



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-TC4421/TC4422

9A High-Speed Power MOSFET Drivers

网址 www.sztdbdt.com Q

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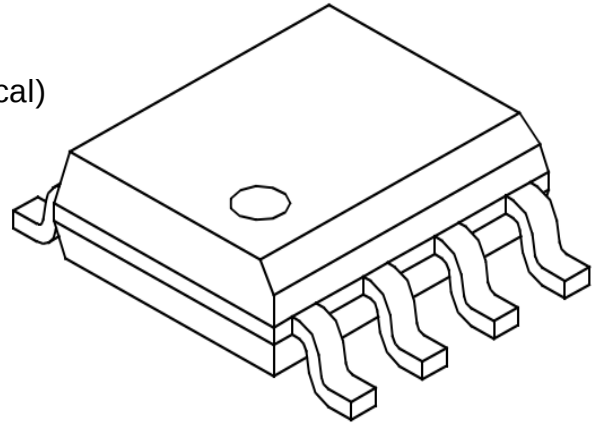
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



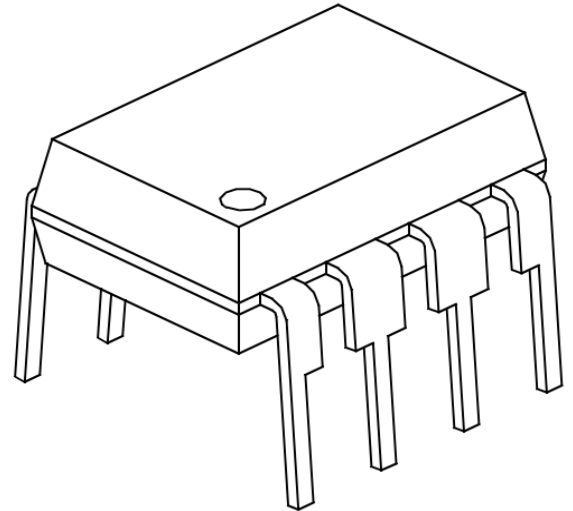
Features

- High Peak Output Current:9A
- High Continuous Output Current:2A
- Wide Supply Voltage Operating Range:4.5V to 18V
- High Capacitive Load Drive Capability10nF in 35ns (typical)
- Short Delay Times:58ns (typical)
- Matched Rise/Fall Times
- Low Output Impedance : 0.5 Ω (typical)
- Low Supply Current
- Over-temperature Protection
- Under-voltage Lockout (UVLO)
- Non-overlapped Drive Tech
- Input withstands negative inputs up to 5V
- Available in Green SOP8 and DIP8 Packages



Applications

- Driving the large MOSFET,SiC and IGBT
- Line Drivers for Heavily Loaded Lines
- Local Power ON/OFF Switch
- Motor and Solenoid Driver
- Switch Mode Power Supplies



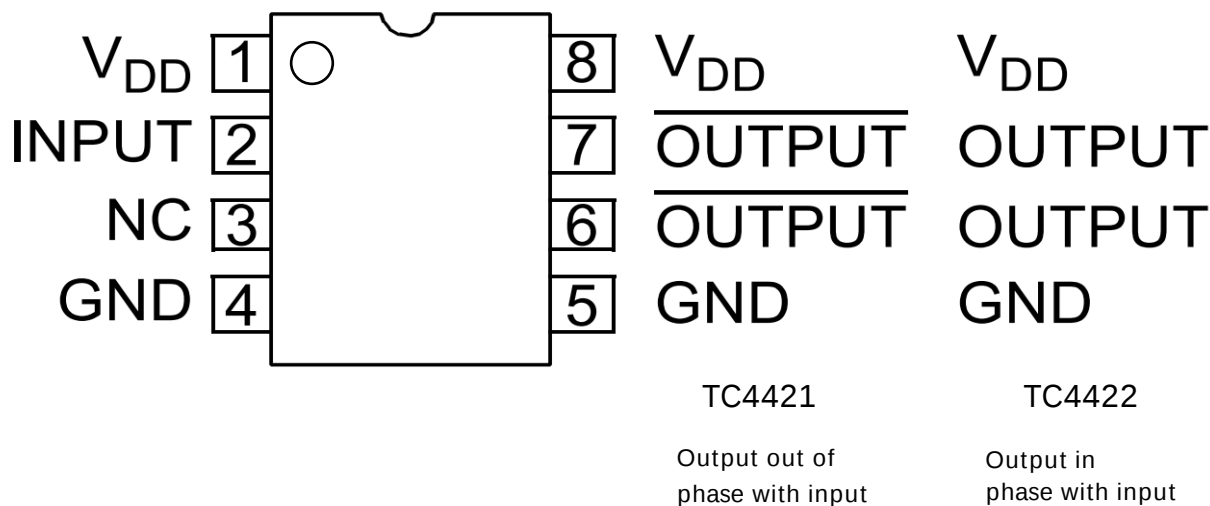
Description

The TC4421/4422 are single channel, high-current low-side gate drivers capable of driving large MOSFET,SiC,GaN and IGBTs. Unique circuit design enables high speed operation capable of delivering peak currents of 9A into 10,000pF capacitive loads. Improved speed and drive capability are enhanced by matched rise and fall delay times. Dynamic switching losses are minimized with non-overlapped drive techniques. These devices are highly latch-up resistant within their power and voltage ratings. They are not subject to damage when up to 5V of noise spiking (of either polarity) occurs on the ground pin.

The TC4421/4422 inputs can be driven directly from either TTL or CMOS (1.6V to 18V). In addition, the 300 mV of built-in hysteresis provides noise immunity and allows the device to be driven from slow rising or falling waveforms. Output is held LOW if Input is unbiased or floating.



Pin Diagram



Pin Description (Duplicate pins must both be connected for proper operation.)

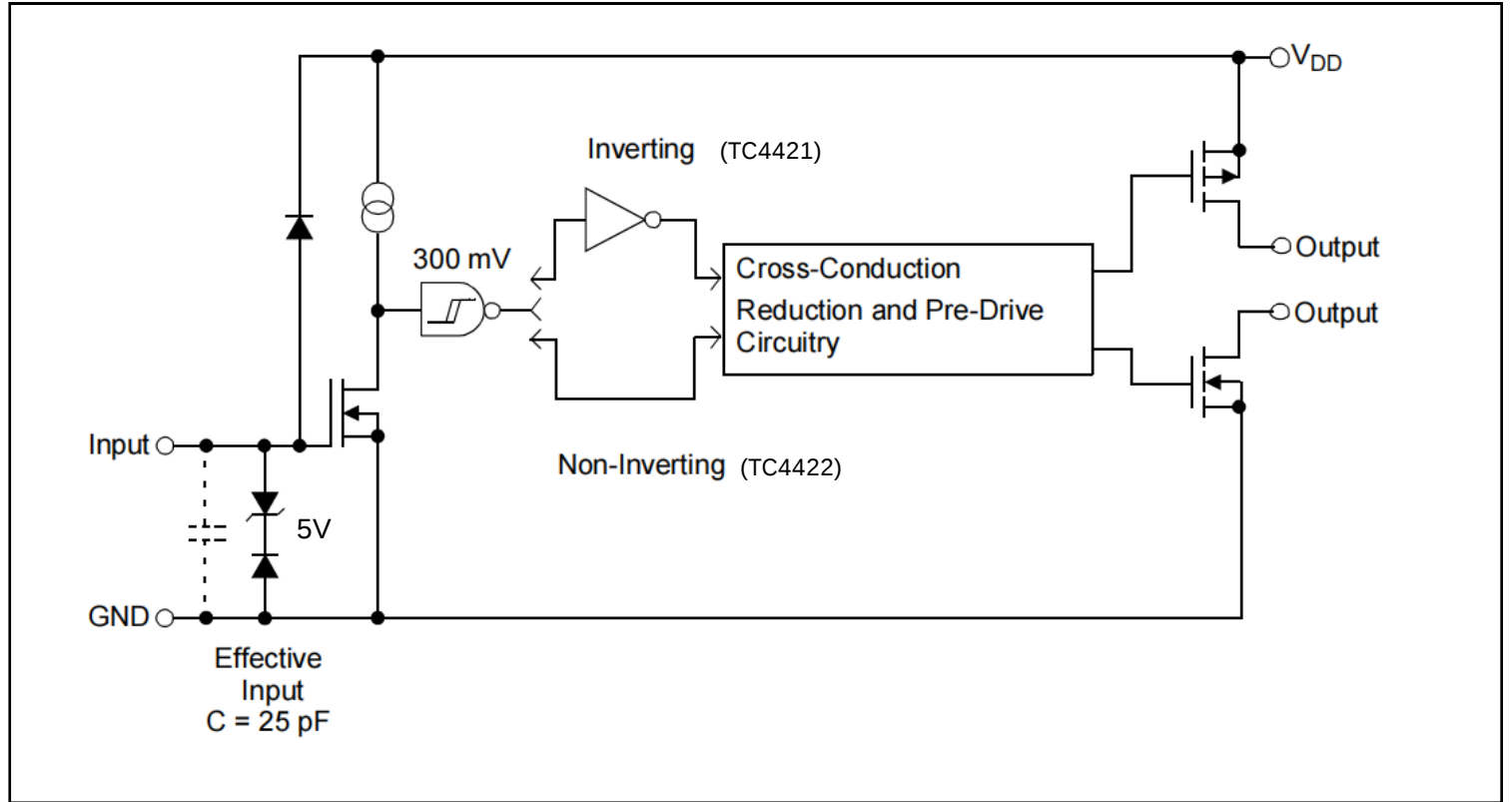
Pin	Name	Description
1	VDD	Power Supply
2	INPUT	Control input,TTL/CMOS compatible input
3	NC	No Connection
4	GND	Ground
5	GND	Ground
6	OUTPUT	CMOS push-pull output
7	OUTPUT	CMOS push-pull output
8	VDD	Power Supply
-	PAD	Exposed Metal Pad,electrically isolated

Thermal Data

Parameter	Rating	Unit
Package Thermal Resistance	155(SOP8) 125(DIP8)	°CW



Functional Block Diagram



Absolute Maximum Ratings

Parameter	Min	Max	Unit
DC supply voltage V_s		28	V
Operating junction temperature	-40	125	
Storage temperature	-55	150	
Maximum input voltage	GND-5	$V_{DD}+0.3$	V
Combined peak output current		2	A

Note: Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.



Recommended Operating Conditions

Parameter	Rating	Unit
DC Supply Voltage	4.5-18	V
Operating ambient temperature	-40~125	°C

Additional description

Output
MOSFET driver outputs are low-impedance,CMOS push-pull style outputs.The pull-down and pullup devices are of equal strength,making the rise and fall times equivalent.The Output is held LOW if Input is unbiased or floating.
Inputs
MOSFET driver input is a high-impedance,TTL/CMOS compatible input.It also has 300 mV of hysteresis between the high and low thresholds that prevents output glitching even when the rise and fall time of the input signal is very slow.
Supply Input (VDD)
The VDD input is the bias supply for the MOSFET driver and is rated for 4.5V to 18V with respect to the Ground pin.The VDD input should be bypassed with local ceramic capacitors.The value of these capacitors should be chosen based on the capacitive load that is being driven.A value of 1.0μF is suggested.
Ground(GND)
Ground is the device return pin.The Ground pin(s)should have a low-impedance connection to the bias supply source return.High peak current flows out the Ground pin(s)when the capacitive load is being discharged.
Exposed Metal Pad
The exposed metal pad of the DFN-S package is not internally connected to any potential. Therefore, this pad can be connected to a ground plane or other copper plane on a Printed Circuit Board (PCB), to aid in heat removal from the package.



Electrical Characteristics

(Typical values are tested at $T_A=25^{\circ}\text{C}$, $V_{DD}=18\text{V}$)

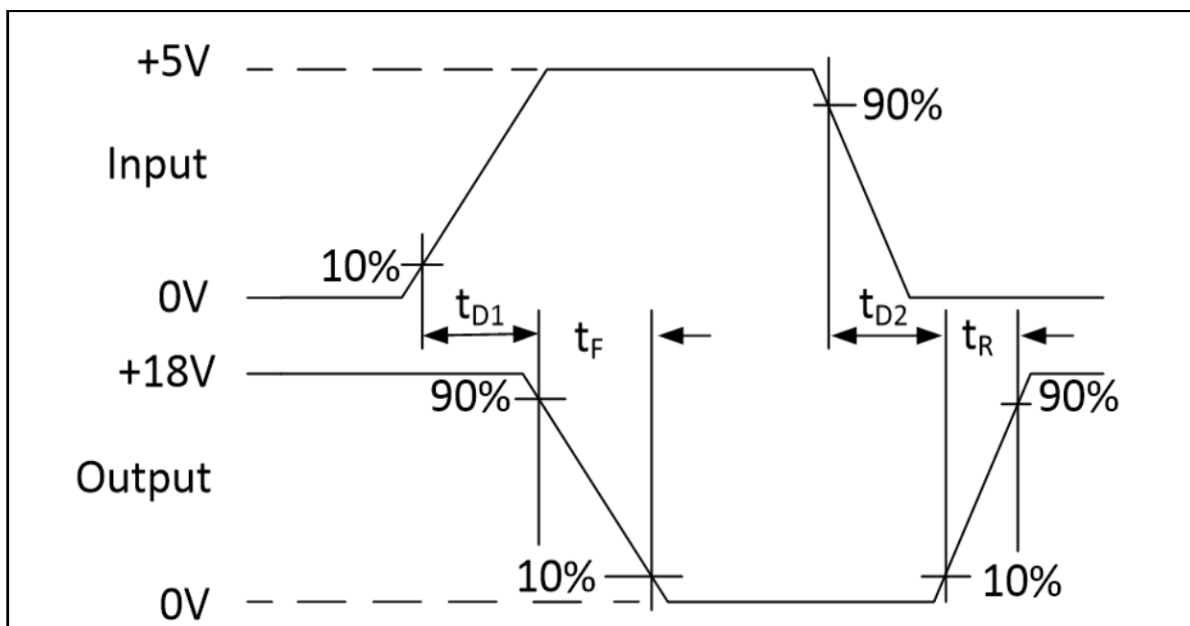
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
switching characteristics						
Rise Time	tR	CL=10,000 pF		35		ns
Fall Time	tF	CL=10,000 pF		36		ns
Turn-On Delay Time	tD1	TC4421,CL=10,000 pF		58		ns
		TC4422,CL=10,000 pF		60		ns
Turn-Off Delay Time	tD2	TC4421,CL=10,000 pF		59		ns
		TC4422,CL=10,000 pF		63		ns
Input						
Input Signal High Threshold	VIH		1.6			V
Input Signal Low Threshold	VIL				0.7	V
Input Signal Hysteresis	VHYS			0.3		V
Input Signal High Current	IIH	Inverting Input Current, VINx=18V			0.01	μA
		Non-inverting Input Current,VInx=18V		88	125	
Input Signal High Current	IL	Inverting Input Current, VINx=0V		88	125	μA
		Non-inverting Input Current,VINx=0V			0.01	
output						
High Output Voltage VOH	VoH	DC Test	VDD-0.025			V
Low Output Voltage	VoL	DC Test			0.025	V
Pull-Up Resistance	RoH	Source Current =10mA		0.83		Ω
Pull-Down Resistance	RoL	Sink Current = -10mA		0.5		Ω
Peak Output Current	Ipk	10V≤VDD ≤18V		9.0		A
power supply						
Power Supply Current	Icc	VIn=3V		0.85		mA
		VIn=0V		0.65		
Operating Voltage Range	VDD		4.5		25	V
Under-Voltage Lockout ON Threshold				3.7	4.1	V
Under-Voltage Lockout Hysteresis				0.5		V
Over-temperature protection						
Thermal Shutdown Threshold				150		
Thermal Shutdown Threshold Hysteresis				25		



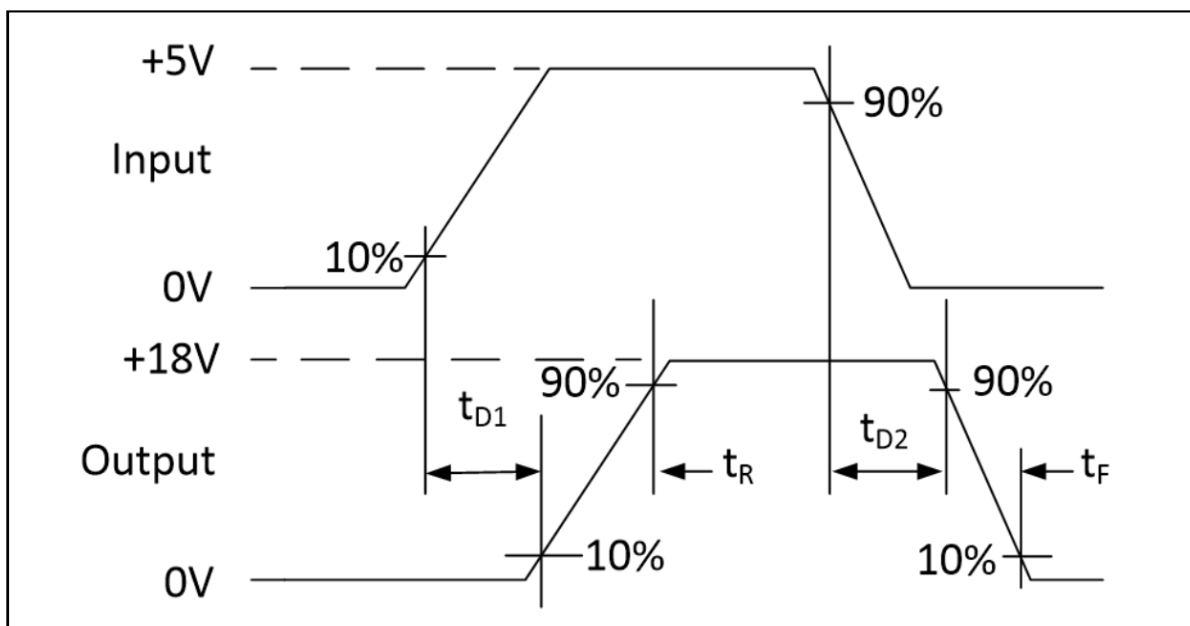
Over-temperature protection

Thermal Shutdown Threshold				150		
Thermal Shutdown Threshold Hysteresis				25		

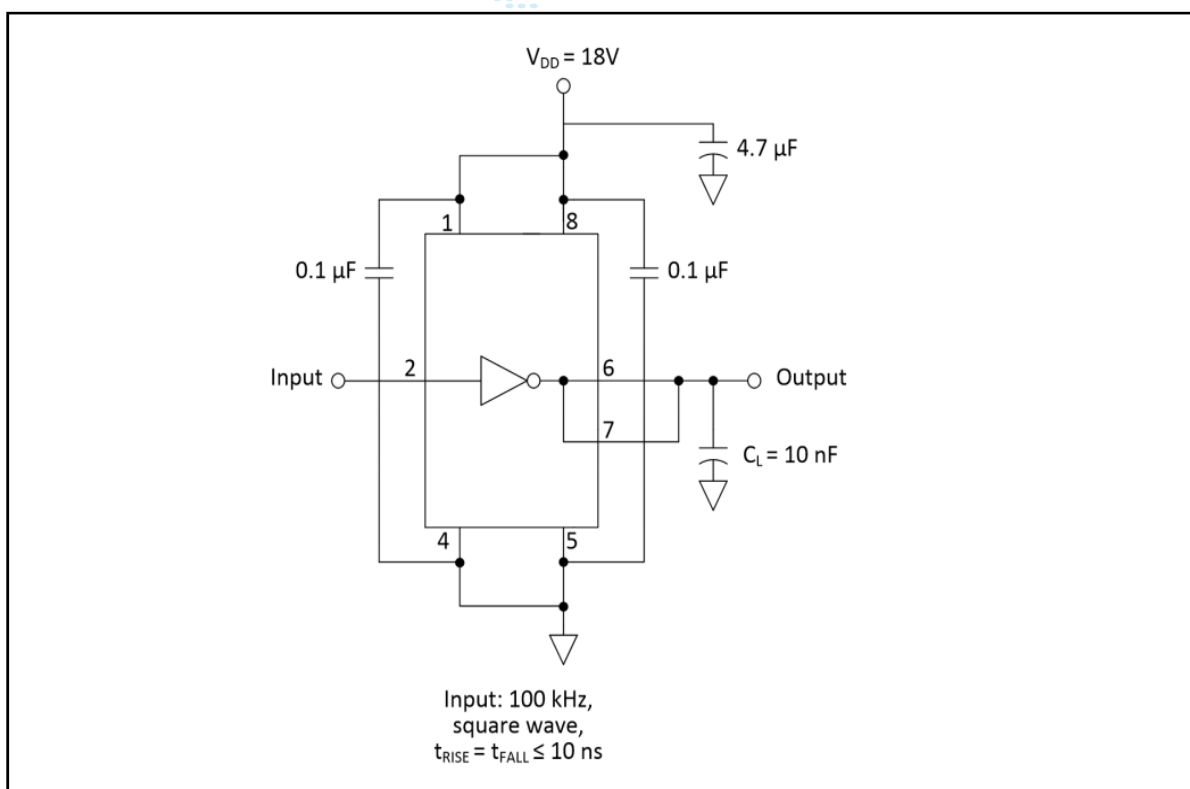
Switching Time Test Circuit



TC4421 Inverting Driver



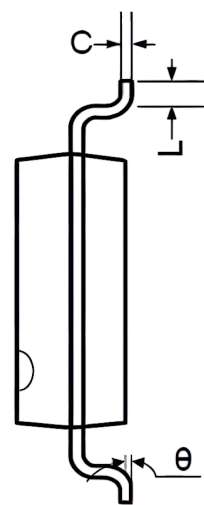
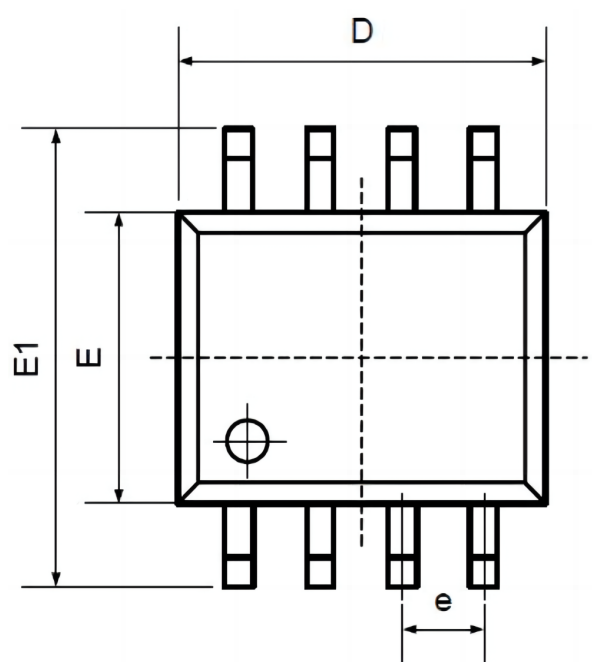
TC4422 Non Inverting Driver



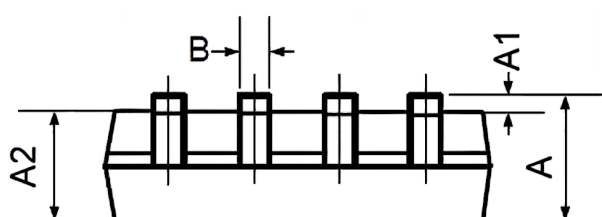
Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
TC4421COA713-TUDI	SOP8	Tape,Reel,2500	TC4421COA	0°C to 70°C
TC4421CPA-TUDI	DIP8	Tube,50,A box of 2000	TC4421CPA	
TC4422COA713-TUDI	SOP8	Tape,Reel,2500	TC4422COA	
TC4422CPA-TUDI	DIP8	Tube,50,A box of 2000	TC4422CPA	
TC4421EOA713-TUDI	SOP8	Tape,Reel,2500	TC4421EOA	-40°C to 85°C
TC4421EPA-TUDI	DIP8	Tube,50,A box of 2000	TC4421EPA	
TC4422EOA713-TUDI	SOP8	Tape,Reel,2500	TC4422EOA	
TC4422EPA-TUDI	DIP8	Tube,50,A box of 2000	TC4422EPA	
TC4421VOA713-TUDI	SOP8	Tape,Reel,2500	TC4421VOA	-40°C to 125°C
TC4421VPA-TUDI	DIP8	Tube,50,A box of 2000	TC4421VPA	
TC4422VOA713-TUDI	SOP8	Tape,Reel,2500	TC4422VOA	
TC4422VPA-TUDI	DIP8	Tube,50,A box of 2000	TC4422VPA	

Package SOP8

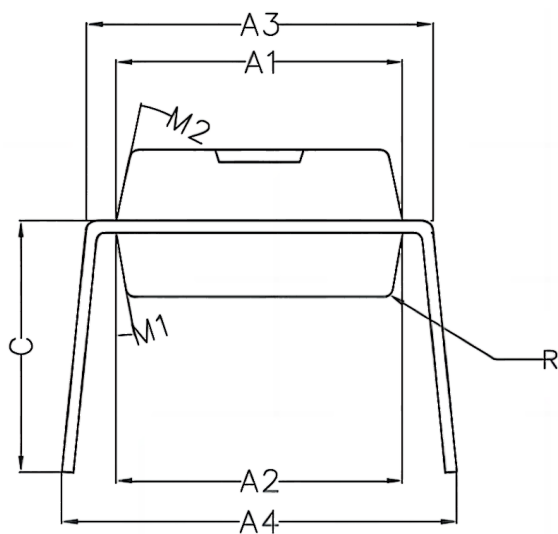
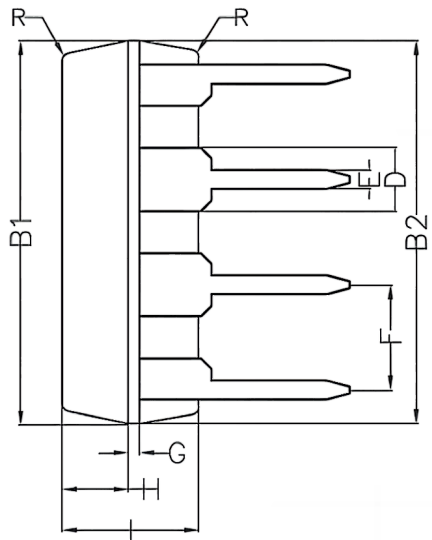
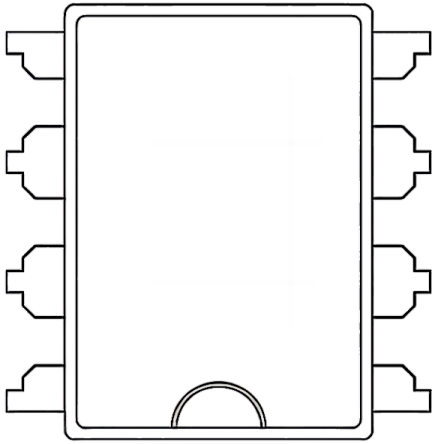


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°





Package DIP8



Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
I	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°



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