

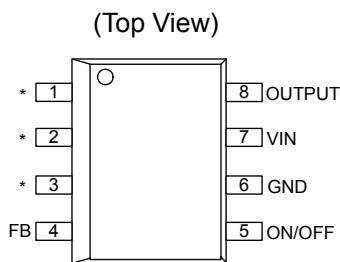
### FEATURES

- 3.3V, 5V, 12V, and adjustable output versions
- Adjustable version output voltage range, 1.2V to 37V  $\pm 4\%$  max over line and load conditions
- Available in 8-pin surface mount and DIP-8 package
- Guaranteed 0.5A output current
- Input voltage range up to 40V
- Requires only 4 external components
- 150 kHz fixed frequency internal oscillator
- TTL Shutdown capability
- Low power standby mode,  $I_Q$  typically 85  $\mu A$
- High Efficiency
- Uses readily available standard inductors
- Thermal shutdown and current limit protection

### Typical Application

- Simple high-efficiency step-down (buck) regulator
- Efficient pre-regulator for linear regulators
- On-card switching regulators
- Positive to Negative convertor

### PIN ASSIGNMENT



\*: Pin 1,2,3 No internal connection, but should be soldered to PC board for best heat transit

### ABSOLUTE MAXIMUM RATINGS(NOTE1)

Parameter	Value	Unit
Maximum Supply Voltage	45	V
ON/OFF Pin Input Voltage	-0.3 to 25	V
Feedback Pin Voltage	- 0.3 to 25	V
Output Voltage to Ground(Steady State)	-1	V
Power Dissipation	Internally limited	
Maximum Junction Temperature	+150	$^{\circ}C$
ESD Susceptibility(Note 2)	2000	V
Storage Temperature	-65 to 150	$^{\circ}C$
Lead Temperature (SOP8L)	Vapor Phase (60 sec.)	215
	Infrared (15 sec.)	220
Lead Temperature (PDIP8L) (Soldering, 10 sec)	260	$^{\circ}C$

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics.

Note 2: The human body model is a 100 pF capacitor discharged through a 1.5k resistor into each pin.

**■ OPERATING CONDITIONS**

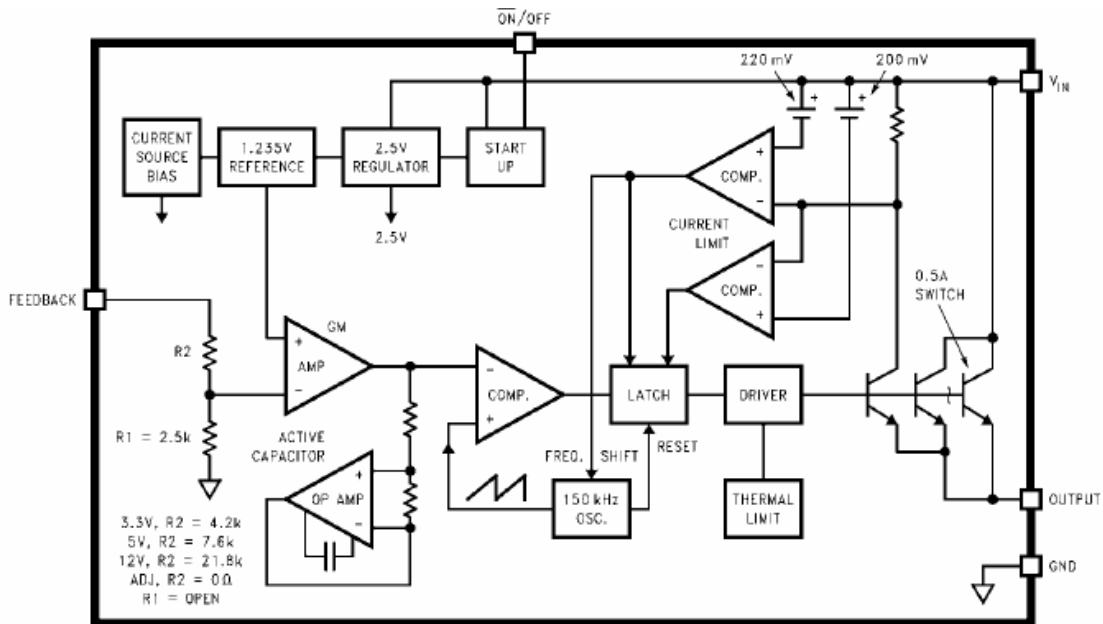
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	$V_{IN}$		4.5		40	V
Junction Temperature	$T_J$		-40		+125	°C

**■ ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Feedback Bias Current	$I_{FB}$	$V_{FB} = 1.3V$ (Adjustable Version Only)		10	50 <b>100</b>	nA
Oscillator Frequency	$F_{osc}$	No Outside Circuit , $V_{FB} = 0V$ force drive on	127 <b>110</b>	150	173 <b>173</b>	kHz
Short Circuit Oscillator Frequency	$F_{CSP}$	When Current Limit Occur and $V_{FB} < 0.5V, T_A=25^\circ C$	10	30	50	kHz
Saturation Voltage	$V_{SAT}$	$I_{OUT} = 0.5A,$		0.9	1.1 <b>1.2</b>	V
Maximum Duty Cycle(On)	DC	$V_{FB} = 0V$ force drive on		100		%
Minimum Duty Cycle(Off)		$V_{FB} = 12V$ force drive off		0		
Current Limit	$I_{CL}$	Peak Current No Outside Circuit , $V_{FB} = 0V$ force drive on	0.65 <b>0.58</b>	0.8	1.3 <b>1.4</b>	A
Output=0	Output Leakage Current	No Outside Circuit , $V_{FB} = 12V$ force drive off		2	50	$\mu A$
Output=1						
Quiescent Current	$I_Q$	$V_{FB} = 12V$ force drive off		5	10	mA
Standby Quiescent Current	$I_{STBY}$	ON/OFF Pin= $5V, V_{IN} = 40V$		85	200 <b>250</b>	$\mu A$
ON/OFF Pin Logic Input Threshold Voltage	$V_{IL}$	Low (Regulator ON)		1.3	<b>0.6</b>	V
	$V_{IH}$	High (Regulator OFF)	<b>2.0</b>			
ON/OFF Pin Input Current	$I_L$	$V_{LOGIC} = 0.5V(ON)$		0.02	5	$\mu A$
ON/OFF Pin Logic Input Current	$I_H$	$V_{LOGIC} = 2.5V(OFF)$		5	15	
Thermal Resistance	$\theta_{JA}$	SOP8L	Junction to Ambient		150	°C/W
		PDIP8L	Junction to Ambient		95	
Output Feedback	FSP3127-ADJ	$V_{FB}$ $4.5V \leq V_{IN} \leq 40V$ $0.1A \leq I_{LOAD} \leq 0.5A$ $V_{OUT}$ Programmed for 3V	1.193 <b>1.18</b>	1.23	1.267 <b>1.28</b>	V
Efficiency			$\eta$		$V_{IN} = 12V, I_{LOAD} = 0.5A$	80
Output Feedback	FSP3127-3.3V	$V_{FB}$ $4.5V \leq V_{IN} \leq 40V$ $0.1A \leq I_{LOAD} \leq 0.5A$	3.168 <b>3.135</b>	3.3	3.432 <b>3.465</b>	V
Efficiency			$\eta$		$V_{IN} = 12V, I_{LOAD} = 0.5A$	80
Output Feedback	FSP3127-5.0V	$V_{FB}$ $7V \leq V_{IN} \leq 40V$ $0.2=1A \leq I_{LOAD} \leq 2=0.5A$	4.8 <b>4.75</b>	5	5.2 <b>5.25</b>	V
Efficiency			$\eta$		$V_{IN} = 12V, I_{LOAD} = 2=0.5A$	82
Output Feedback	FSP3127-12V	$V_{FB}$ $15V \leq V_{IN} \leq 40V$ $0.1A \leq I_{LOAD} \leq 0.5A$	11.52 <b>12.48</b>	12	11.4 <b>12.6</b>	V
Efficiency			$\eta$		$V_{IN} = 12V, I_{LOAD} = 0.5A$	88

 Specifications with **boldface** are for full operating temperature range, the other type are for  $T_J=25^\circ C$

### FUNCTIONAL BLOCK DIAGRAM



### FUNCTIONAL DESCRIPTION

#### Pin Functions

**$V_{IN}$**   
This is the positive input supply for the IC switching regulator. A suitable input bypass capacitor must be present at this pin to minimize voltage transients and to supply the switching currents needed by the regulator.

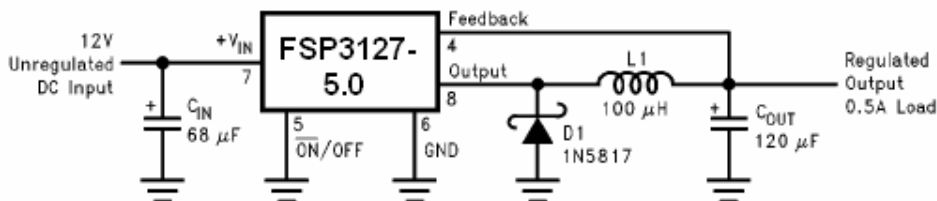
**Ground**  
Circuit ground.

**Output**  
Internal switch. The voltage at this pin switches between  $(V_{IN} - V_{SAT})$  and approximately +0.5V, with a duty cycle of  $V_{OUT}/V_{IN}$ . To minimize coupling to sensitive circuitry, the PC board copper area connected to this pin should be kept to a minimum.

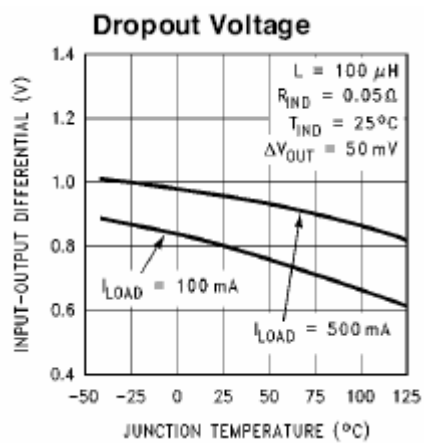
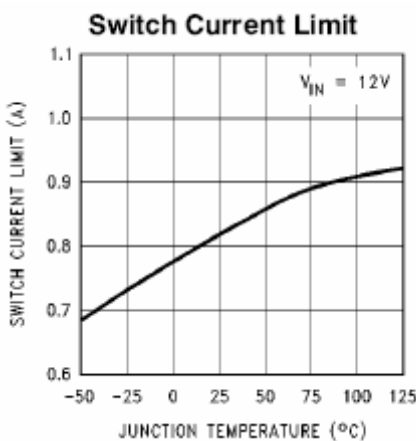
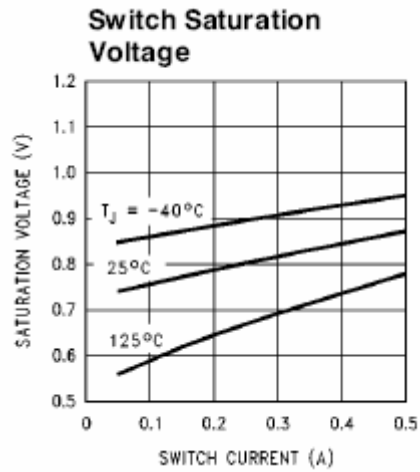
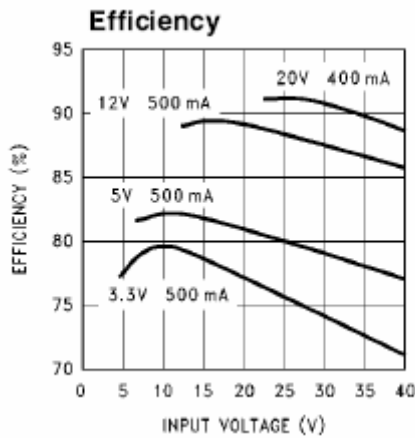
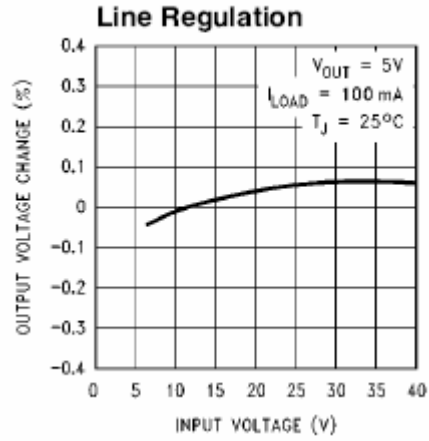
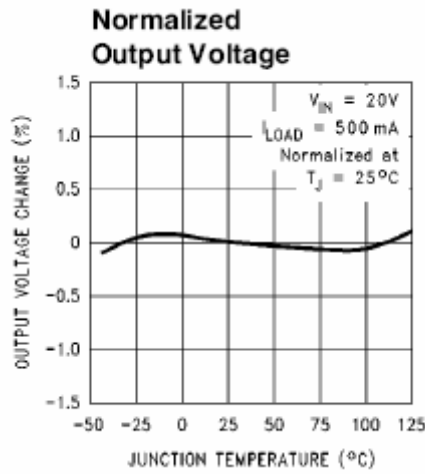
**Feedback**  
Senses the regulated output voltage to complete the feedback loop.

**ON/OFF**  
Allows the switching regulator circuit to be shut down using logic level signals thus dropping the total input supply current to approximately 80 mA. Pulling this pin below a threshold voltage of approximately 1.3V turns the regulator on, and pulling this pin above 1.3V (up to a maximum of 25V) shuts the regulator down. If this shutdown feature is not needed, the ON/OFF pin can be wired to the ground pin or it can be left open, in either case the regulator will be in the ON condition.

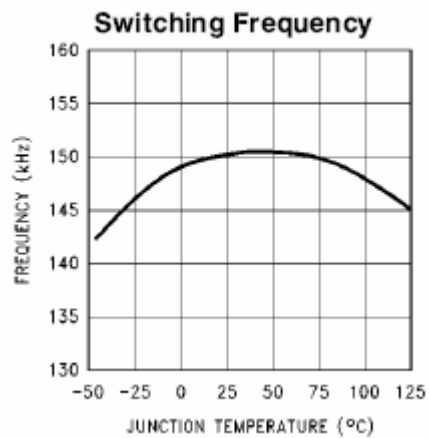
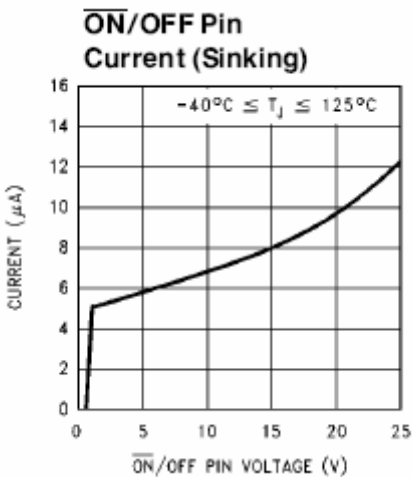
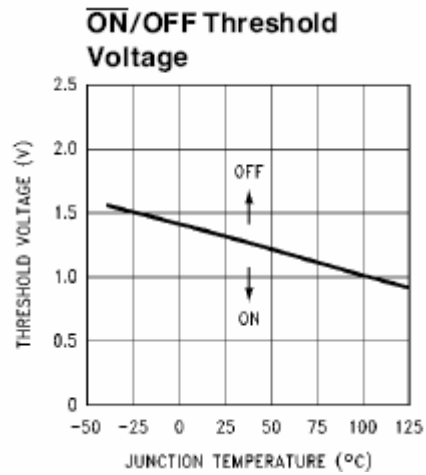
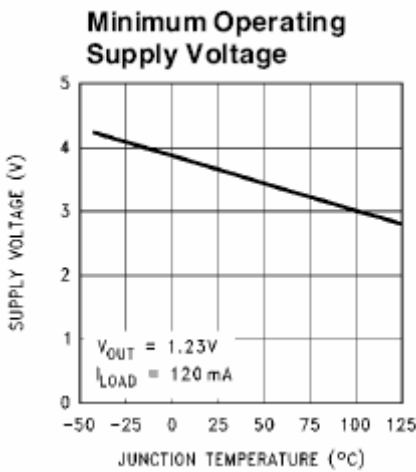
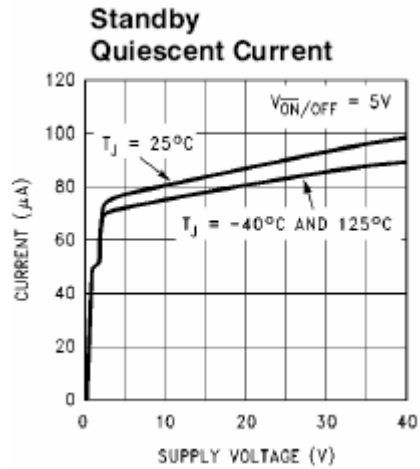
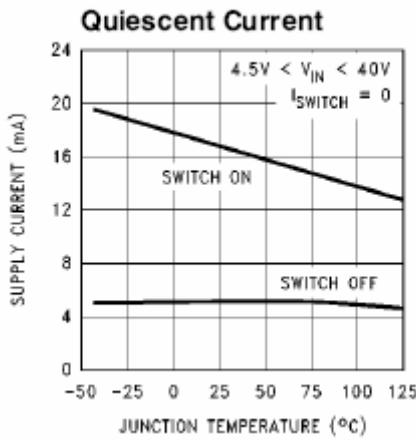
### TYPICAL APPLICATION CIRCUIT



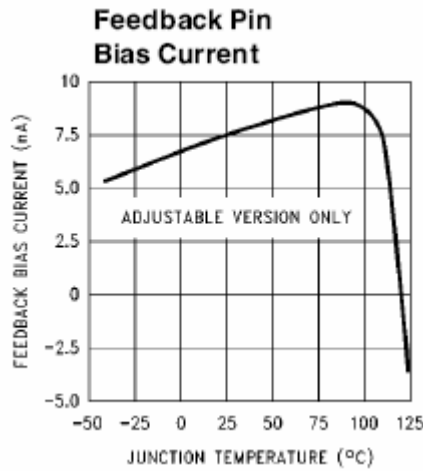
■ TYPICAL CHARACTERISTICS



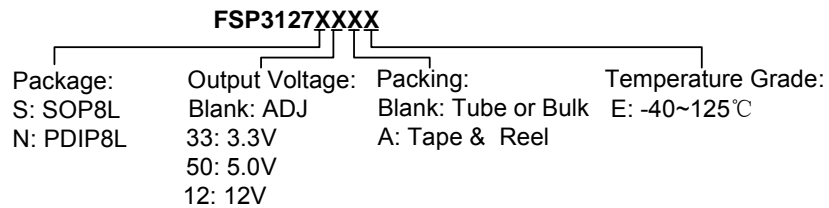
■ TYPICAL CHARACTERISTICS (CONTINUED)



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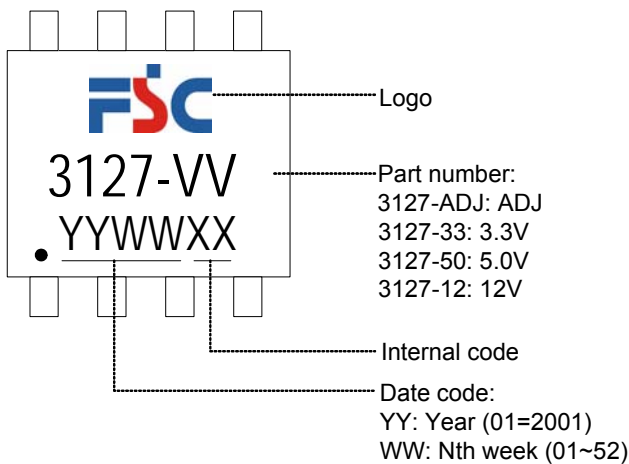


■ ORDER INFORMATION

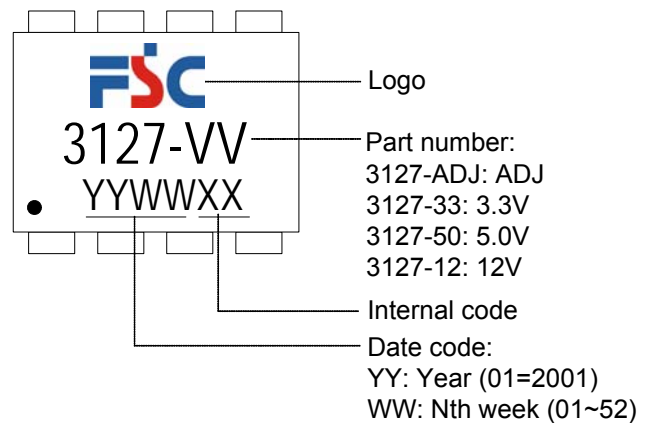


■ MARKING INFORMATION

(1) SOP8L

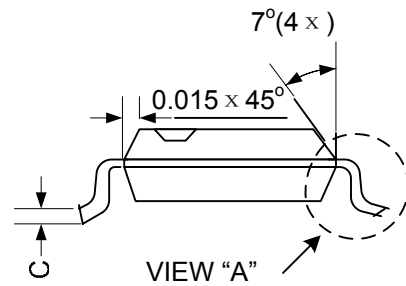
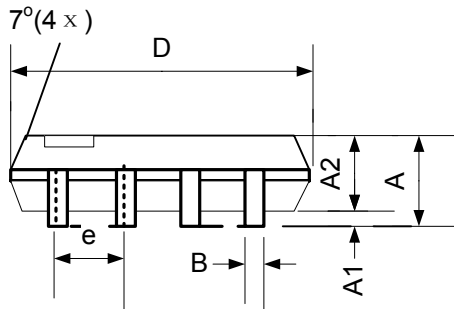
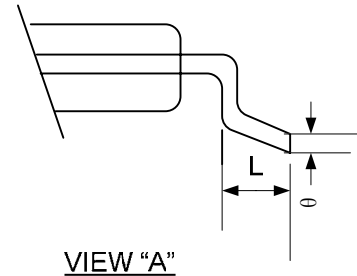
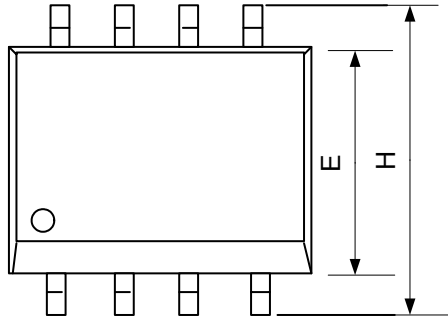


(2) PDIP8L



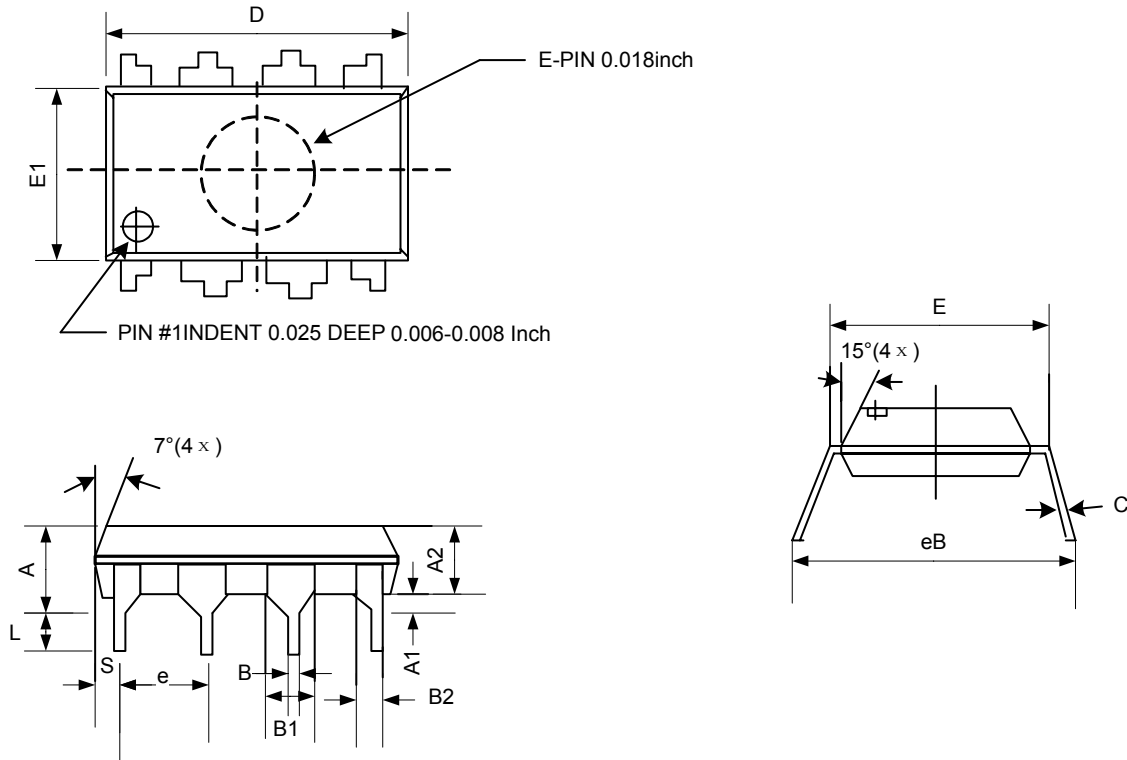
■ PACKAGE INFORMATION

(1) SOP8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10		0.25	0.004		0.010
A2	1.35	1.45	1.55	0.053	0.057	0.061
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	4.90	5.00	0.192	0.196	0.200
E	3.80	3.90	4.00	0.148	0.154	0.160
e	1.27TYP.			0.050TYP.		
H	5.80	5.99	6.30	0.228	0.236	0.248
L	0.38	0.71	1.27	0.015	0.028	0.050
θ	0°		8°	0°		8°

(2) PDIP8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A			5.33			0.210
A1	0.38			0.015		
A2	3.1	3.30	3.5	0.122	0.130	0.138
B	0.36	0.46	0.56	0.014	0.018	0.022
B1	1.4	1.52	1.65	0.055	0.060	0.065
B2	0.81	0.99	1.14	0.032	0.039	0.045
C	0.20	0.25	0.36	0.008	0.010	0.014
D	9.02	9.27	9.53	0.335	0.365	0.375
E	7.62	7.94	8.26	0.300	0.313	0.325
E1	6.15	6.35	6.55	0.242	0.250	0.258
e		2.54			0.100	
L	2.92	3.3	3.81	0.115	0.130	0.150
eB	8.38	8.89	9.40	0.330	0.350	0.370
S	0.71	0.84	0.97	0.028	0.033	0.038