

## General Description

The MDS3603 uses advanced MagnaChip's MOSFET Technology to provide low on-state resistance.

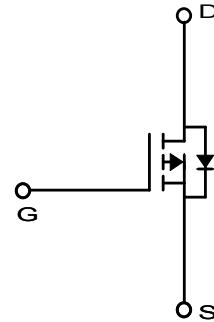
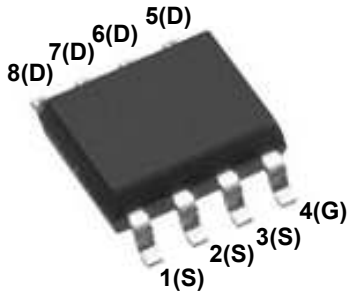
This device is suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

## Features

- $V_{DS} = -30V$
- $I_D = -12A$  @  $V_{GS} = -10V$
- $R_{DS(ON)}$   
 $< 8.5m\Omega$  @  $V_{GS} = -20V$   
 $< 10.1m\Omega$  @  $V_{GS} = -10V$   
 $< 14.5m\Omega$  @  $V_{GS} = -5V$

## Applications

- Load Switch
- General purpose applications
- Smart Module for Note PC Battery



## Absolute Maximum Ratings ( $T_a = 25^\circ C$ unless otherwise noted)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	-30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 25$	V
Continuous Drain Current (Note 1)	$I_D$	-12	A
Pulsed Drain Current	$I_{DM}$	-48	A
Power Dissipation	$P_D$	2.5	W
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	112.5	mJ
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~150	$^\circ C$

## Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	22	

## Ordering Information

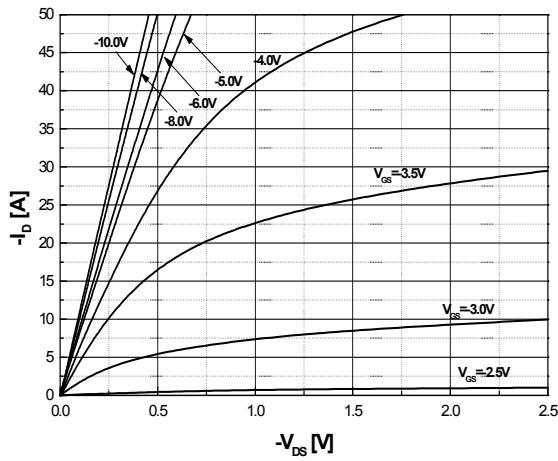
Part Number	Temp. Range	Package	Packing	Quantity	RoHS Status
MDS3603URH	-55~150°C	SOIC-8	Tape & Reel	3000 units	Halogen Free

## Electrical Characteristics (T<sub>a</sub> = 25°C unless otherwise noted)

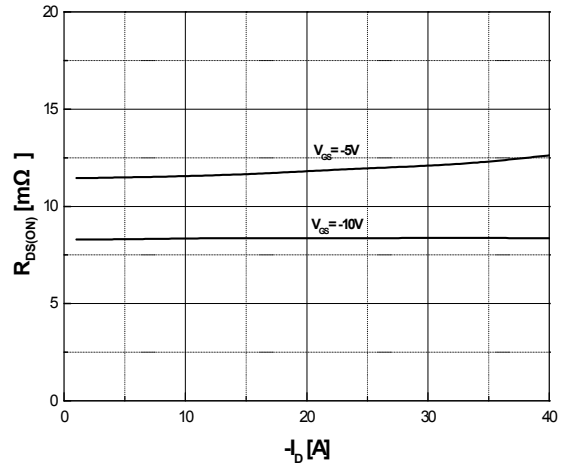
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V	-30	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.8	-3.0	
Drain Cut-Off Current	I <sub>DSS</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V	-		-1	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V	-	-	±0.1	
Drain-Source ON Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = -20V, I <sub>D</sub> = -12A	-	7.3	8.5	mΩ
		V <sub>GS</sub> = -10V, I <sub>D</sub> = -12A	-	8.3	10.1	
		V <sub>GS</sub> = -5V, I <sub>D</sub> = -10A		11.5	14.5	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -10A		28	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -12A V <sub>GS</sub> = -10V	-	38.4	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	5.9	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	8.2	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	1788	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	268	-	
Output Capacitance	C <sub>oss</sub>		-	445	-	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, R <sub>L</sub> = 1.25Ω, R <sub>GEN</sub> = 3Ω	-	15.3	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	13.0	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	61.6	-	
Turn-Off Fall Time	t <sub>f</sub>		-	53.2	-	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-0.72	-1.0	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -12A, di/dt = 100A/μs	-	42.3		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		-	40.7	-	nC

Note :

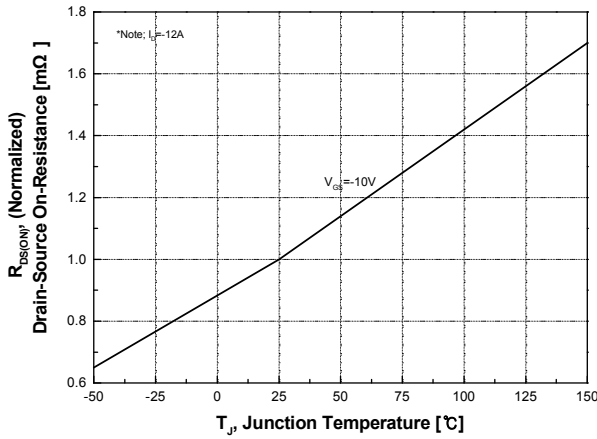
- Surface mounted FR-4 board by JEDEC (jesd51-7)
- Starting T<sub>J</sub>=25°C, L=1mH, I<sub>AS</sub>= -15A V<sub>DD</sub>=-20V, V<sub>GS</sub>=-10V.



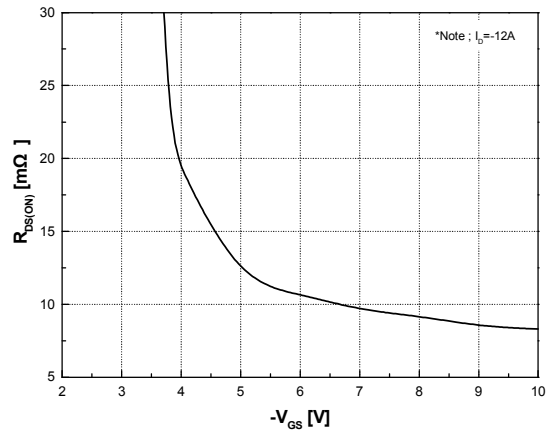
**Fig.1 On-Region Characteristics**



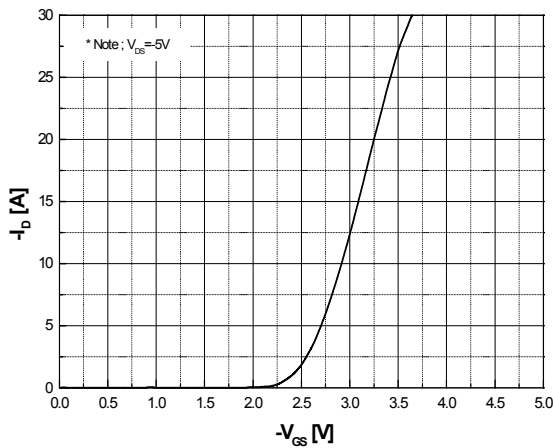
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



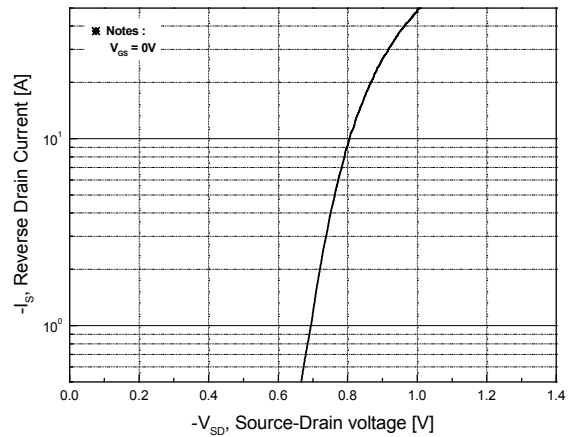
**Fig.3 On-Resistance Variation with Temperature**



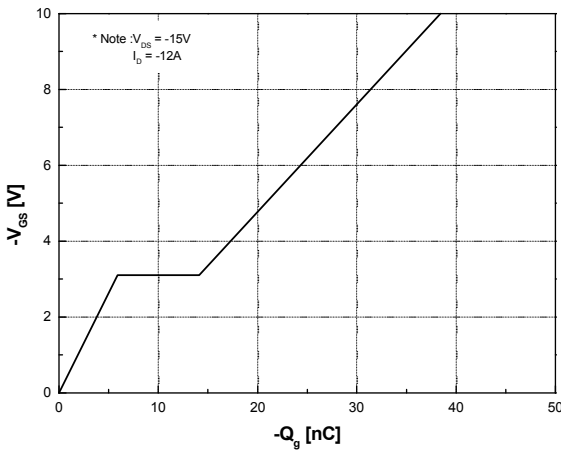
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



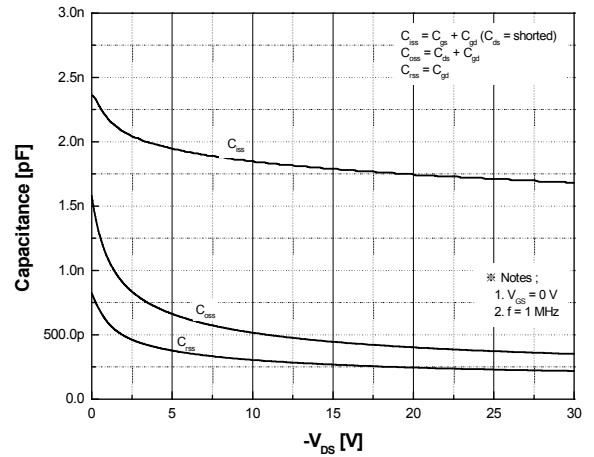
**Fig.5 Transfer Characteristics**



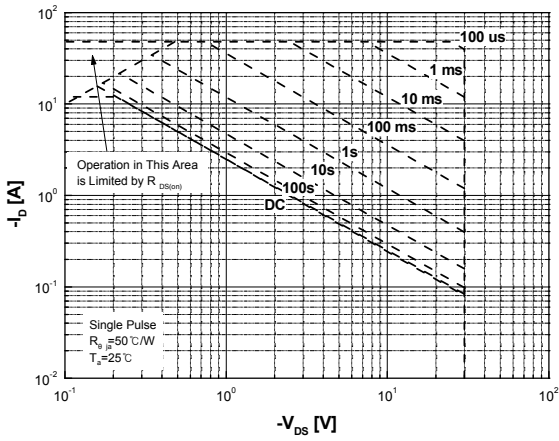
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



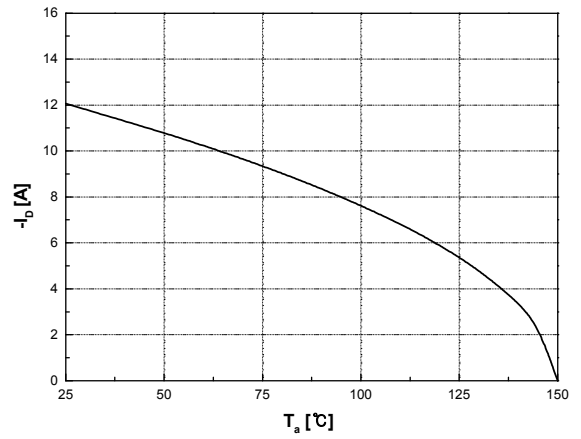
**Fig.7 Gate Charge Characteristics**



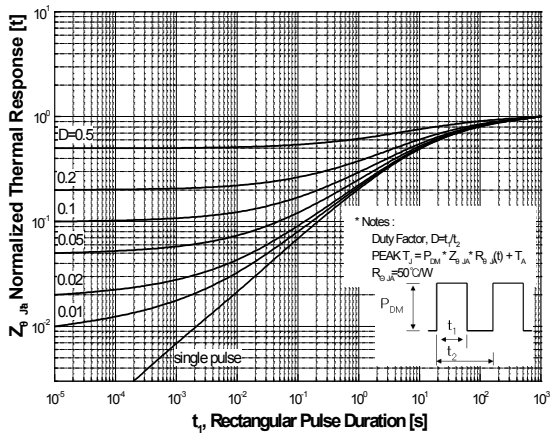
**Fig.8 Capacitance Characteristics**



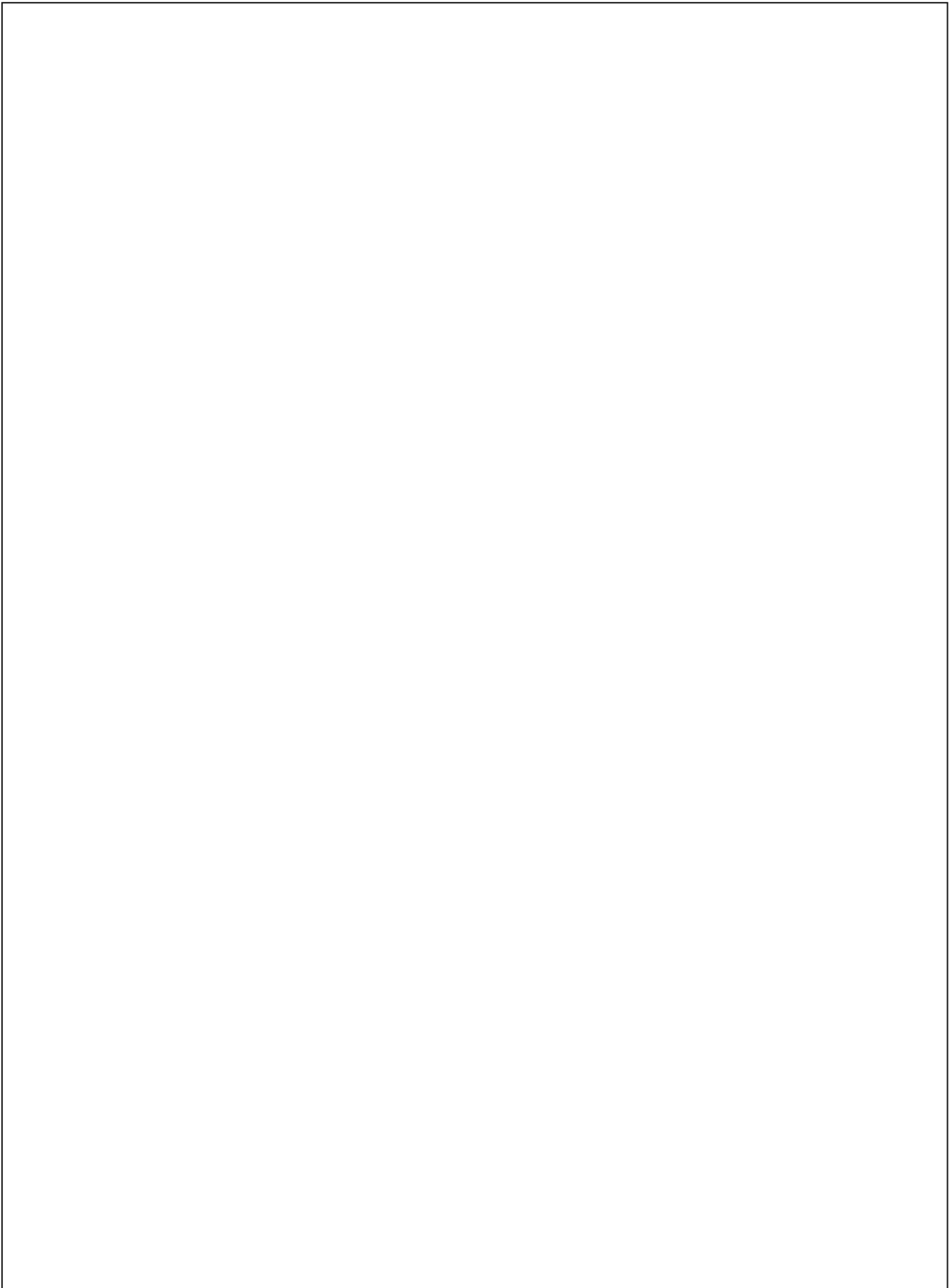
**Fig.9 Maximum Safe Operating Area**



**Fig.10 Maximum Drain Current vs. Ambient Temperature**



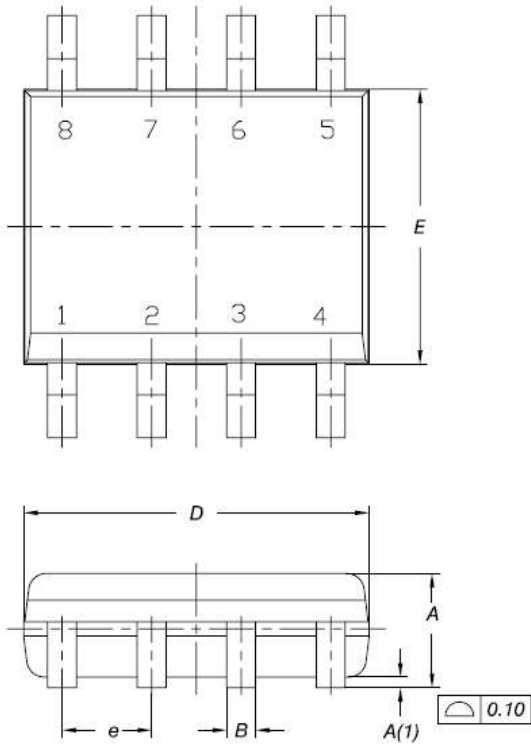
**Fig.11 Transient Thermal Response Curve**



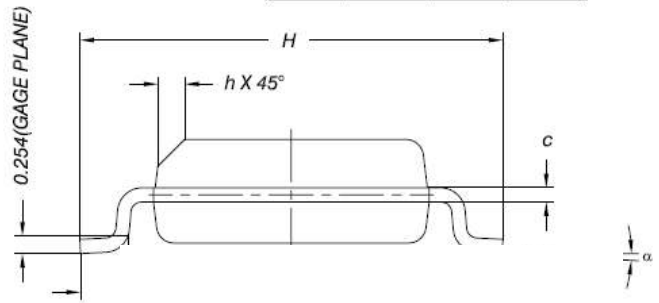
## Physical Dimensions

### 8 Leads, SOIC

Dimensions are in millimeters unless otherwise specified




DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.175	0.25
B	0.38	0.445	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.715	0.93
$\alpha$	0°	4°	8°
h	0.25	0.375	0.50



**DISCLAIMER:**

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