		65 70		pF
R_G	Gate Resistance	V_{GS} = 15 mV, f = 1.0 MHz	N-Ch P-Ch		2.1 6.0		Ω

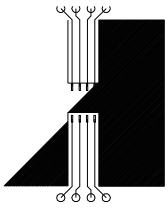
Electrical Characteristics (continued)

T_A = 25°C unless otherwise noted

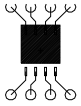
Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
Switching Characteristics (Note 2)							
$t_{d(on)}$	Turn-On Delay Time	N-Ch V_{DD} = 15 V, I_D = 1 A, V_{GS} = 10V, R_{GEN} = 6 Ω P-Ch V_{DD} = -15 V, I_D = -1 A, V_{GS} = -10V, R_{GEN} = 6 Ω	N-Ch P-Ch		8 7	16 14	ns
t_r	Turn-On Rise Time		N-Ch P-Ch		5 13	10 24	ns
$t_{d(off)}$	Turn-Off Delay Time		N-Ch P-Ch		23 14	37 25	ns
t_f	Turn-Off Fall Time		N-Ch P-Ch		3 9	6 17	ns
Q_g	Total Gate Charge	N-Ch V_{DS} = 15 V, I_D = 7 A, V_{GS} = 10 V P-Ch V_{DS} = -15 V, I_D = -5 A,V_{GS} = -10 V	N-Ch P-Ch		11.4 9.6	16 13	nC
Q_{gs}	Gate-Source Charge		N-Ch P-Ch		1.7 2.2		nC
Q_{gd}	Gate-Drain Charge		N-Ch P-Ch		2.1 1.7		nC
Drain–Source Diode Characteristics and Maximum Ratings							
I_S	Maximum Continuous Drain-Source Diode Forward Current		N-Ch P-Ch			1.3 -1.3	A
I_{SM}	Maximum Plused Drain-Source Diode Forward Current (Note 2)		N-Ch P-Ch			20 -20	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 1.3 A (Note 2) V_{GS} = 0 V, I_S = -1.3 A (Note 2)	N-Ch P-Ch		0.75 -0.88	1.2 -1.2	V
t_{rr}	Diode Reverse Recovery Time	N-Ch I_F = 7 A, d_{iF}/d_t = 100 A/µs P-Ch I_F = -5 A, d_F/d_t = 100 A/µs	N-Ch P-Ch		19 19		nS
Q_{rr}	Diode Reverse Recovery Charge		N-Ch P-Ch		9 6		nC

Notes:

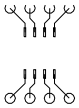
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 78°/W when mounted on a 0.5 in^2 pad of 2 oz copper



b) 125°/W when mounted on a .02 in^2 pad of 2 oz copper



c) 135°/W when mounted on a minimum pad.

Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width < 300µs, Duty Cycle < 2.0%

3. Starting TJ = 25°C, L = 3mH, I_{AS} = 6A, V_{DD} = 30V, V_{GS} = 10V (Q1).

Starting TJ = 25°C, L = 3mH, I_{AS} = 3A, V_{DD} = 30V, V_{GS} = 10V (Q2).

Typical Characteristics: (N-Channel)

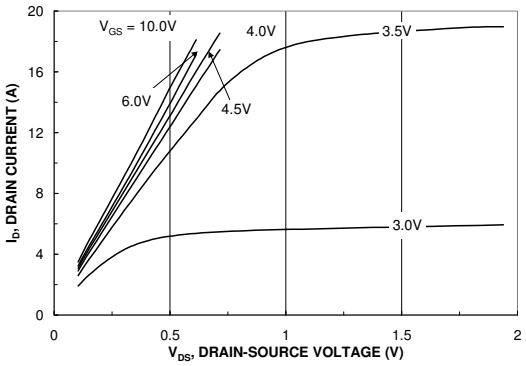


Figure 1. On-Region Characteristics.

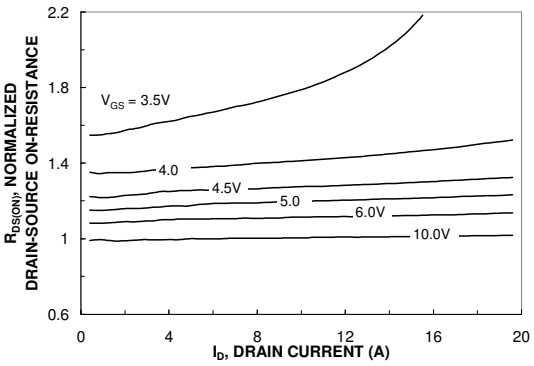


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

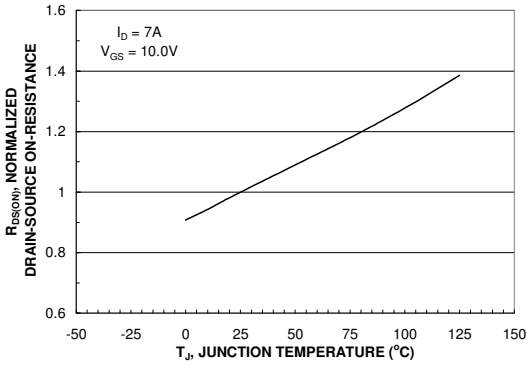


Figure 3. On-Resistance Variation with Temperature.

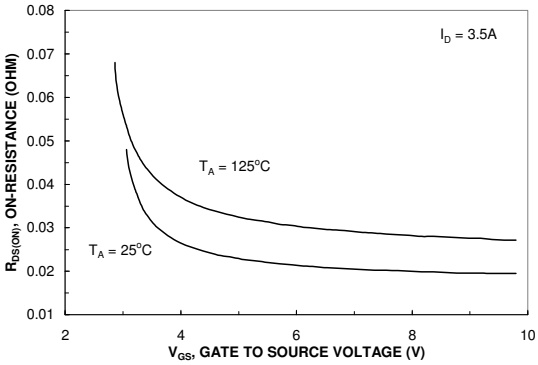


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

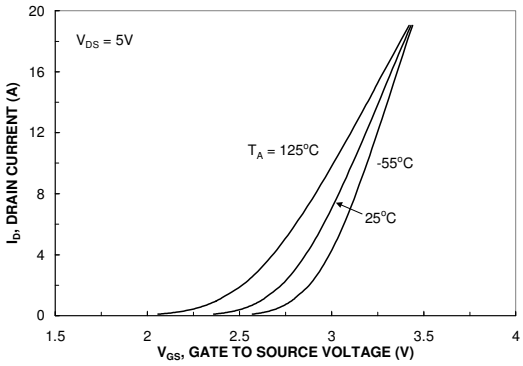


Figure 5. Transfer Characteristics.

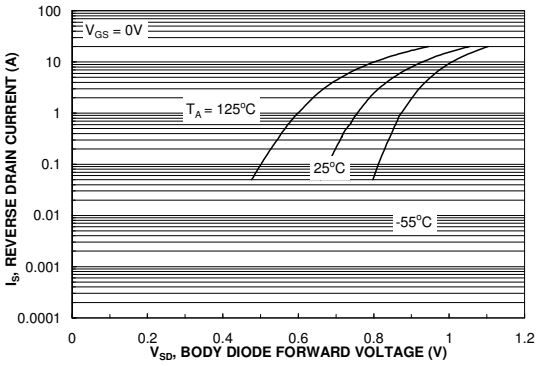


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics: (N-Channel)

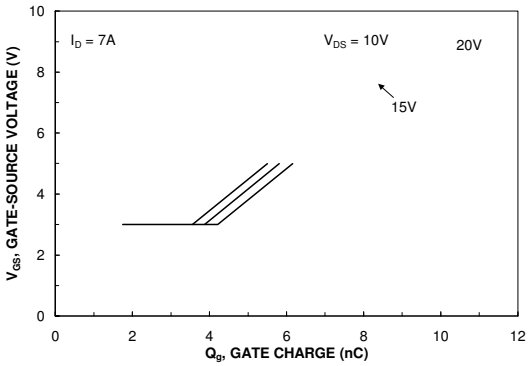


Figure 7. Gate Charge Characteristics.

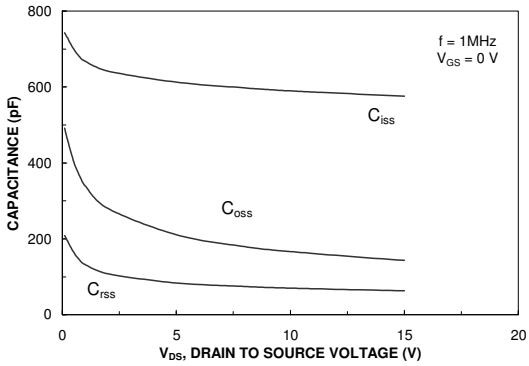


Figure 8. Capacitance Characteristics.

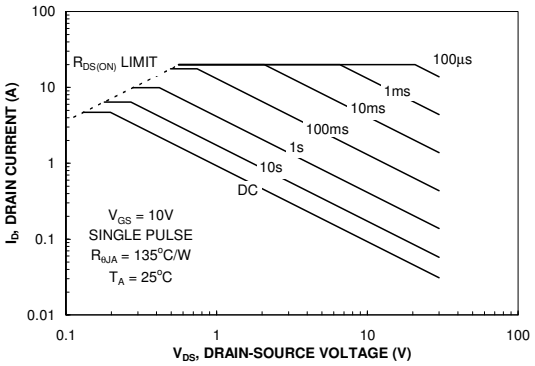


Figure 9. Maximum Safe Operating Area.

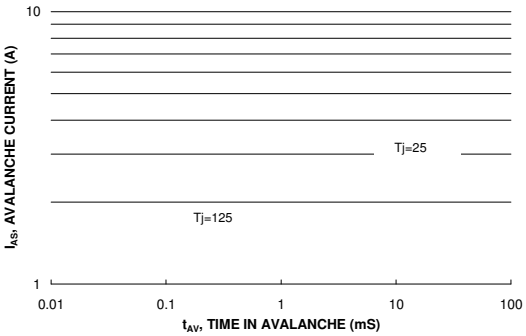


Figure 10. Unclamped Inductive Switching Capability Figure

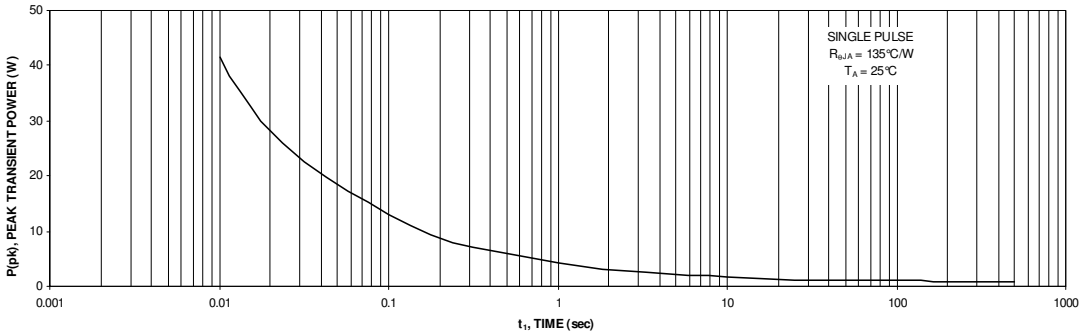


Figure 11. Single Pulse Maximum Power Dissipation.

Typical Characteristics: (P-Channel)

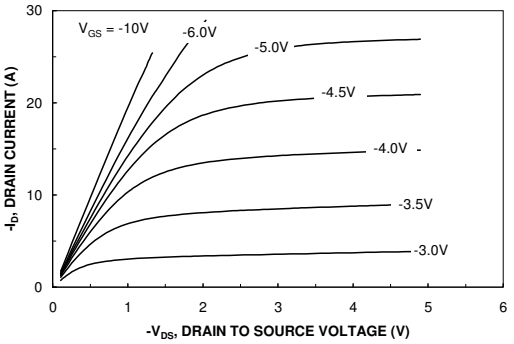


Figure 12. On-Region Characteristics.

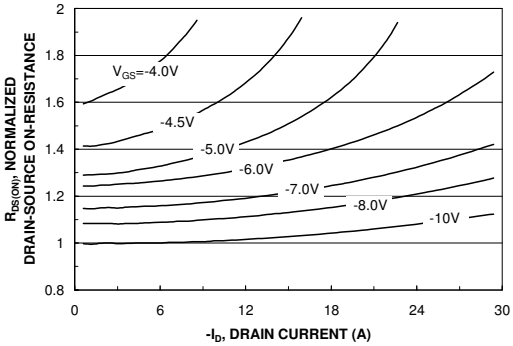


Figure 13. On-Resistance Variation with Drain Current and Gate Voltage.

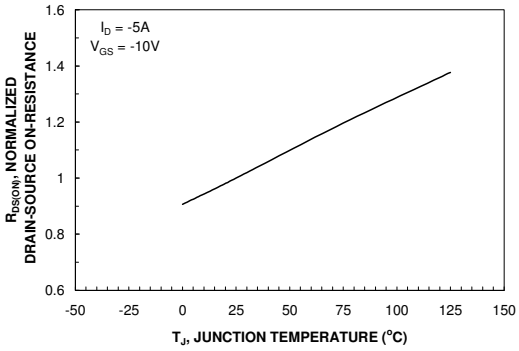


Figure 14. On-Resistance Variation with Temperature.

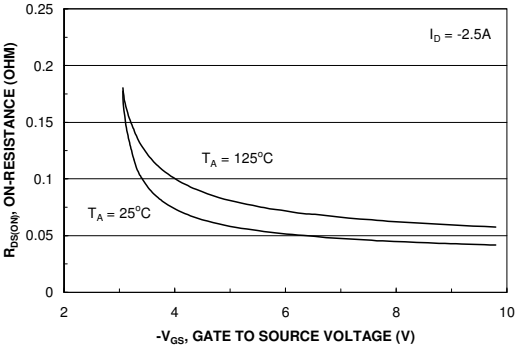


Figure 15. On-Resistance Variation with Gate-to-Source Voltage.

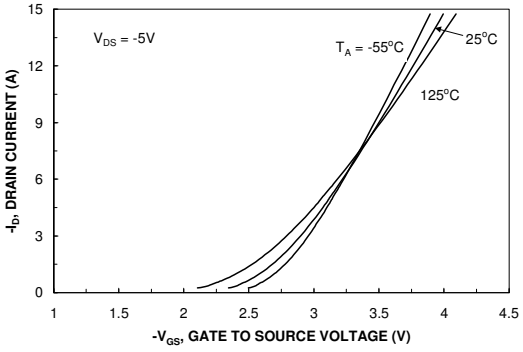


Figure 16. Transfer Characteristics.

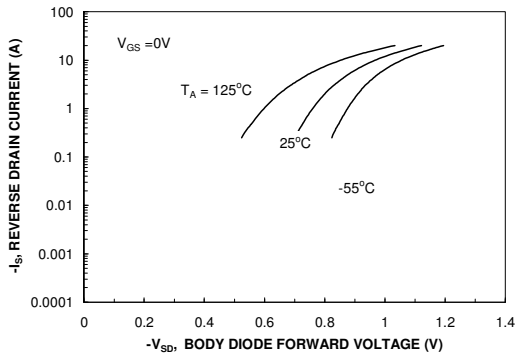


Figure 17. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics: (P-Channel)

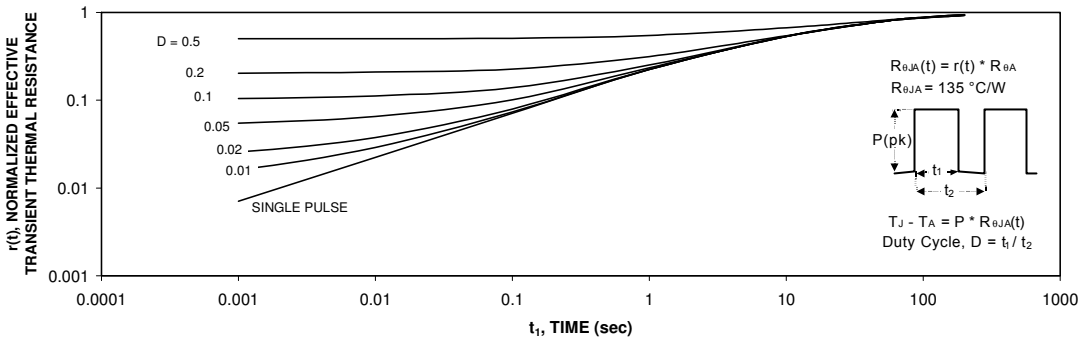
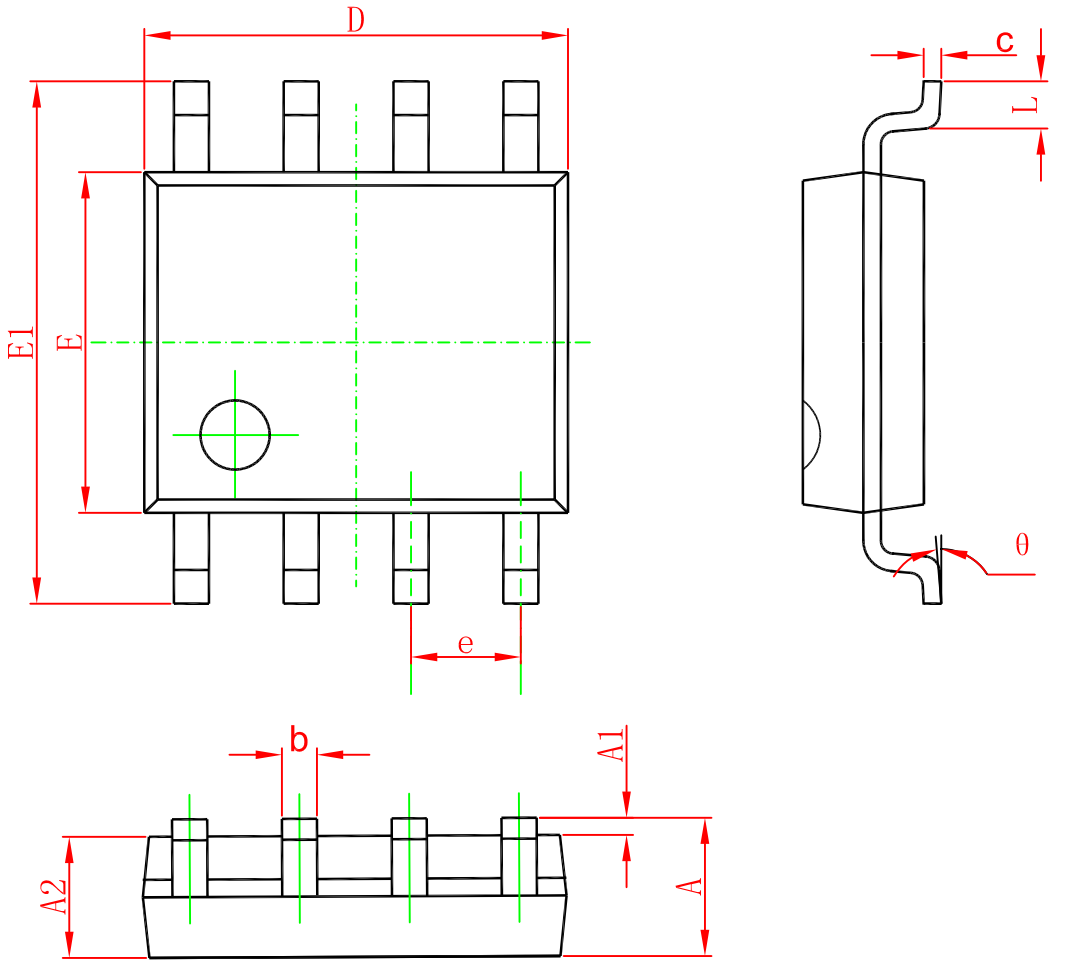


Figure 23. Transient Thermal Response Curve.

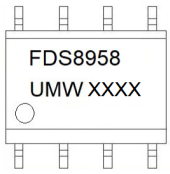
Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.

Package Mechanical Data 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°

Marking



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Order code	Package	Baseqty	Deliverymode
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