

**40V DUAL N-CANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ\text{C}$
40V	34m $\Omega$ @ $V_{GS} = 10\text{V}$	6.3A
	59m $\Omega$ @ $V_{GS} = 4.5\text{V}$	4.8A

**Description and Applications**

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

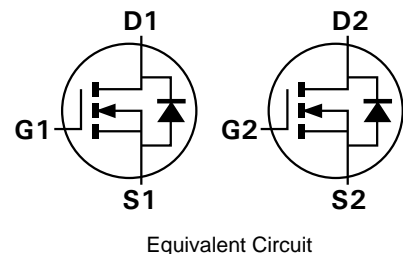
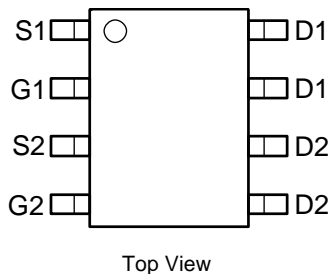
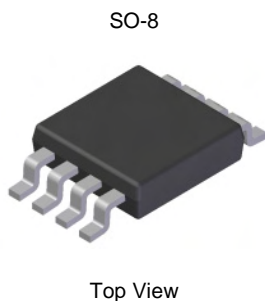
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

**Features and Benefits**

- 100% Unclamped Inductive Switch (UIS) test in production
- Low on-resistance
- Fast switching speed
- Max  $Q_g$  rated
- “Green” component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

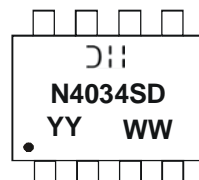
**Mechanical Data**

- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)


**Ordering Information** (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN4034SSD-13	N4034SD	13	12	2,500

Notes: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

**Marking Information**


DII = Manufacturer's Marking  
 N4034SD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 09 = 2009)  
 WW = Week (01 - 53)

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

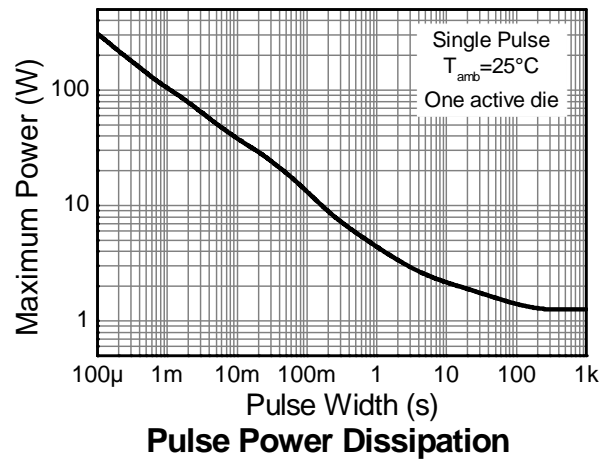
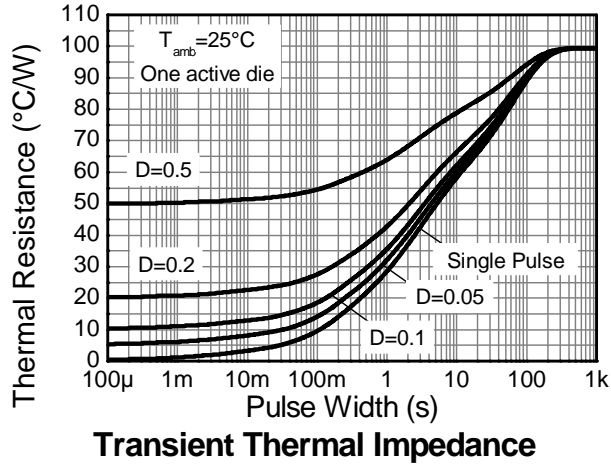
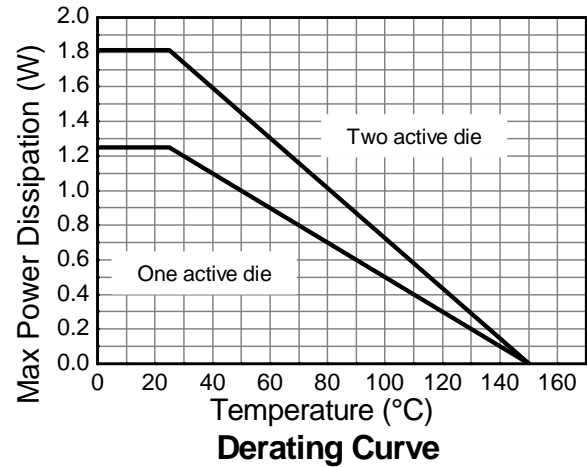
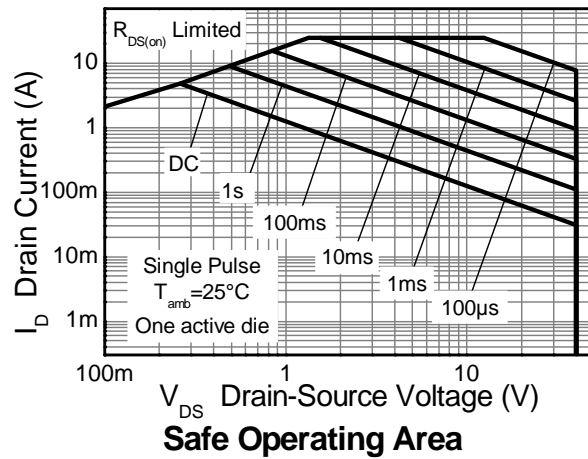
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V <sub>DSS</sub>	40	V
Gate-Source voltage	(Note 2)		V <sub>GS</sub>	±20	V
Single Pulsed Avalanche Energy	(Note 9)		E <sub>AS</sub>	27	mJ
Single Pulsed Avalanche Current	(Note 9)		I <sub>AS</sub>	15.25	A
Continuous Drain current	V <sub>GS</sub> = 10V	(Note 4)	I <sub>D</sub>	6.3	A
		T <sub>A</sub> = 70°C (Note 4)		5.0	
		(Note 3)		4.8	
Pulsed Drain current	V <sub>GS</sub> = 10V	(Note 5)	I <sub>DM</sub>	24.8	A
Continuous Source current (Body diode)		(Note 4)	I <sub>S</sub>	3.3	A
Pulsed Source current (Body diode)		(Note 5)	I <sub>SM</sub>	24.8	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 3 & 6)	P <sub>D</sub>	1.25	W mW/°C
			10.0	
	(Notes 3 & 7)		1.80	
			14.3	
Thermal Resistance, Junction to Ambient	(Notes 4 & 6)	R <sub>θJA</sub>	2.14	°C/W
	(Notes 3 & 6)		100	
	(Notes 3 & 7)		70	
Thermal Resistance, Junction to Lead	(Notes 4 & 6)	R <sub>θJL</sub>	58	°C/W
	(Notes 6 & 8)		55	
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

- Notes:
- AEC-Q101 V<sub>GS</sub> maximum is ±16V.
  - For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as note (3), except the device is measured at t ≤ 10 sec.
  - Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300μs. The pulse current is limited by the maximum junction temperature.
  - For a dual device with one active die.
  - For a device with two active die running at equal power.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).
  - UIS in production with L = 100μH, V<sub>DD</sub> = 40V.

## Thermal Characteristics

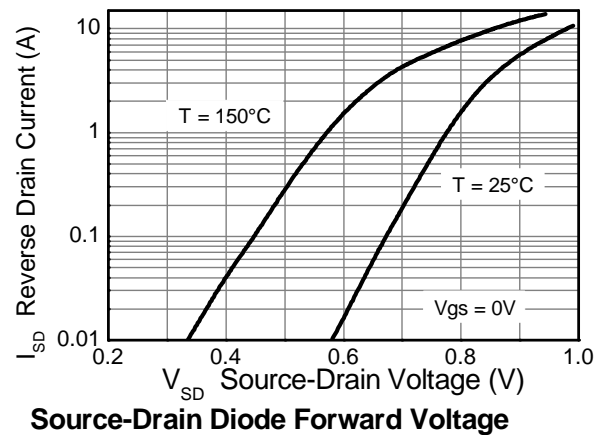
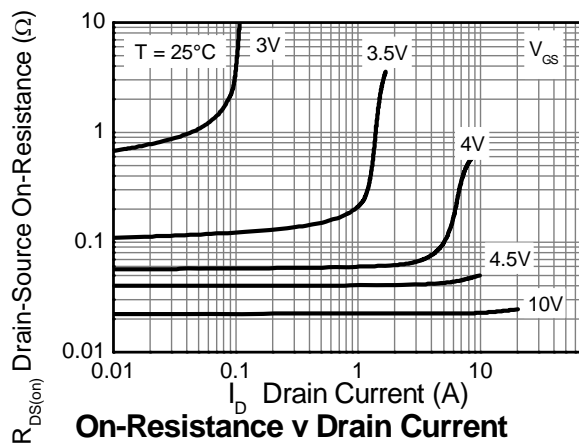
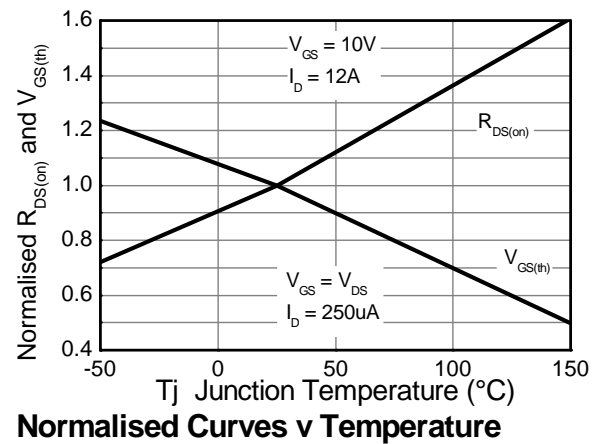
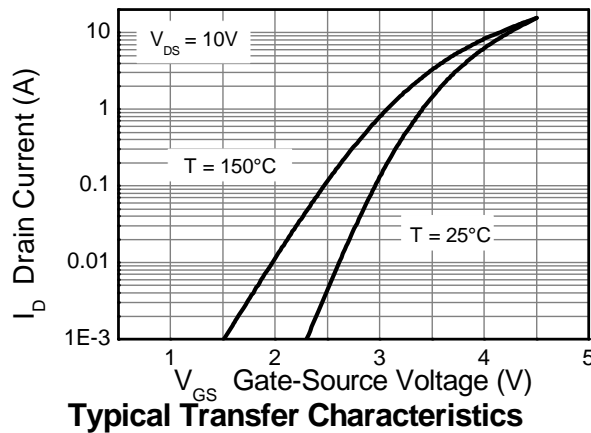
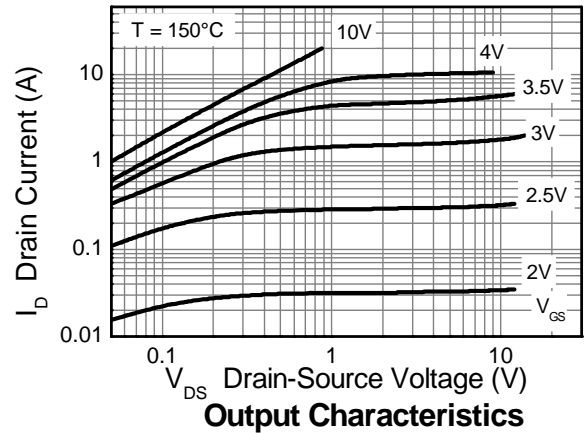
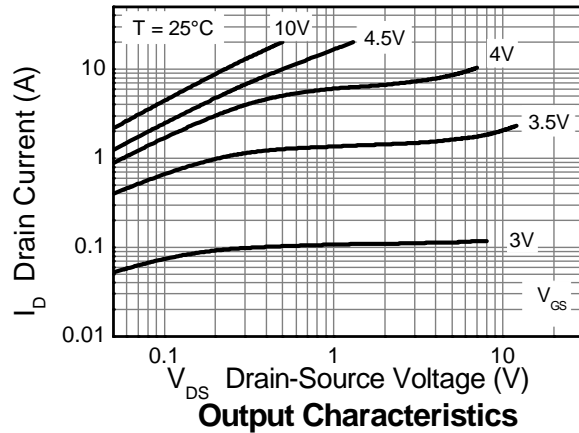


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

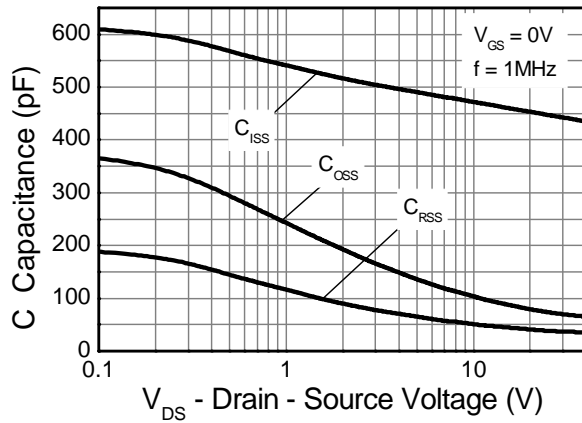
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	40	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	3.0	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>	
Static Drain-Source On-Resistance (Note 10)	R <sub>DS (ON)</sub>	—	0.023	0.034	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A	
			0.039	0.059		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A	
Forward Transconductance (Notes 10 & 11)	g <sub>fs</sub>	—	20.5	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 6A	
Diode Forward Voltage (Note 10)	V <sub>SD</sub>	—	0.87	1.1	V	I <sub>S</sub> = 6A, V <sub>GS</sub> = 0V	
Reverse recovery time (Note 11)	t <sub>rr</sub>		11.2	—	ns	I <sub>S</sub> = 2A, di/dt= 100A/μs	
Reverse recovery charge (Note 11)	Q <sub>rr</sub>	—	4.8	—	nC		
DYNAMIC CHARACTERISTICS (Note 11)							
Input Capacitance	C <sub>iss</sub>	—	453	—	pF	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V f = 1MHz	
Output Capacitance	C <sub>oss</sub>	—	79.1	—	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	40.5	—	pF		
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	4.9	8	nC	V <sub>GS</sub> = 4.5V	V <sub>DS</sub> = 20V I <sub>D</sub> = 6A
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	10	18	nC	V <sub>GS</sub> = 10V	
Gate-Source Charge (Note 12)	Q <sub>gs</sub>	—	1.8	—	nC		
Gate-Drain Charge (Note 12)	Q <sub>gd</sub>	—	2.4	—	nC		
Turn-On Delay Time (Note 12)	t <sub>D(on)</sub>	—	2.7	—	ns	V <sub>DD</sub> = 20V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1A, R <sub>G</sub> ≅ 6.0Ω	
Turn-On Rise Time (Note 12)	t <sub>r</sub>	—	2.7	—	ns		
Turn-Off Delay Time (Note 12)	t <sub>D(off)</sub>	—	14	—	ns		
Turn-Off Fall Time (Note 12)	t <sub>f</sub>	—	6	—	ns		

Notes: 10. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%  
11. For design aid only, not subject to production testing.  
12. Switching characteristics are independent of operating junction temperatures.

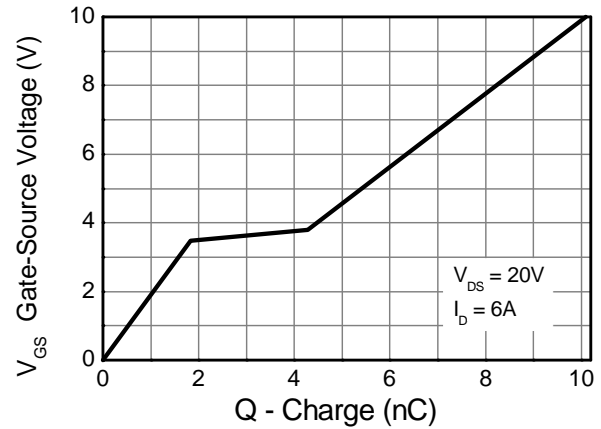
## Typical Characteristics



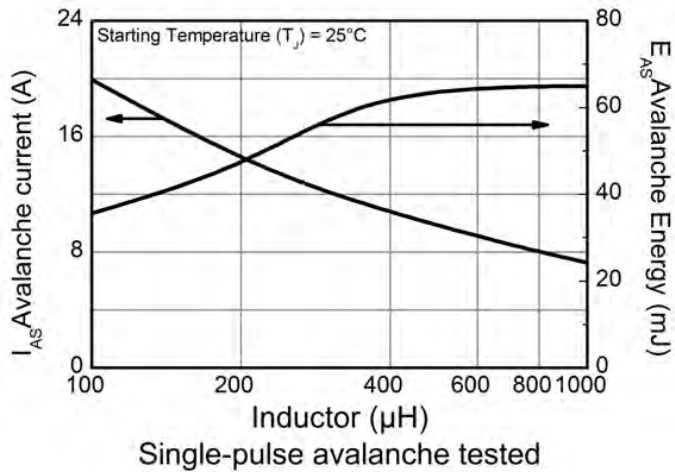
## Typical Characteristics – continued



**Capacitance v Drain-Source Voltage**

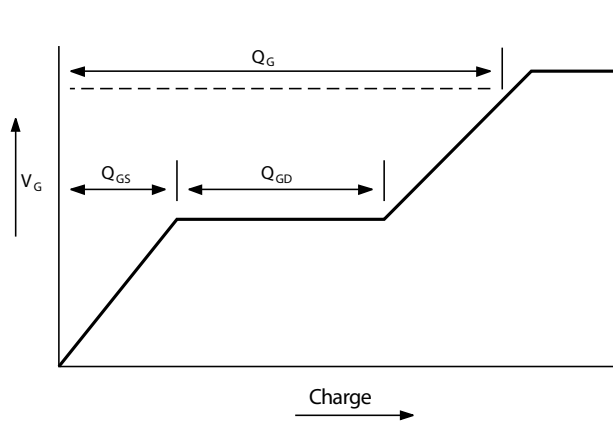


**Gate-Source Voltage v Gate Charge**

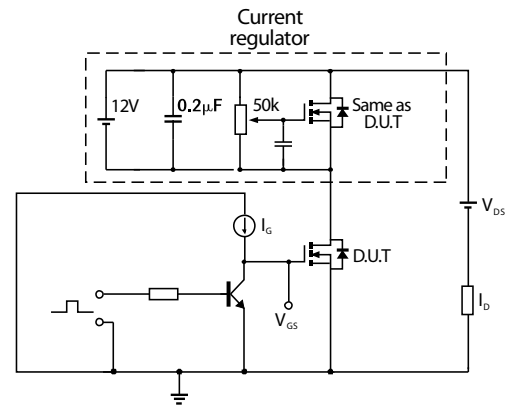


**Single-pulse avalanche tested**

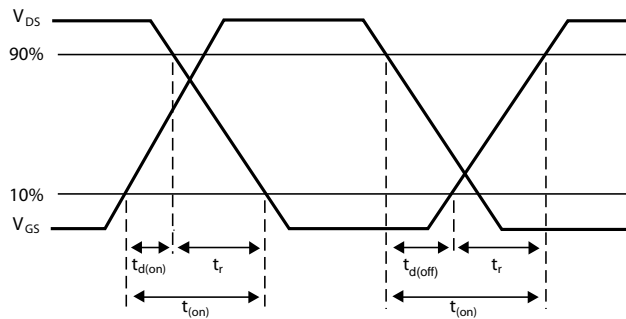
## Test Circuits



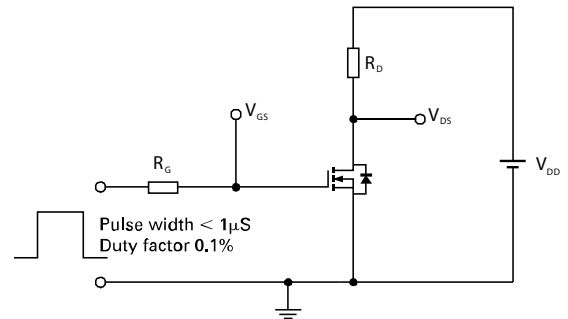
**Basic gate charge waveform**



**Gate charge test circuit**

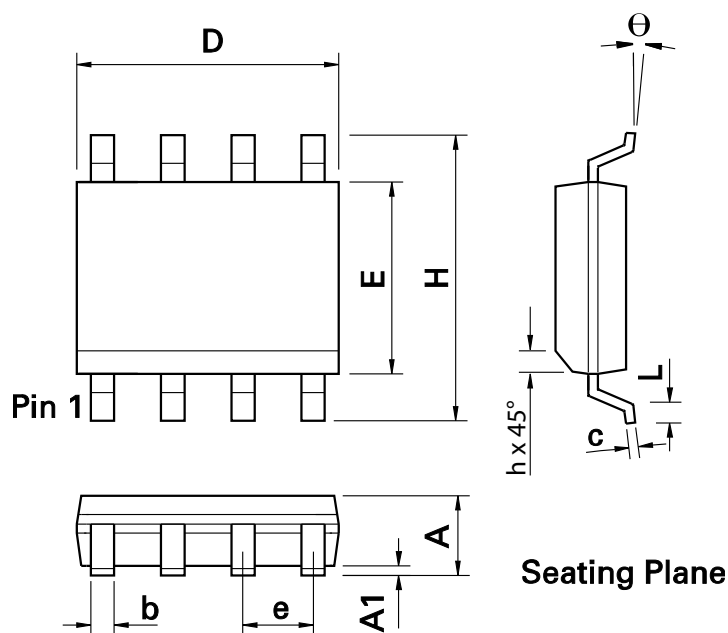


**Switching time waveforms**



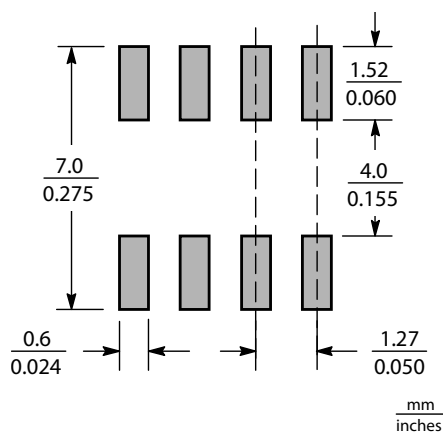
**Switching time test circuit**

## Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

## Suggested Pad Layout





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