GS2911

300mA CMOS Positive LDO Voltage Regulator

Product Description

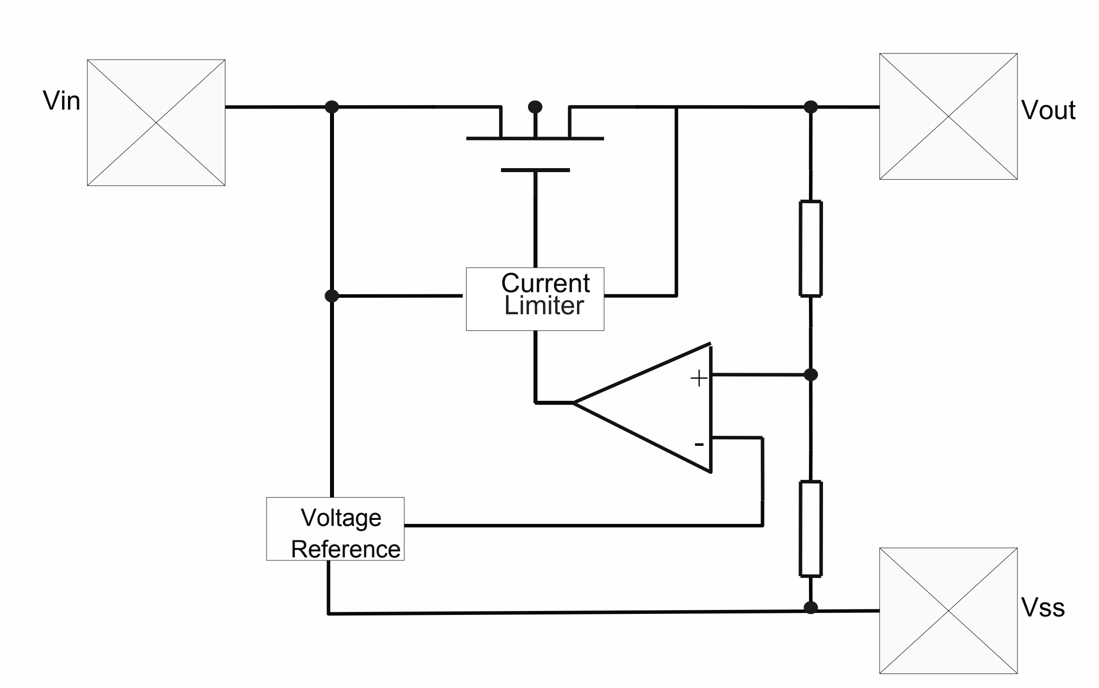
The GS2911 is a positive voltage output, three-pin regulator that provides a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and laser trimming technologies.

The GS2911 consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Transient response to load variations has improved in comparison to the existing series.

TO-92 and SOT-89 packages are available.

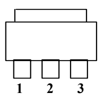
Features	Applications
■ Maximum output current: 250mA (within the maximum power dissipation, V_{OUT}=5.0V) ■ Output voltage: 2.0V to 6.0V in 0.1V increments (1.1V to 1.9V for custom products) ■ Highly accurate: Output voltage ± 2% (±1% for semi-custom products) ■ Low power consumption: Typ. 2.0μA at V_{OUT} = 5.0V ■ Output voltage temperature coefficient 0.1%/V: Typ. ± 100ppm/℃ ■ Input stability: Typ. 2.0%/V ■ Small input/output differential: I_{OUT} = 100mA at V_{OUT} = 5.0V with a 0.12V differential. ■ SOT-89 and TO-92 packages are available	■ Wireless Communication Systems ■ Battery Powered Systems ■ Palmtops ■ Portable Cameras and Video Recorders ■ Voltage Regulator for Microprocessor ■ Voltage Regulator for CD-ROM Drivers, LAN Cards, 56K Modem

Block Diagram



Package and Pin Assignments

GS2911YXX (SOT-89)

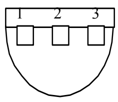


Pin1 = GND

Pin2 = V_{IN}

Pin3 = V_{OUT}

GS2911NXX (TO-92)



Pin1 = GND

Pin2 = V_{IN}

Pin3 = V_{OUT}

Ordering Information

SOT-89	TO-92	Output
GS2911Y15	GS2911N15	1.5V
GS2911Y18	GS2911N18	1.8V
GS2911Y20	GS2911N20	2.0V
GS2911Y25	GS2911N25	2.5V
GS2911Y33	GS2911N33	3.3V
GS2911Y50	GS2911N50	5.0V

*For additional available fixed voltages contact factory.

*Add “F” means lead free part.

Absolute Maximum Ratings

Parameter	Symbol	Ratings
Input Voltage	V_{IN}	12V
Output Current	I_{OUT}	500 mA
Output Voltage	V_{OUT}	Vss-0.3 to VIN+0.3
Continuous Total Power Dissipation TO-92 SOT-89	P_D	 500 mW 550 mW
Operating Ambient Temperature	T_{opr}	0℃ to 80℃
Storage temperature Range	T_{stg}	-40℃ to 125℃
Lead Temperature (10 sec)	T_{LEAD}	260℃

Electrical Characteristics V_{OUT}(T) =2.0 (Note 1)

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Output voltages	V_{OUT} (E) (Note 2)	I_{OUT} = 40mA V_{IN} = 3.0V	1.960	2.000	2.040	V
Maximum output current	I_{OUT} max	V_{IN} = 3.0V V_{OUT}(E) ≧ 1.8V	100			mA
Load stability	$\triangle V_{OUT}$	V_{IN} = 3.0V 1mA ≦ I_{OUT} ≦60mA		45	90	mV
Input-Output Voltage differential (Note 3)	Vdif	I_{OUT}=60mA		180	360	mV
		I_{OUT}=120mA		400	700	mV
Supply current	I_{SS}	V_{IN} = 3.0V		1.0	100	μA
Line regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} * \triangle V_{OUT}}$	I_{OUT} = 40mA 3.0V≦V_{IN}≦10.0V		0.2	0.3	%/V
Input voltage	V_{IN}				10	V
Output voltage Temperature characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr * \triangle V_{OUT}}$	I_{OUT} = 40mA -40℃ ≦Topr≦85℃		±100		ppm/℃

Electrical Characteristics $V_{OUT}(T)$ =2.5V (Note 1)

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Output voltages	V_{OUT} (E) (Note 2)	I_{OUT} = 40mA, V_{IN} = 3.5V	2.450	2.500	2.550	V
Maximum output current	I_{OUT} max	V_{IN} = 3.5V, $V_{OUT}(E) \geqq 2.25V$	150			mA
Load stability	$\triangle V_{OUT}$	V_{IN} = 3.5V, $1mA \leqq I_{OUT} \leqq 80mA$		45	90	mV
Input-Output Voltage differential (Note 3)	Vdif	I_{OUT}=80mA		180	360	mV
		I_{OUT}=160mA		400	700	mV
Supply current	Iss	V_{IN} = 3.5V		1.0	100	μA
Line regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} * \triangle V_{OUT}}$	I_{OUT} = 40mA, $3.5V \leqq V_{IN} \leqq 10.0V$		0.2	0.3	%/V
Input voltage	V_{IN}				10	V
Output voltage Temperature characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr * \triangle V_{OUT}}$	I_{OUT} = 40mA, -40℃ ≦Topr≦85℃		±100		ppm/℃

Electrical Characteristics $V_{OUT}(T)$ =3.3 (Note 1)

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Output voltages	V_{OUT} (E) (Note 2)	I_{OUT} = 40mA, V_{IN} = 4.3V	3.234	3.3	3.366	V
Maximum output current	I_{OUT} max	V_{IN} = 4.3V, $V_{OUT}(E) \geqq 2.97V$	165			mA
Load stability	$\triangle V_{OUT}$	V_{IN} = 4.3V, $1mA \leqq I_{OUT} \leqq 80mA$		45	90	mV
Input-Output Voltage differential (Note 3)	Vdif	VIN = 4.3V				
		IOUT=160mA		400	700	mV
Supply current	Iss	V_{IN} = 4.3V		1.0	100	μA
Line regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} * \triangle V_{OUT}}$	I_{OUT} = 40mA, $4.3V \leqq V_{IN} \leqq 10.0V$		0.2	0.3	%/V
Input voltage	V_{IN}				10	V
Output voltage	$\triangle V_{OUT}$	I_{OUT} = 40mA		±100		ppm/℃

Temperature characteristics	△Topr * △V_{OUT}	-40℃ ≦Topr≦125℃				

Electrical Characteristics $V_{OUT}(T)$ =5.0 (Note 1)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltages	$V_{OUT}(E)$ (Note 2)	I_{OUT} = 40mA V_{IN} = 6.0V	4.900	5.000	5.100	V
Maximum output current	I_{OUT} max	V_{IN} = 6.0V $V_{OUT}(E) \geq 5.0V$	165			mA
Load stability	ΔV_{OUT}	V_{IN} = 6.0V $1mA \leq I_{OUT} \leq 80mA$		45	90	mV
Input-Output Voltage differential (Note 3)	Vdif	V_{IN} = 6.0V				
	Vdif	I_{OUT} =200mA		380	600	mV
Supply current	Iss	V_{IN} = 6.0V		1.0	100	μA
Line regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \bullet \Delta V_{OUT}}$	I_{OUT} = 40mA $4.3V \leq V_{IN} \leq 10.0V$		0.2	0.3	%/V
Input voltage	V_{IN}				10	V
Output voltage Temperature characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \bullet \Delta V_{OUT}}$	I_{OUT} = 40mA -40℃ ≤ Topr ≤125℃		±100		ppm/℃

Note1. $V_{OUT}(T)$ = Specified output voltage.

Note2. $V_{OUT}(E)$ = Effective output voltage (i.e. the output voltage when " $V_{OUT}(T)$+1.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)

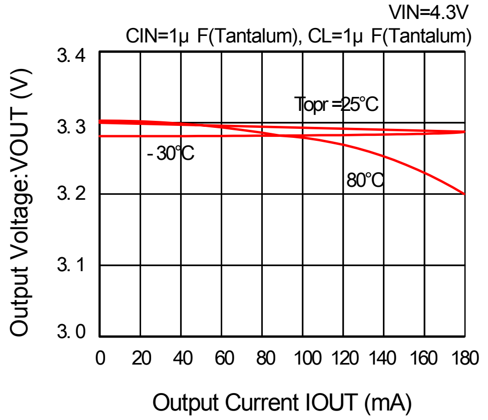
Note3. Vdif = (V_{IN} 1 (Note 4) – V_{OUT} (E))

Note4. V_{IN} 1 = The input voltage at the time 98% of $V_{OUT}(E)$ is output (input voltage has been gradually reduced).

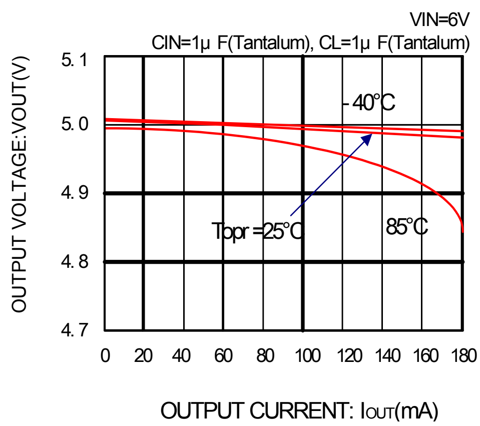
Typical Performance Characteristics

Output Voltage vs. Output Current

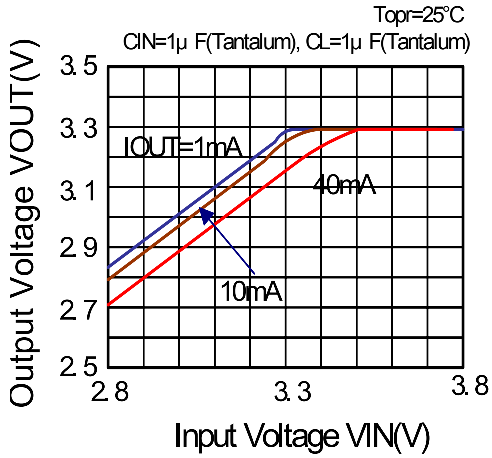
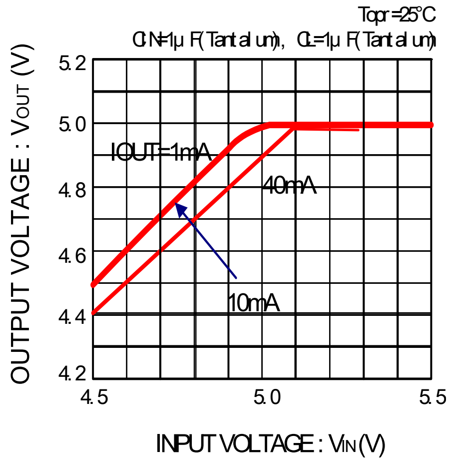
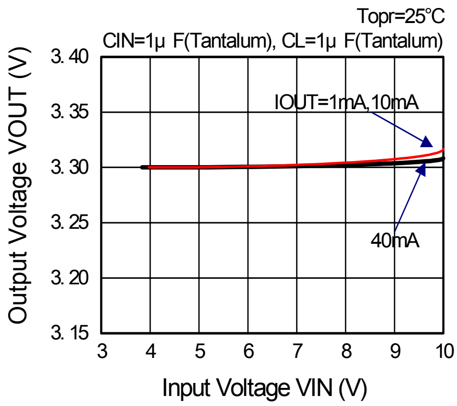
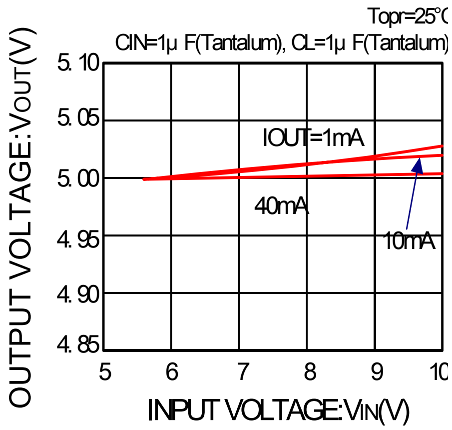
GS2911 (3.3V)



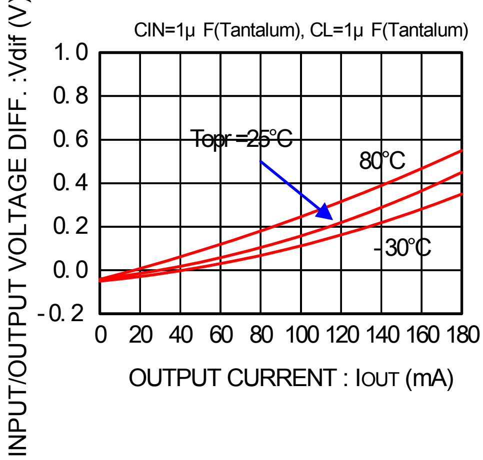
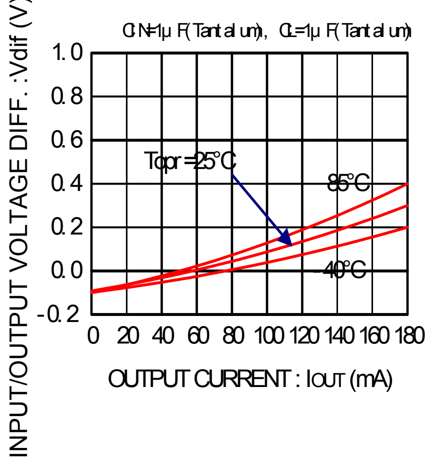
GS2911 (5V)



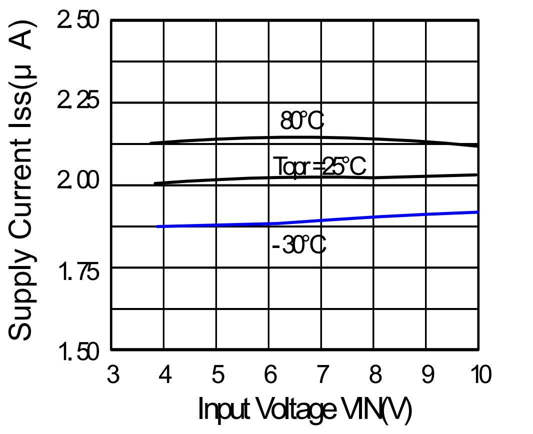
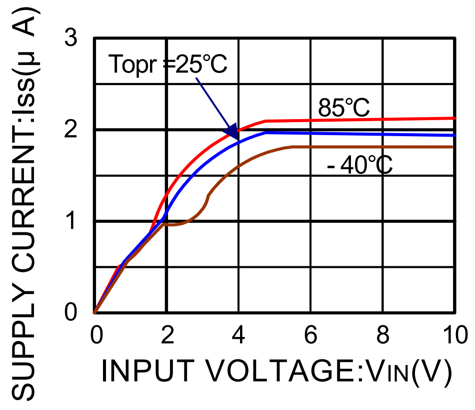
Output Voltage vs. Input Voltage

GS2911 (3.3V)	GS2911 (5V)
	
	

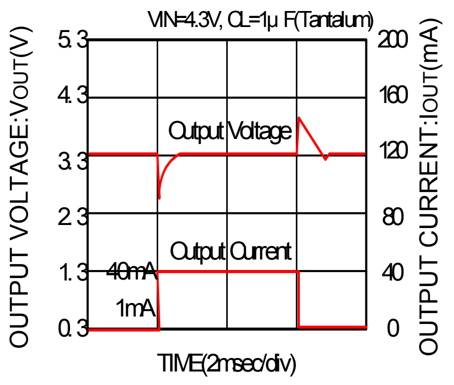
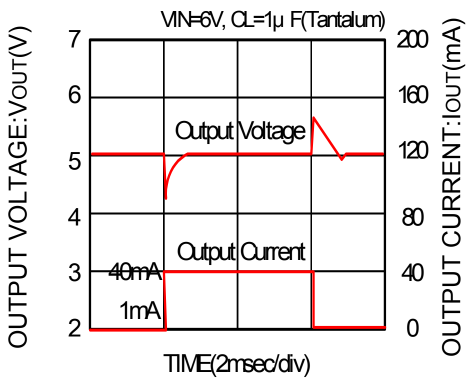
Input/Output Voltage Differential vs. Output Current

GS2911 (3.3V)	GS2911 (5V)
	

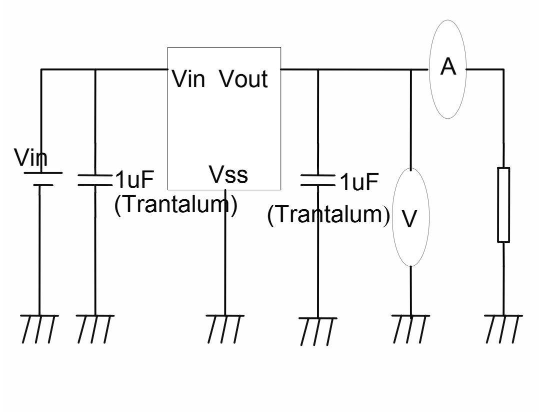
Supply Current vs. Input Voltage

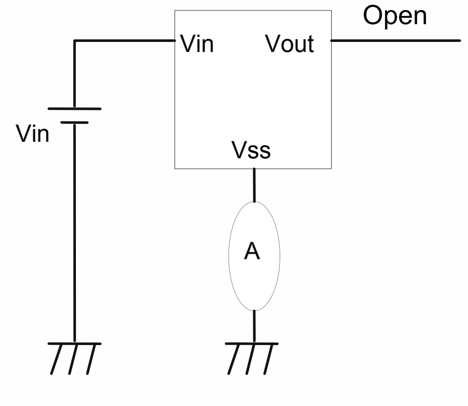
GS2911 (3.3V)	GS2911 (5V)
	

Load Transient Response

GS2911 (3.3V)	GS2911 (5V)
	

Typical Application Circuits



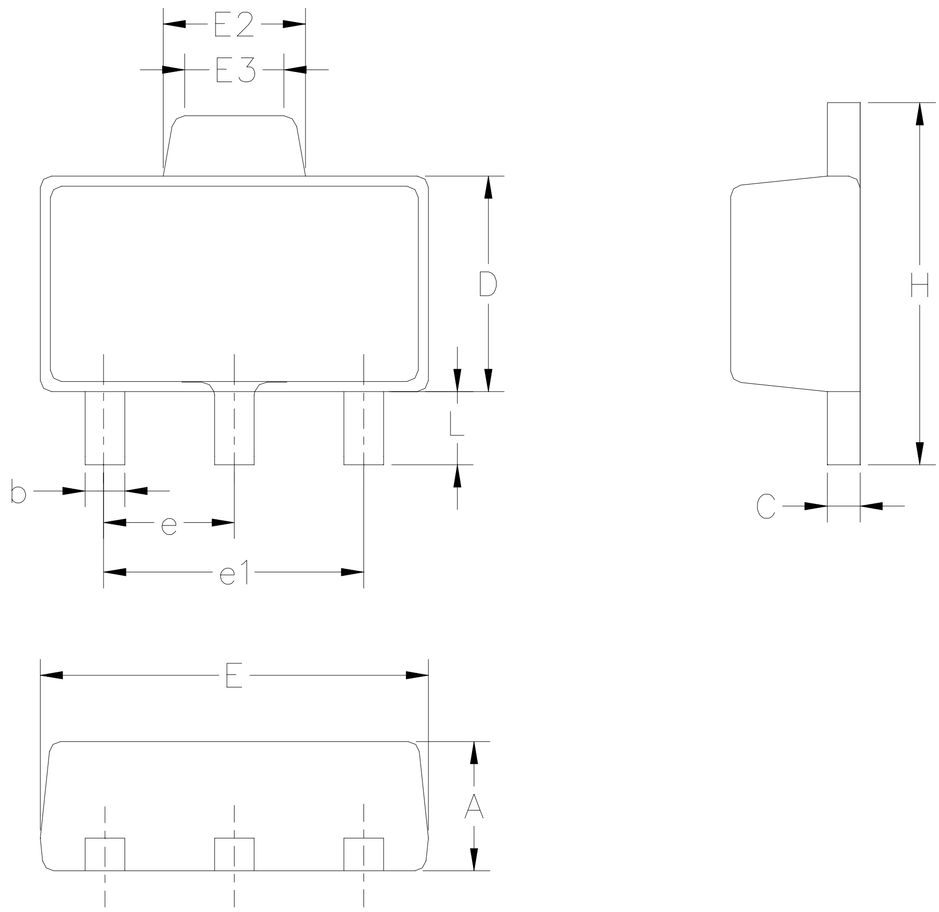


Notes on Use

1. There is a possibility that oscillation may occur as a result of the impedance present between the power supply and the IC's input. Where impedance is 10Ω or more, please use a capacitor (C_{IN}) of at least 1μF. With a large output current, operations can be stabilised by increasing capacitor size (C_{IN}). If C_{IN} is small and capacitor size (CL) is increased, there is a possibility of oscillation due to input impedance. In such cases, either increasing the size of C_{IN} or decreasing the size of CL can stabilize operations.
2. Please ensure that output current (I_{OUT}) is less than P_D + (V_{IN} - V_{OUT}) and does not exceed the stipulated Continuous Total Power Dissipation value (P_D).
3. Should you wish to increase output current (I_{OUT}) and/or have the capability to exceed the stipulated P_D value, using a current boost circuit (similar to the one shown below) is likely to lead to oscillation. With such applications, we recommend use of a boost type voltage regulator, such as the GS2911 series.

Package Dimension

SOT-89 PLASTIC PACKAGE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Min
A	1.450	1.550	0.570	0.061
b	0.440	0.480	0.017	0.019
C	0.360	0.400	0.014	0.016
E	4.450	4.550	0.175	0.179
E2	1.500	1.700	0.059	0.067
E3	1.400Ref		0.055Ref	
e	1.500BSC		0.059BSC	
e1	3.000BSC		0.118BSC	
H	4.150	4.250	0.163	0.167
D	2.450	2.550	0.096	0.100
L	0.900	1.100	0.035	0.043

TO-92 PLASTIC PACKAGE