

■ Description

JC75HXX series is a high voltage, ultralow-power, low dropout voltage regulator. The device can deliver 100mA output current with a dropout voltage of 550mV and allows an input voltage as high as 35V. The typical quiescent current is only 1.6 μ A. The device is available in fixed output voltages of 1.8, 2.5, 3.0, 3.3, 3.6, 4.0, 4.2 and 5.0V.

The device features integrated short-circuit and thermal shutdown protection.

Although designed primarily as fixed voltage regulators, the device can be used with external components to obtain variable voltages.

■ Application

- Battery-powered equipment
- Smoke detector and sensor
- Microcontroller Applications
- Home Appliance

■ Features

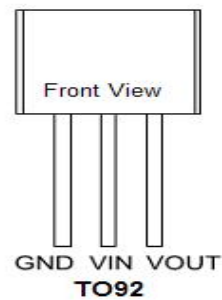
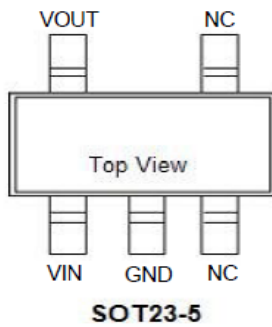
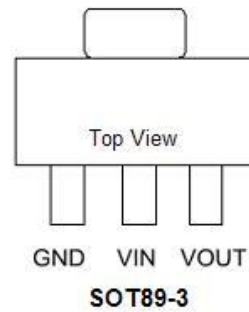
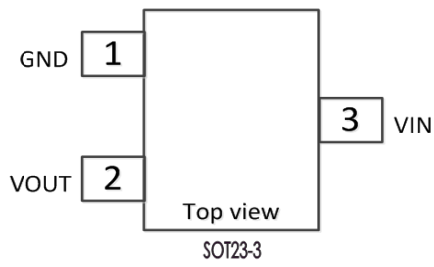
- Low Quiescent Current: 1.6 μ A
- High Input Voltage: Up to 35V
- High Output Current: \geq 150mA
- No Overshoot in Start Up
- No Overshoot in Short-Circuit Recovery
- Low Dropout Voltage:
 - 55mV@10mA
 - 550mV@100mA
- Fixed Output Voltages: 1.8, 2.5, 3.0, 3.3, 3.6, 4.0, 4.2 and 5.0V
- High-accuracy Output Voltage:
 - JC75HXXA \pm 1%
 - JC75HXXB \pm 2%
- Good Transient Response
- Low Temperature Drift: \pm 100ppm/ $^{\circ}$ C
- Integrated Short-Circuit Protection
- Integrated Thermal Protection
- Available Packages:

JC75HXXBTE	SOT23-3
JC75HXXBTG	SOT23-5
JC75HXXBTS	SOT89-3
JC75HXXBTY	TO92

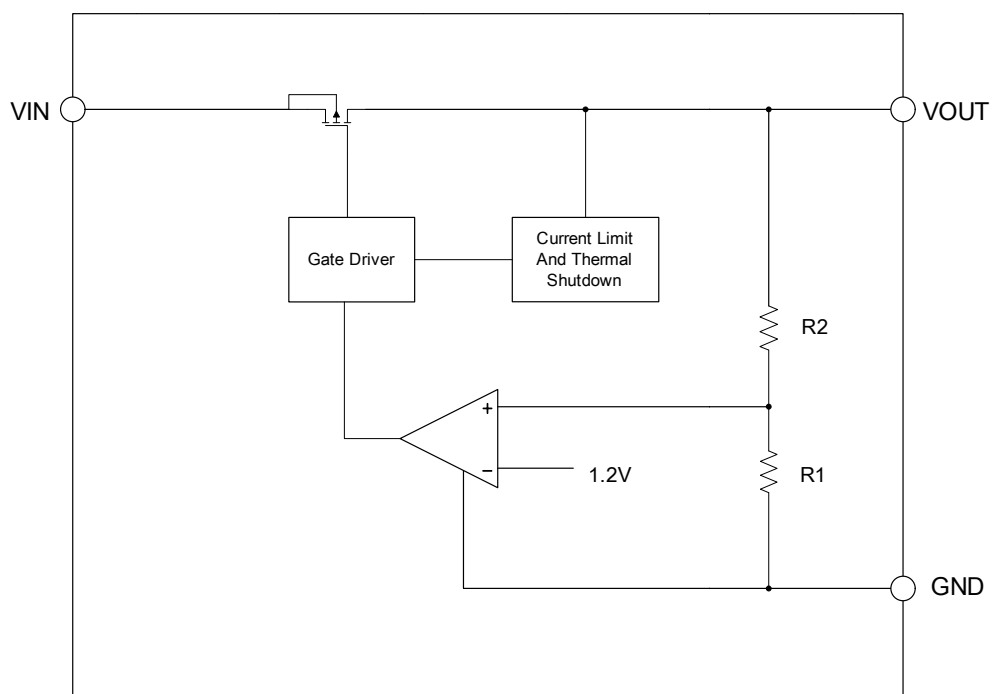
■ Pin Descriptions

Pin Number			Pin Name	Description
SOT23-3	SOT89-3/TO92	SOT23-5		
1	1	2	GND	Ground pin
2	3	5	VOUT	Regulator output pin
3	2	1	VIN	Regulator input supply pin

■ Packages and Pin Assignments



■ Functional Block Diagram



■ Absolute Maximum Ratings

Item	Description	Min	Max	Unit
Voltage	VIN Pin to GND Pin	-0.3	35	V
	VOUT Pin to GND pin	-0.3	6	V
	VOUT Pin to VIN Pin	-35	0.3	V
Current	Peak output	Internally limited		
Temperature	Operating Ambient Temperature	-40	85	°C
	Storage Temperature	-40	150	°C
	Operating virtual junction Temperature	-	150	°C
Thermal Resistance (Junction to Ambient)	SOT89	165		°C/W
	SOT23-3	350		°C/W
	SOT23-5	260		°C/W
	TO92	180		°C/W
Power Dissipation	SOT89	500		mW
	SOT23-3	350		m/W
	SOT23-5	480		mW
	TO92	690		mW
Electrostatic discharge rating	Human Body Model (HBM)	4		kV
	Charged Device Model (MM)	100		V

Note : Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in this specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

■ Electrical characteristics

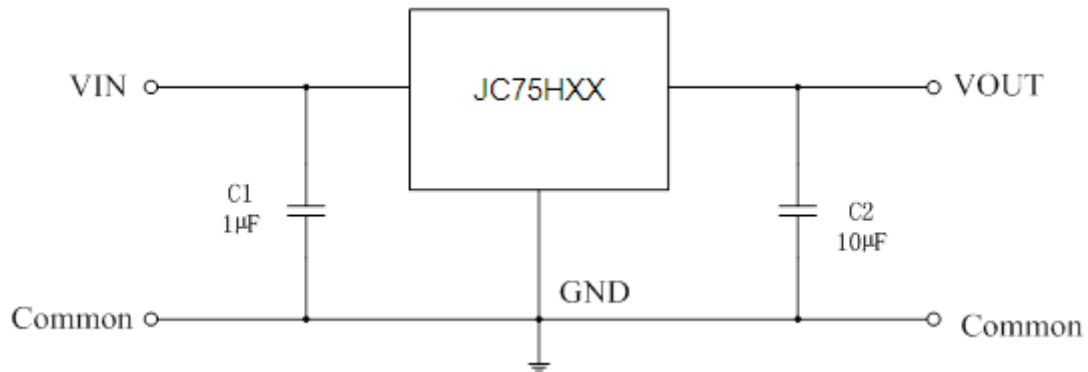
(At $T_A=25^\circ\text{C}$, $C_{IN}=1\mu\text{F}$, $V_{IN}=V_{OUTNOM}+1.0\text{V}$, $C_{OUT}=10\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	MIN	TYP	MAX	UNIT
V_{IN}	Input Voltage		—	—	35	V
I_{GND}	Quiescent Current	No load	—	1.6	2.0	μA
V_{OUT} (JC75HXX)	Output Voltage	$I_{OUT}=10\text{mA}$	-2%		2%	V_{OUT}
I_{OUT_MAX}	Output Current		100	150	—	mA
V_{DROP}	Dropout Voltage*1 (JC75H50)	$I_{OUT}=10\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	50		mV
		$I_{OUT}=100\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	500		mV
		$I_{OUT}=150\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	750		mV
	Dropout Voltage*1 (JC75H33)	$I_{OUT}=100\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	50		mV
		$I_{OUT}=100\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	500		mV
		$I_{OUT}=150\text{mA}$, $\Delta V_{OUT} = -V_{OUTNOM} * 2\%$	—	750		mV
ΔV_{OUT}	Load Regulation	$1\text{mA} \leq I_{OUT} \leq 100\text{mA}$	—	20	50	mV
$\frac{\Delta V_{OUT} \times 100}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	$I_{OUT}=1\text{mA}$, $V_{IN}=(V_{OUTNOM}+1\text{V})$ to 35V	—	—	0.2	%/V
I_{LIMIT}	Current Limit	$V_{IN}=(V_{OUTNOM}+1\text{V})$ to 35V $R_{LOAD}=V_{OUTNOM}/1\text{A}$		450		mA
T_{SHDN}	Thermal Shutdown Threshold			125		°C
$\frac{\Delta V_{OUT}}{\Delta T_a \times V_{OUT}}$	Temperature Coefficient	$I_{OUT}=10\text{mA}$, $-40^\circ\text{C} < T_a < 100^\circ\text{C}$		±100		ppm/°C

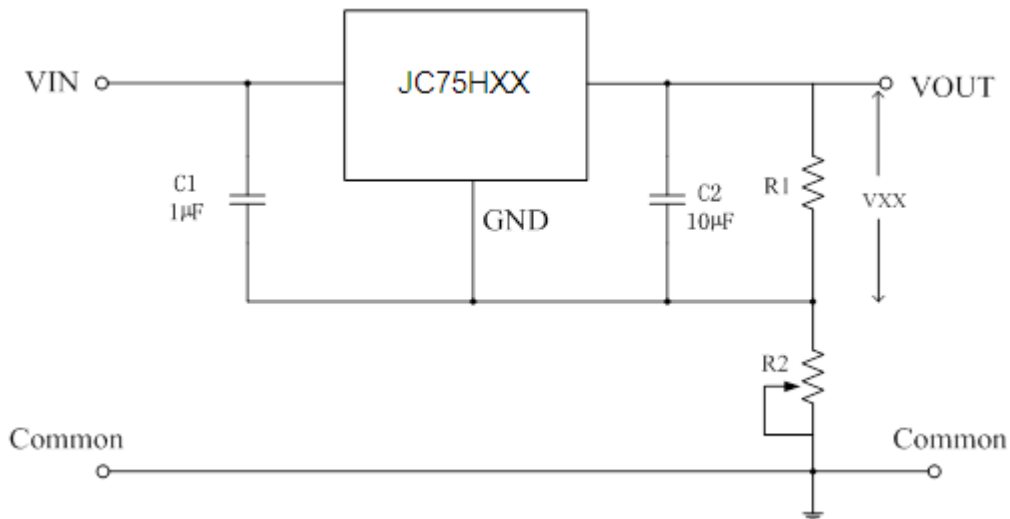
Note : *1 Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

Application Circuits

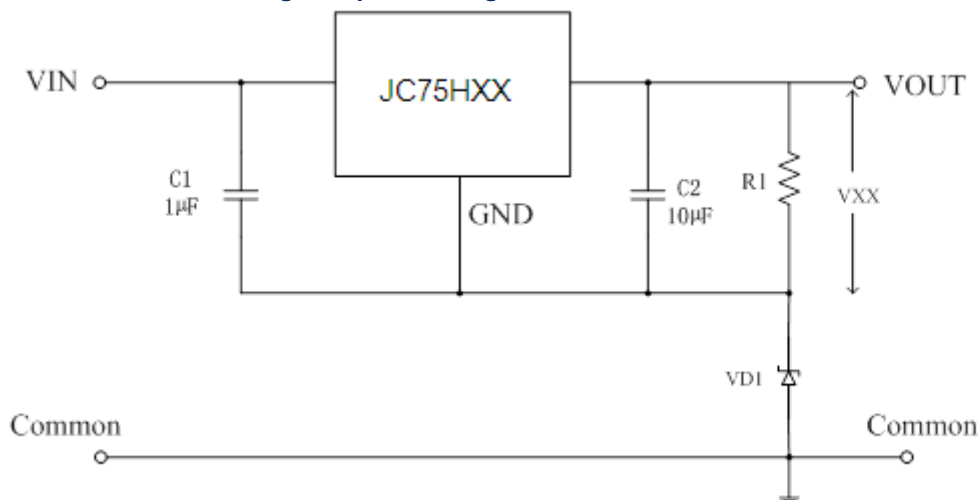
➤ Basic Circuit



➤ Circuit 1 for Increasing Output Voltage



➤ Circuit 2 for Increasing Output Voltage



■ Application Note

➤ Power Dissipation

The power dissipated by the p-channel MOSFET

$$P_D (\text{ MOSFET }) = (V_{IN} - V_{OUT}) * I_{OUT}$$

Total Power Dissipation

$$P_D(\text{TOTAL}) = PD(\text{MOSFET}) + V_{IN} * I_{GND}$$

The quiescent current I_{GND} is only 1.6 μ A , so that $V_{IN} * I_{GND}$ can be ignored. The maximum power dissipation can be estimated by

$$P_D(\text{max}) = [V_{IN}(\text{max}) - V_{OUT}(\text{min})] * I_{OUT}$$

➤ Junction Temperature

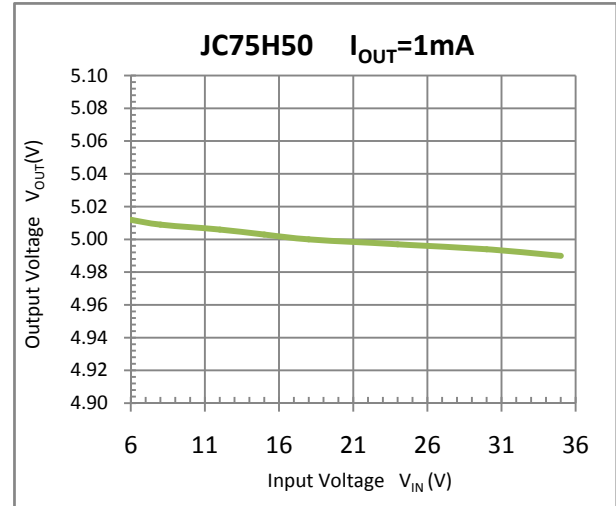
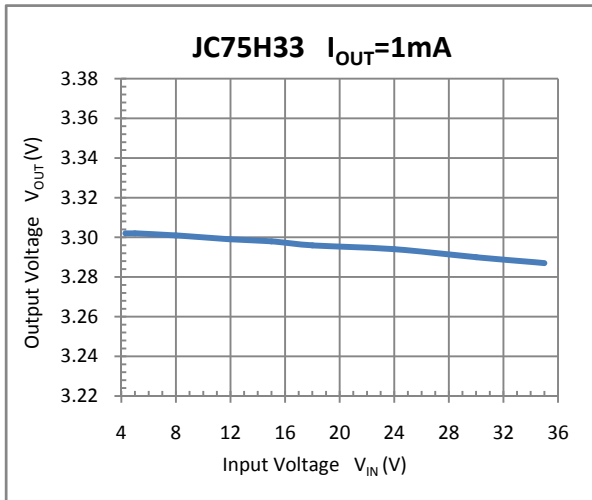
$$T_J = PD(\text{max}) * \theta_{JA} + T_A$$

θ_{JA} is thermal resistance of junction to ambient , T_A is the ambient temperature.

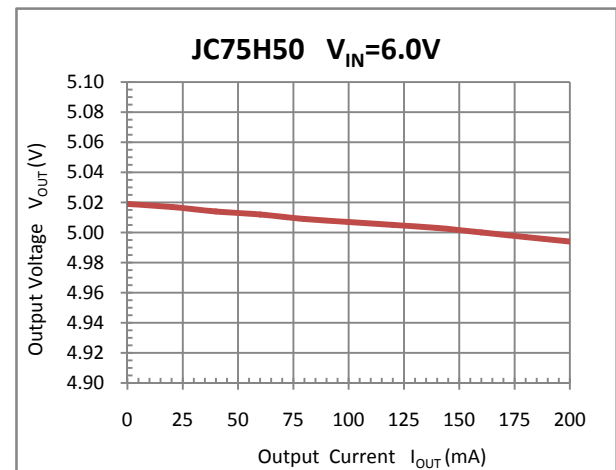
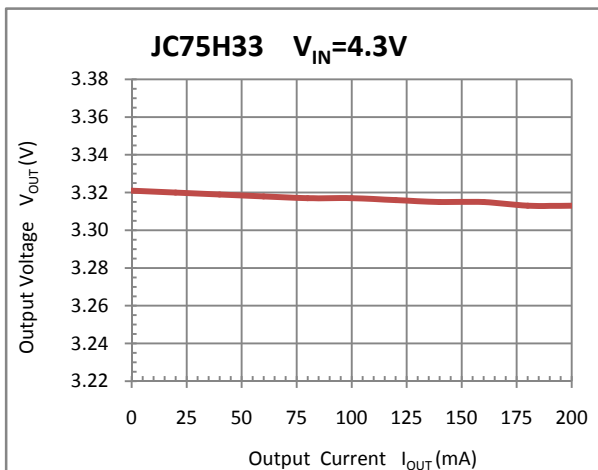
■ Typical Performance Characteristics

Test Condition: $T_A=25^\circ\text{C}$, $V_{IN}=V_{OUTNOM}+1.0\text{ V}$, $I_{OUT}=1\text{ mA}$, $C_{OUT}=10\mu\text{F}$, unless otherwise noted.

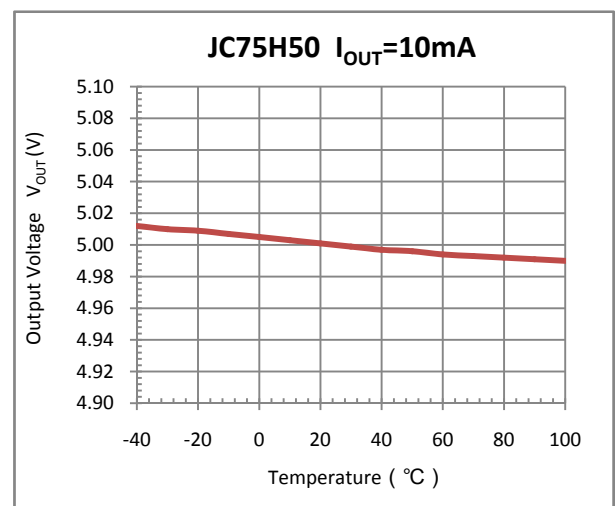
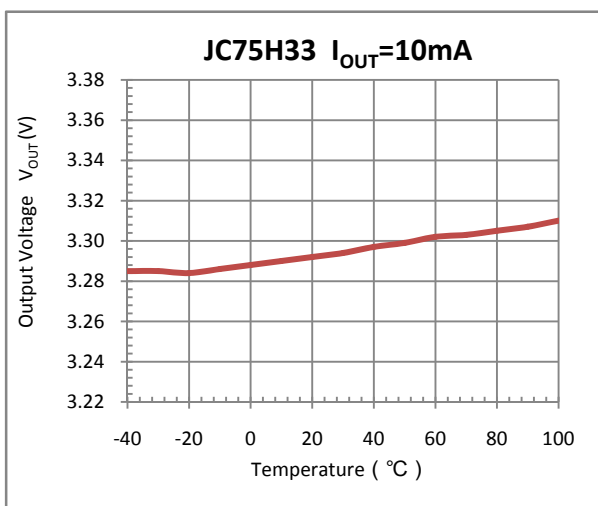
Output Voltage vs. Input Voltage



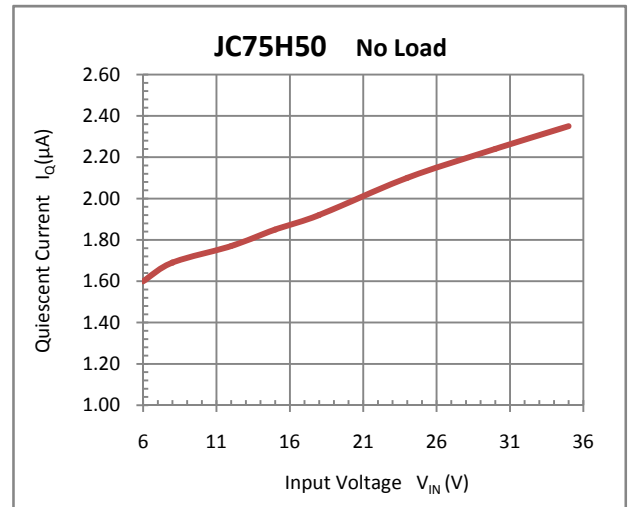
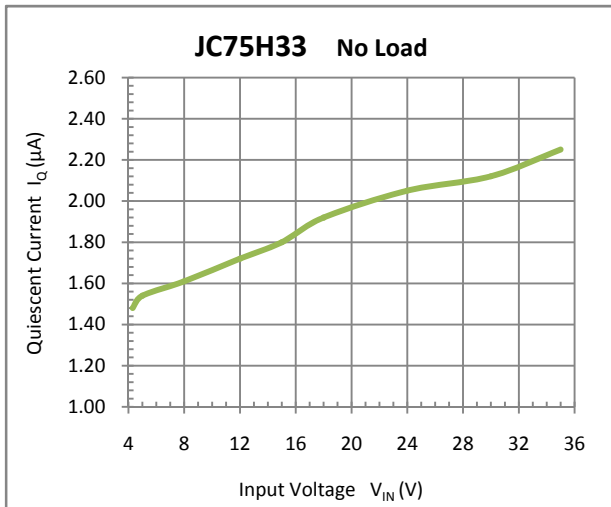
Output Voltage vs. Output Current



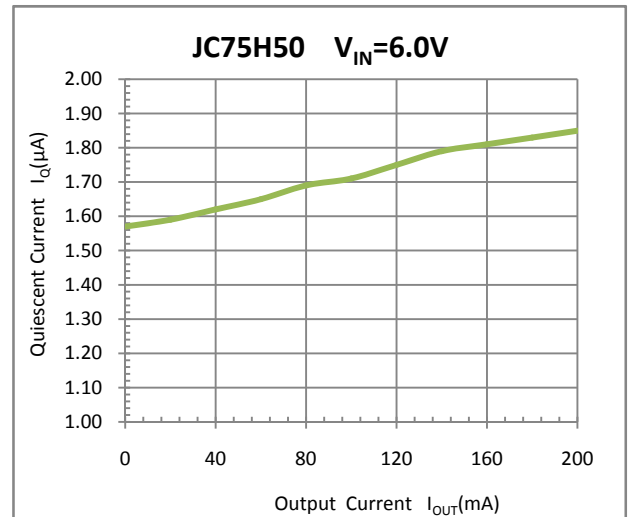
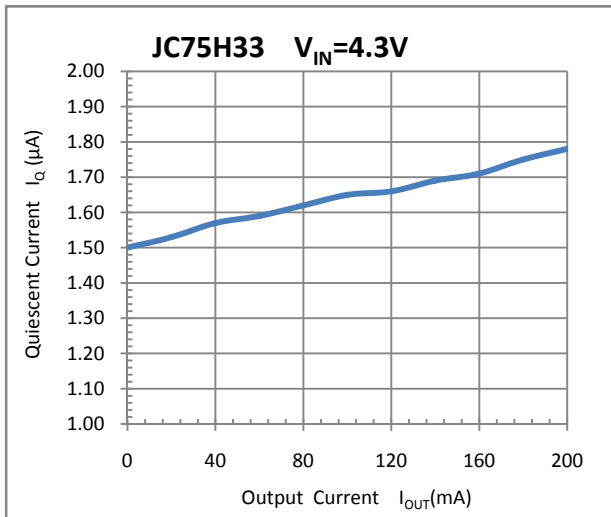
Output Voltage vs. Temperature



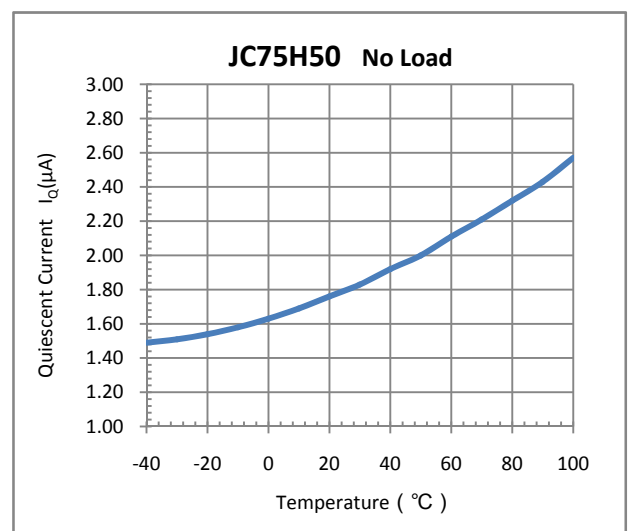
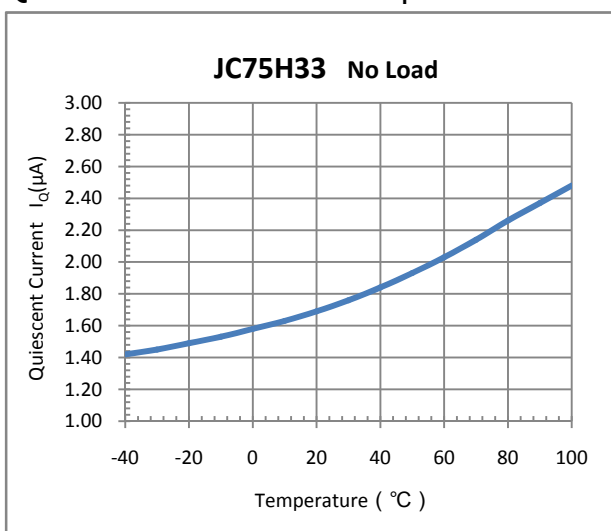
Quiescent Current vs. Input Voltage



Quiescent Current vs. Output Current

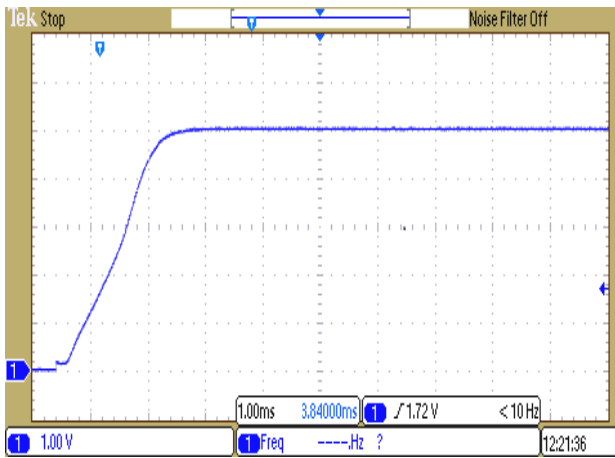


Quiescent Current vs. Temperature

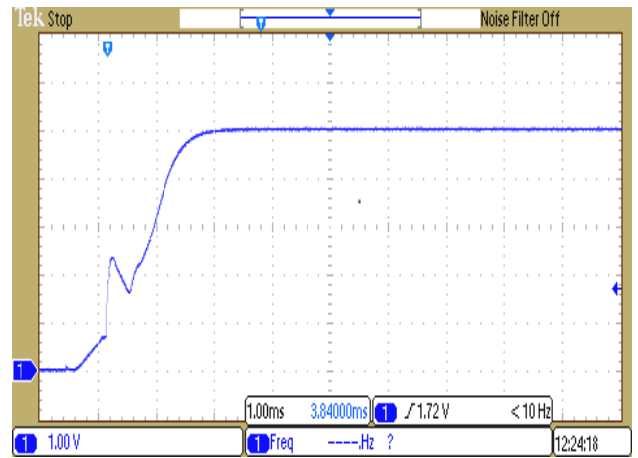


Startup

$V_{IN}=6.0V$, No Load , $C_{OUT}=10\mu F$



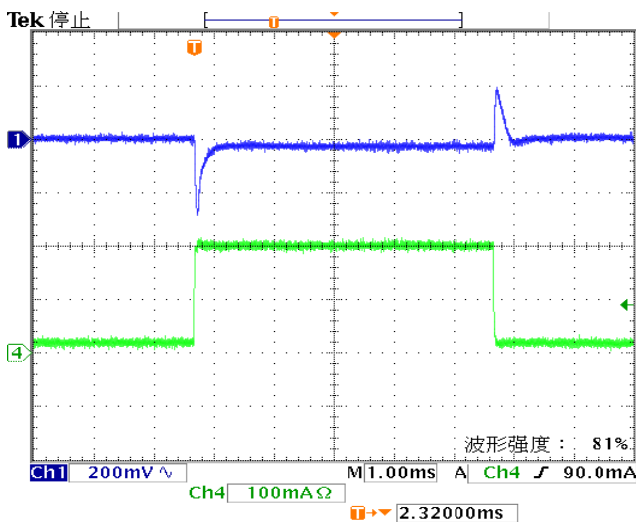
$V_{IN}=6.0V$, $I_{OUT}=30mA$, $C_{OUT}=10\mu F$



Transient Response

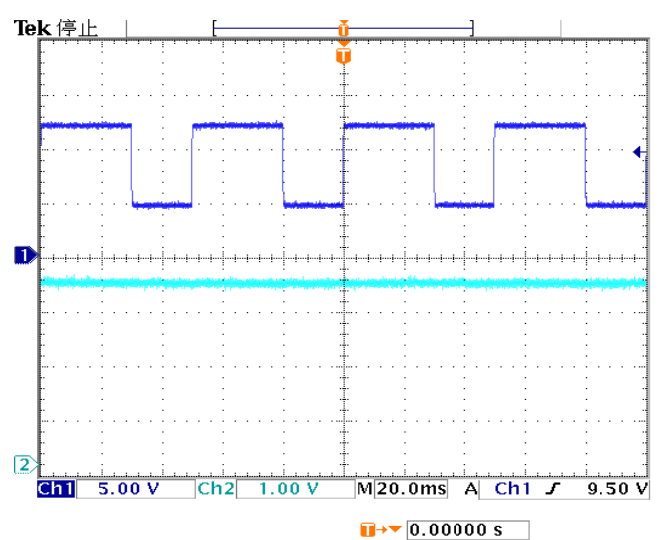
Load Transient

$V_{IN}=12.0V$, $C_{OUT}=10\mu F$, $I_{OUT}=10mA$ to $200mA$



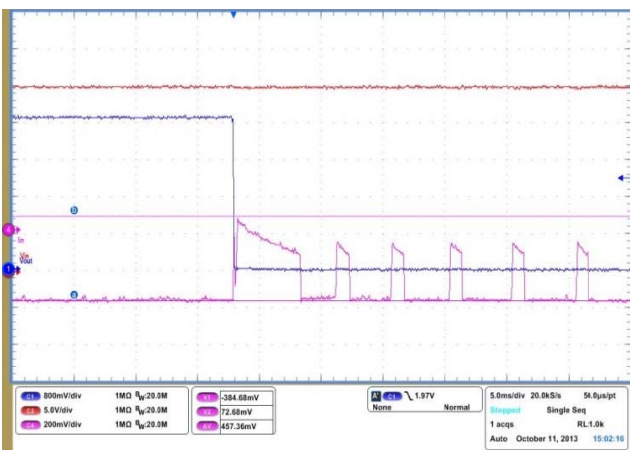
Line Transient

$V_{IN}=5.0V$ to $12.0V$, $C_{OUT}=10\mu F$, $I_{OUT}=1mA$

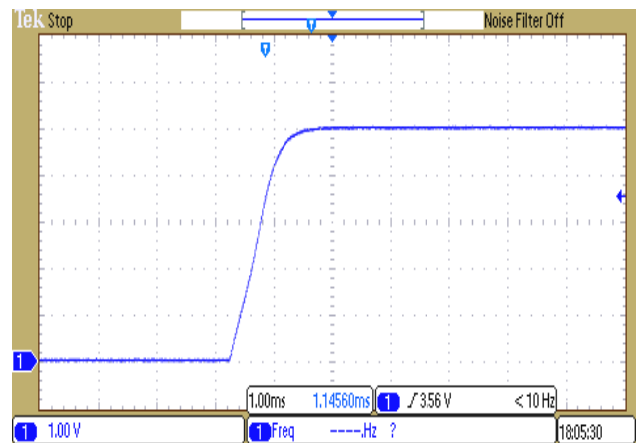


Short Protection

$V_{IN}=25.0V$, Short Protection Occurred



$V_{IN}=25.0V$, Short Protection Removed

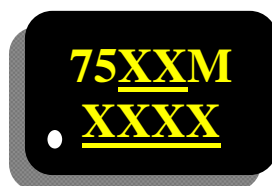


■ Ordering Information

Part No.	Output Voltage (V)	Marking		
		TO92-3	SOT89-3	SOT23-3/SOT23-5
JC75H18BXX	1.8	7518M XXXX		7518M XXXX
JC75H25BXX	2.5	7525M XXXX		7525M XXXX
JC75H30BXX	3.0	7530M XXXX		7530M XXXX
JC75H33BXX	3.3	7533M XXXX		7533M XXXX
JC75H36BXX	3.6	7536M XXXX		7536M XXXX
JC75H40BXX	4.0	7540M XXXX		7540M XXXX
JC75H42BXX	4.2	7542M XXXX		7542M XXXX
JC75H50BXX	5.0	7550M XXXX		7550M XXXX

■ Marking Information

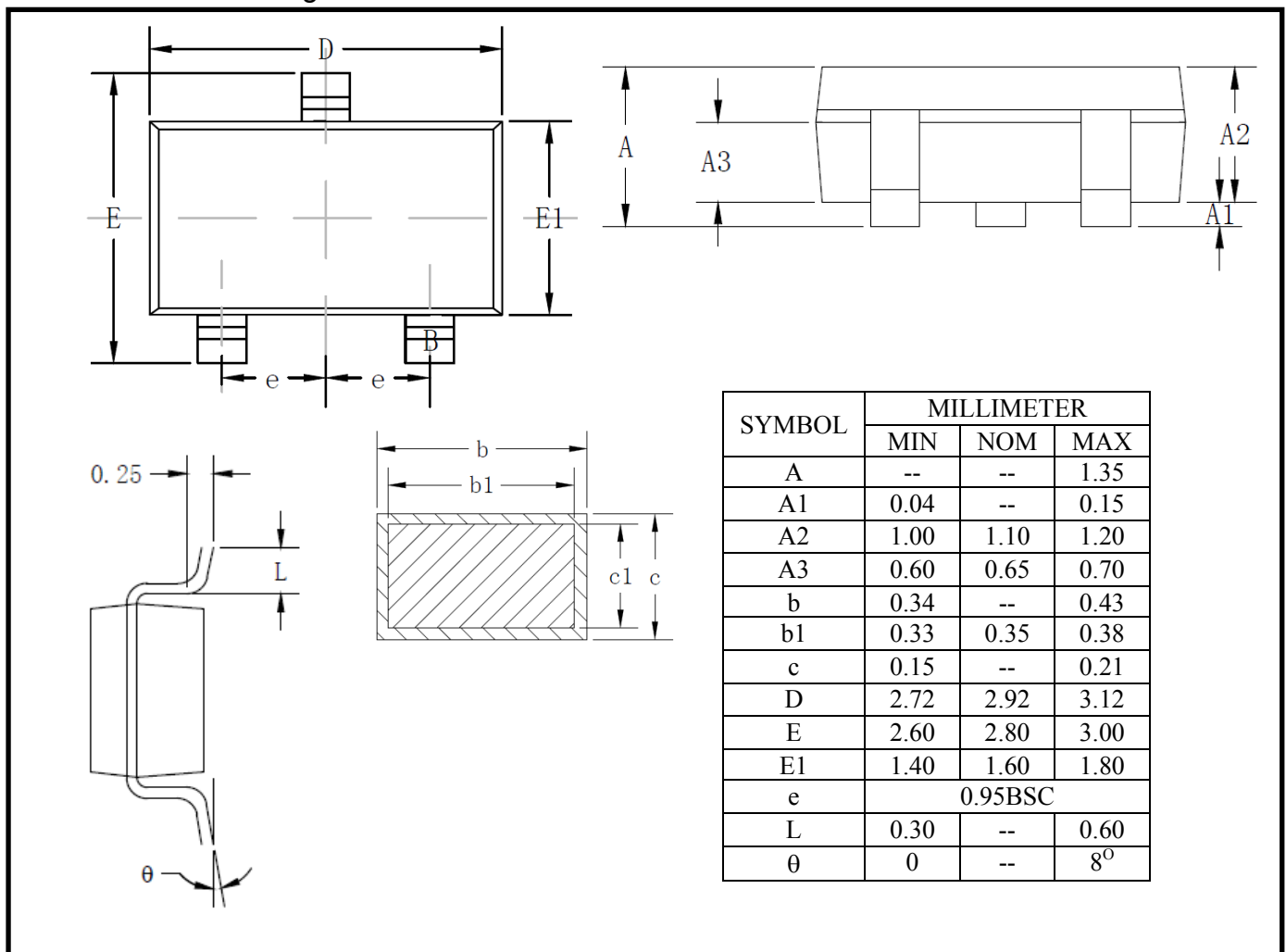
JC75HXXB Marking information



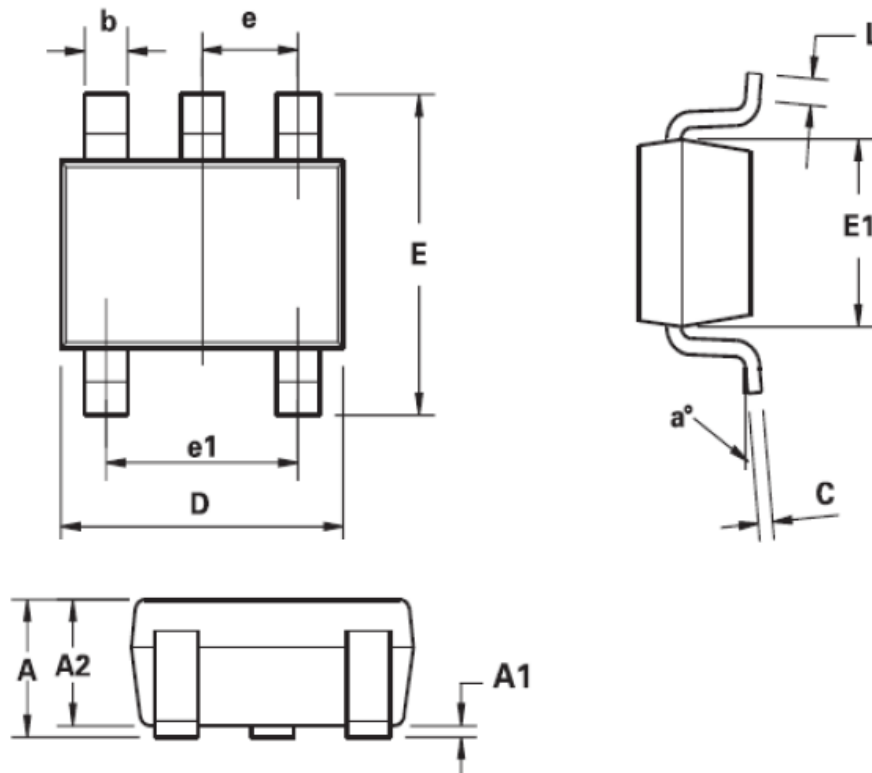
XX: Output Voltage (18,25,30,33,36,40,42,50)
XXXX: D/C

■ Package Information

3-Pin SOT23-3 Package

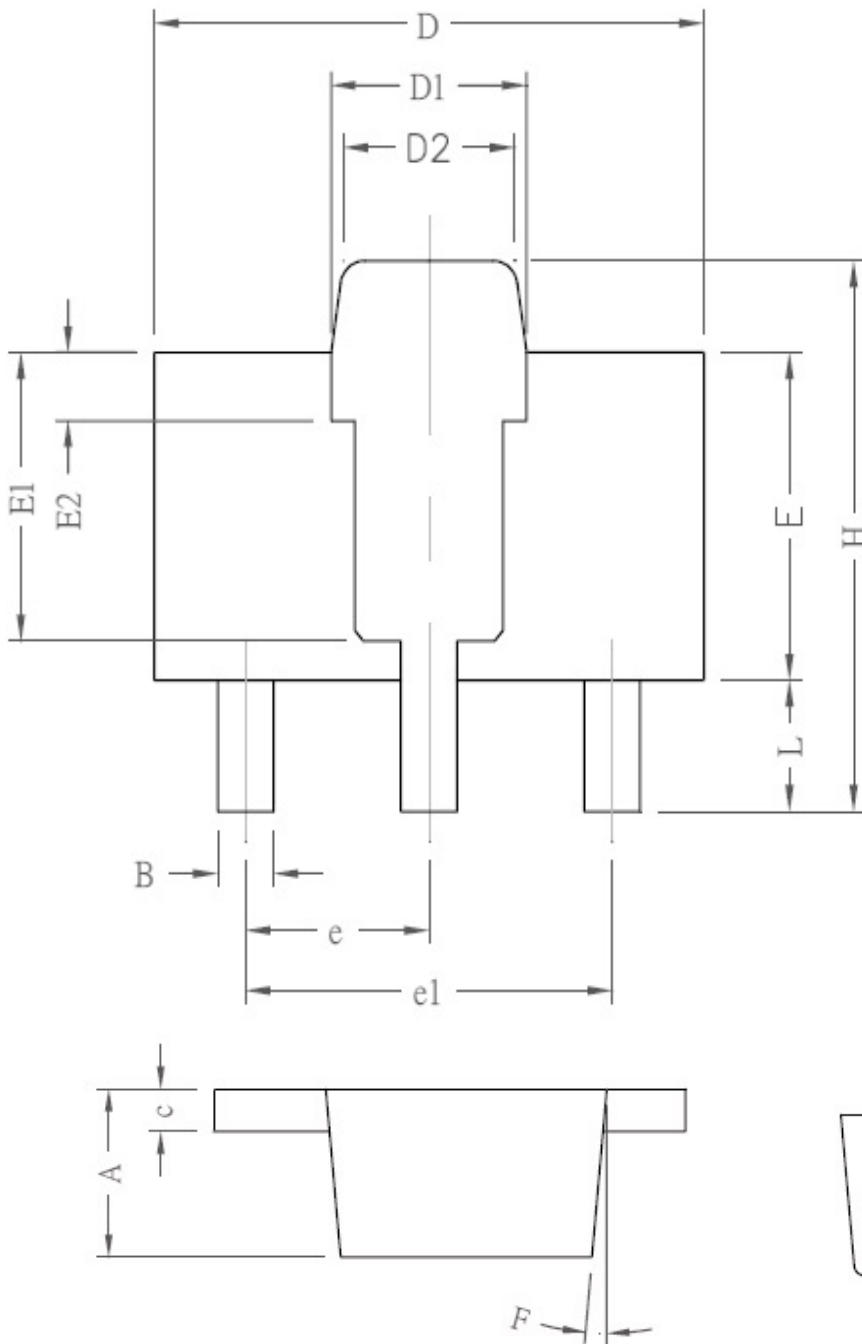


5-Pin SOT23-5 Package



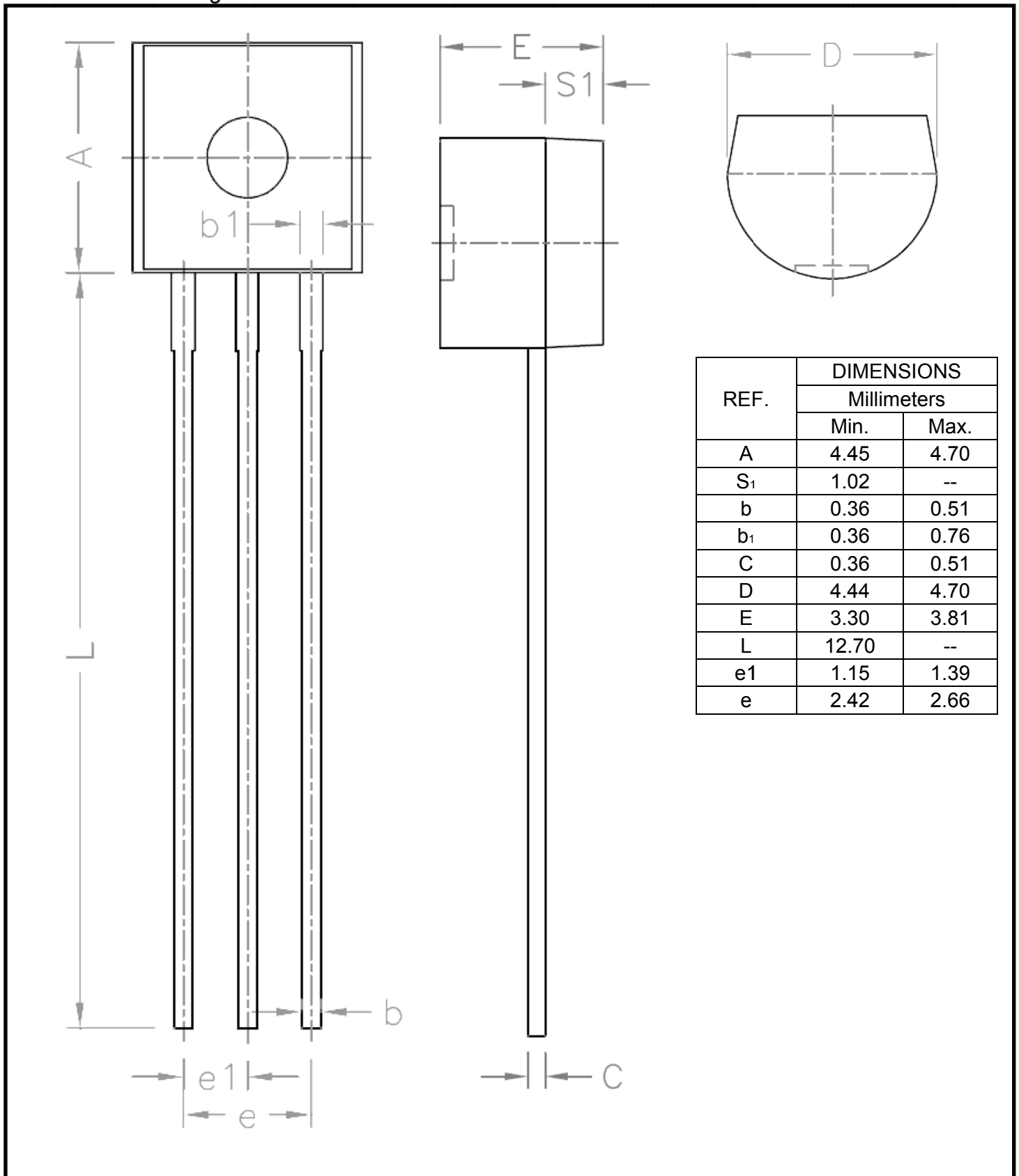
DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.0354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.20	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0.10	0.60	0.0039	0.0236
a°	0°	30°	0°	30°

3-Pin SOT89-3 Package

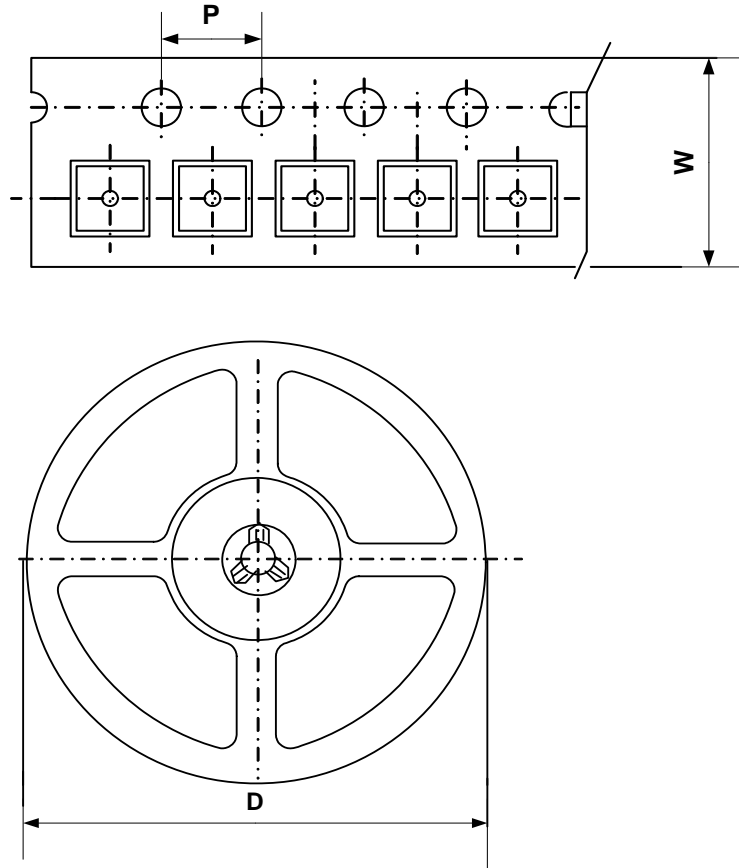


REF.	DIMENSIONS	
	Millimeters	
	Min.	Max.
A	1.40	1.60
B	0.40	0.52
C	0.35	0.41
D	4.40	4.60
D1	1.50	1.70
D2	1.30	1.50
E	2.40	2.60
E1	2.20 REF.	
E2	0.52 REF.	
e	1.50 REF.	
e1	3.00 REF.	
F	5° TYP.	
H	4.05	4.25
L	0.89	1.20

3-Pin TO92 Package



■ Packing information



Type	W(mm)	P(mm)	D(mm)	Qty (pcs)
SOT23-3 SOT23-5	12.0 \pm 0.1 mm	8.0 \pm 0.1 mm	330 \pm 1 mm	3000pcs
SOT89-3	/	/	/	1000pcs
TO92-3	/	/	/	Bag : 1000/bag Box:10000(10 bag)/box