

**DUAL 40 MSPS 6-BIT ANALOG TO DIGITAL CONVERTER**

ADVANCE DATA

- RESOLUTION 6-BIT
- MAX. SAMPLING FREQUENCY : 40 MSPS
- TTL DATA OUTPUTS
- BUILT-IN SAMPLING AND HOLD CIRCUIT
- DUAL ADC ON CHIP TO IMPROVE CHANNEL MATCHING

**APPLICATIONS**

- QPSK DEMODULATION IN A SATELLITE DECODER

**DESCRIPTION**

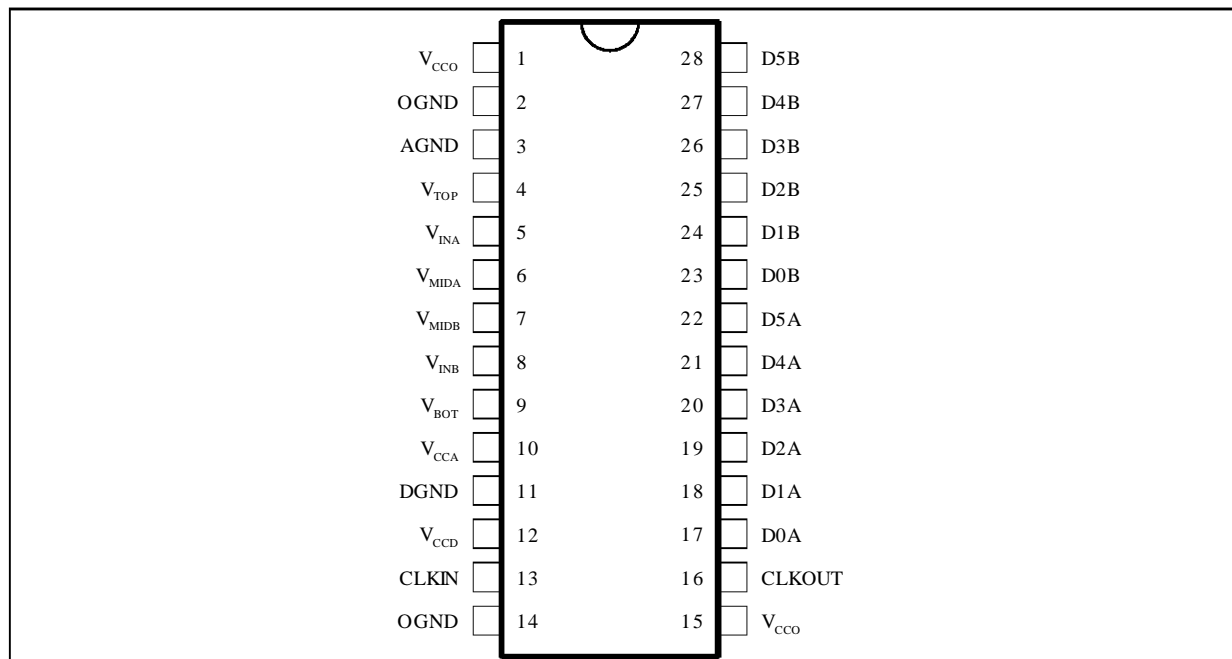
The STV0190 is a dual 40 MSPS 6-bit Analog to Digital converter.

It is dedicated to QPSK demodulation in Satellite receiver.

The Flash architecture combined with interpolation technic gives the best trade off between power consumption and maximum conversion speed.



**PIN CONNECTIONS**



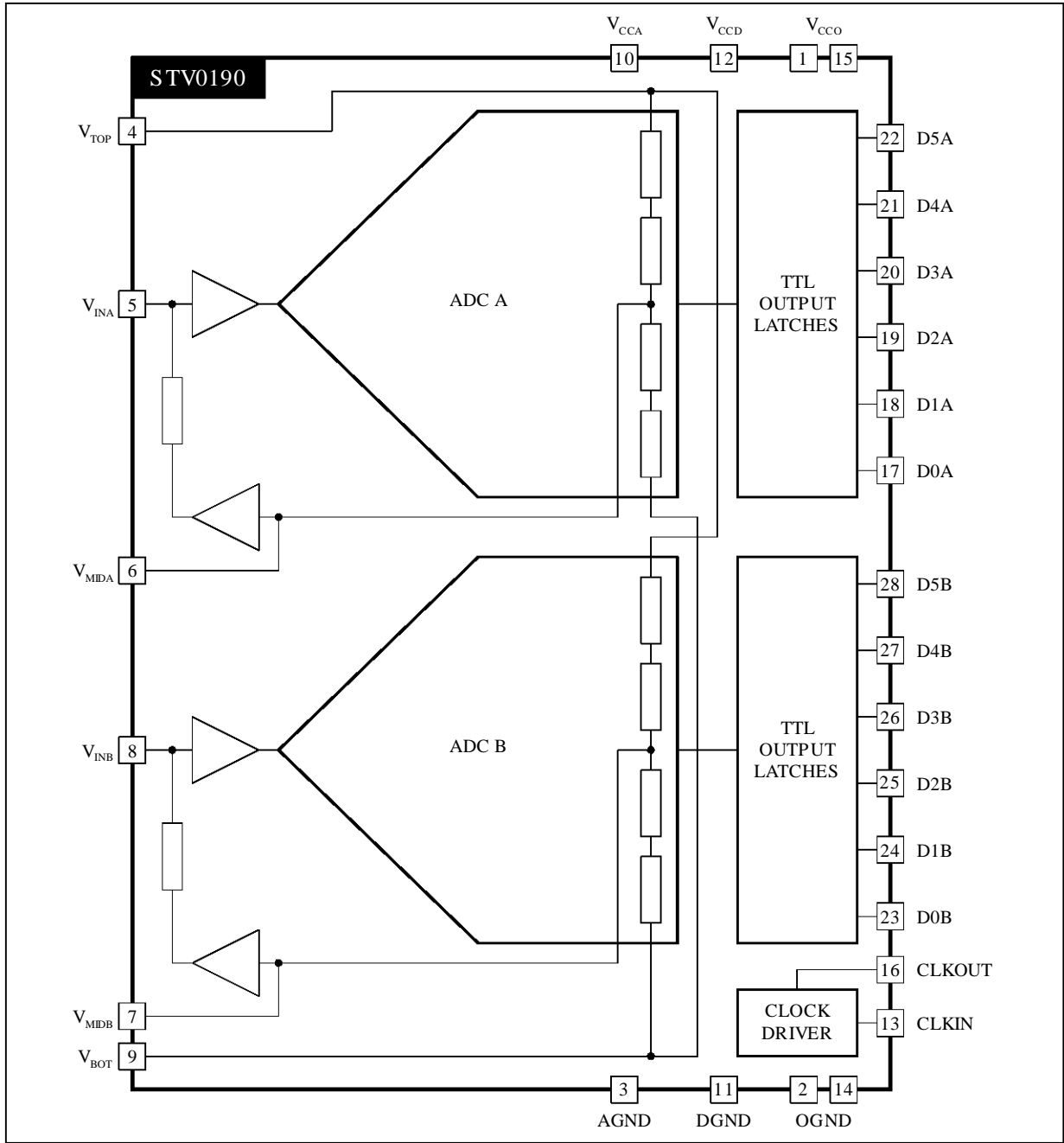
0190-01.EPS

**PIN CONFIGURATION**

Pin N°	Symbol	Function
1	V <sub>CCO</sub>	Output Buffer Supply Voltage Channel A + B
2	OGND	Output Buffer Ground Channel A + B
3	AGND	Analog Ground
4	V <sub>TOP</sub>	Top Reference Voltage
5	V <sub>INA</sub>	Analog Input Channel A
6	V <sub>MIDA</sub>	Reference Voltage DC Coupling Channel A
7	V <sub>MIDB</sub>	Reference Voltage DC Coupling Channel B
8	V <sub>INB</sub>	Analog Input Channel B
9	V <sub>BOT</sub>	Bottom Reference Voltage
10	V <sub>CCA</sub>	Analog Supply Voltage
11	DGND	Digital Ground
12	V <sub>CCD</sub>	Digital Supply Voltage
13	CLKIN	Clock Input
14	OGND	Output Buffer Ground Channel A + B
15	V <sub>CCO</sub>	Output Buffer Supply Voltage Channel A + B
16	CLKOUT	Clock Output
17 to 22	D0A to D5A	D0 (LSB) to D5 (MSB) Outputs Channel A
23 to 28	D0B to D5B	D0 (LSB) to D5 (MSB) Outputs Channel B

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BLOCK DIAGRAM



0190-02.EPS

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
	Analog Supply Voltage	3.1, 3.45	V
	Digital Supply Voltage	3.1, 3.45	V
T <sub>oper</sub>	Operating Temperature	0, +70	°C

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**ELECTRICAL CHARACTERISTICS** (V<sub>CC</sub> = 3.3V, T<sub>amb</sub> = 0 to 70°C, Full scale 10MHz, 1.5V<sub>PP</sub> input, 40MSPS, C<sub>L</sub> = 20pF, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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**ANALOG INPUT**

	Differential Reference Voltage	V <sub>TOP</sub> - V <sub>BOT</sub>	1	1.5		V <sub>PP</sub>
	Variation of Channel A to Channel B (FS)	0.5 LSB			8	mV
R <sub>IN</sub>	Input Resistance		20			kΩ
	Input Bandwidth 3dB		20			MHz

**DIGITAL OUTPUTS**

	High Logic Voltage		2.4		V <sub>CC</sub>	V																																		
	Low Logic Voltage		0		0.4	V																																		
	High Logic Current		-4			mA																																		
	Low Logic Current				4	mA																																		
	Logic Format		<table border="1"> <thead> <tr> <th>Analog Input</th> <th colspan="2">Digital Output</th> </tr> </thead> <tbody> <tr> <td>most positive input</td> <td>63</td> <td>111111</td> </tr> <tr> <td></td> <td>62</td> <td>111110</td> </tr> <tr> <td></td> <td>....</td> <td>.....</td> </tr> <tr> <td></td> <td>33</td> <td>100001</td> </tr> <tr> <td></td> <td>32</td> <td>100000</td> </tr> <tr> <td></td> <td>31</td> <td>011111</td> </tr> <tr> <td></td> <td>30</td> <td>011110</td> </tr> <tr> <td></td> <td>....</td> <td>.....</td> </tr> <tr> <td></td> <td>1</td> <td>000001</td> </tr> <tr> <td>least positive input</td> <td>0</td> <td>000000</td> </tr> </tbody> </table>		Analog Input	Digital Output		most positive input	63	111111		62	111110		....	.....		33	100001		32	100000		31	011111		30	011110		....	.....		1	000001	least positive input	0	000000			
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least positive input	0	000000																																						
t <sub>PD</sub>	Output Timing	See Figure 1			9	ns																																		
t <sub>v</sub>	Output Timing	See Figure 1	5			ns																																		
t <sub>SKEW</sub>	Data Output Skew TSK (all outputs, settled within 20%)	See Figure 1			1	ns																																		
t <sub>APER</sub>	Aperture Delay relative to Data Clock	See Figure 1			1	ns																																		
t <sub>R</sub> , t <sub>F</sub>	Data Output Rise and Fall Time				4	ns																																		

**CLOCK INPUT**

V <sub>IH</sub>	High Input Voltage		2.0		V <sub>CC</sub>	V
V <sub>IL</sub>	Low Input Voltage		0		0.8	V
I <sub>IH</sub>	High Input Current				TBD	μA
I <sub>IL</sub>	Low Input Current		TBD			μA
	Clock Duty Cycle		40		60	%
t <sub>CL</sub>	Clock Period	See Figure 1	24			ns

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**ELECTRICAL CHARACTERISTICS** (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>CLOCK OUTPUT</b>						
V <sub>OH</sub>	High Output Voltage		2.4		V <sub>CC</sub>	V
V <sub>OL</sub>	Low Output Voltage		0		0.4	V
I <sub>OH</sub>	High Output Current		-4			mA
I <sub>OL</sub>	Low Output Current				4	mA
	Clock Duty Cycle		40		60	%
t <sub>CL</sub>	Clock Period		24			ns

**REFERENCE LADDER**

	Top Voltage				V <sub>CC</sub> - 0.5	V
	Bottom Voltage		V <sub>CC</sub> + 0.5			V
	DC Bias Restoration Error	Open input digital output should be	32/64 011111		33/64 100000	
ZV <sub>TOP</sub> /V <sub>BOT</sub>	Input Impedance		90			Ω

**CROSSTALK**

	Isolation A/B		37			dB
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**DC ACCURACY**

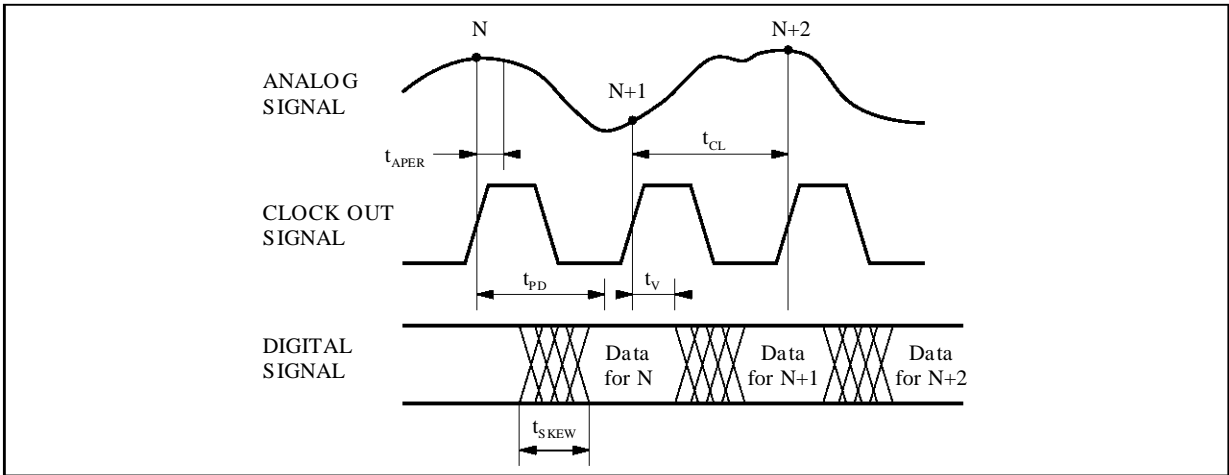
	Integral non Lin.		-0.5		+0.5	LSB
	Diff. Non Lin.		-0.5		+0.5	LSB

**AC ACCURACY** (f<sub>IN</sub> = 10MHz, FS = 40 MSPS, V<sub>IN</sub> = 95% FSCALE)

	Effective Number of Bit		5			bits
SNR			33			dB
THD	THD First 5 Harmony		33			dB
	Integral non Lin.		-1		+1	LSB
	A/D Amplifier Response Mismatching				0.2	dB

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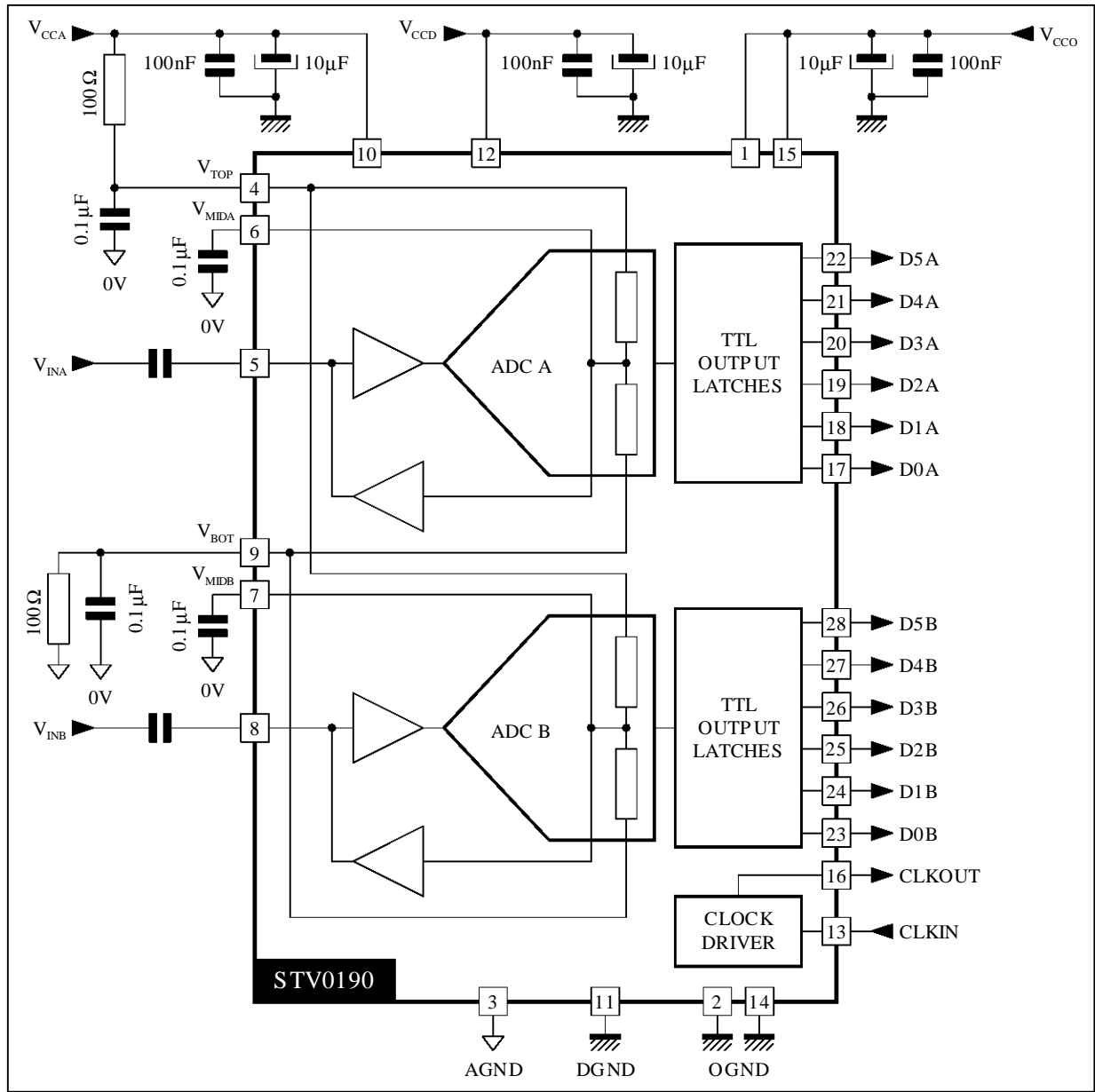
**Figure 1 : Timing Diagram**



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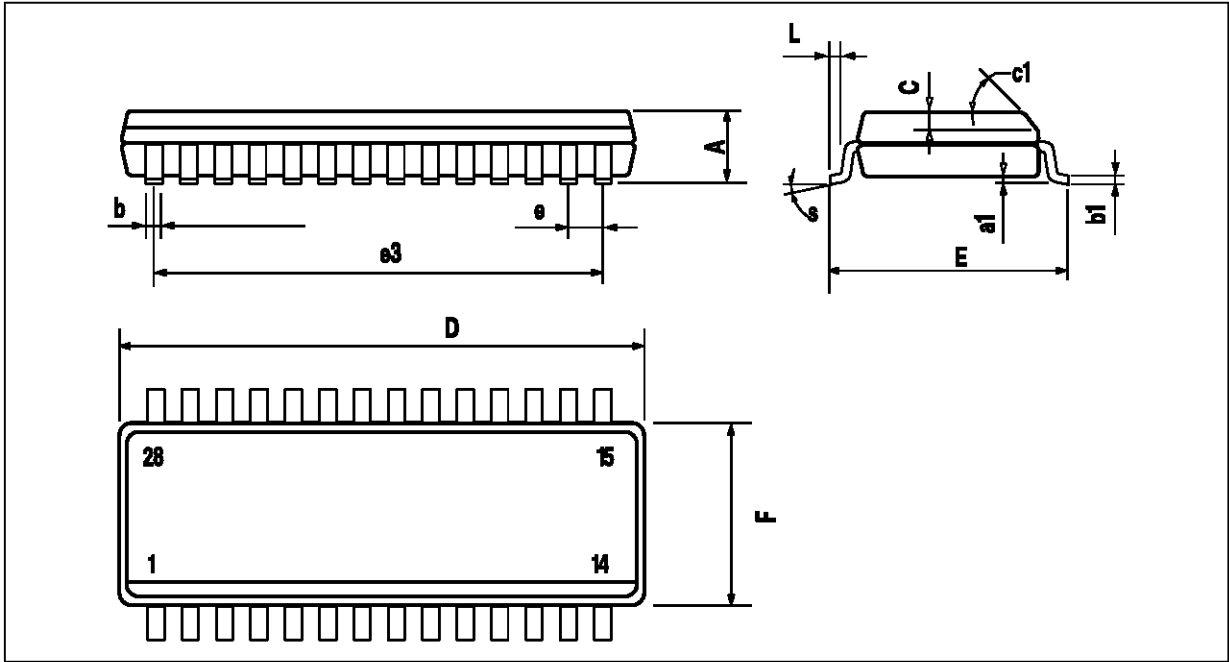
**Note :** This diagram shows a delay of one clock cycle. Additional integer multiple delay periods are acceptable. Output data must be valid on the rising edge of the clock out signal.

TYPICAL APPLICATION



0190-04-EFS

**PACKAGE MECHANICAL DATA**  
 28 PINS - PLASTIC MICROPACKAGE (SO)



PM-SO28LEFS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			2.65			0.104
a1	0.1		0.3	0.004		0.012
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.013
C		0.5			0.020	
c1	45° (Typ.)					
D	17.7		18.1	0.697		0.713
E	10		10.65	0.394		0.419
e		1.27			0.050	
e3		16.51			0.65	
F	7.4		7.6	0.291		0.299
L	0.4		1.27	0.016		0.050
S	8° (Max.)					

SO28TBL

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