PNP LOW DROPOUT REGULATOR TRANSISTOR

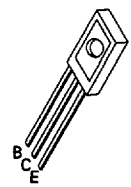
ZBD949

ISSUE 3 – NOVEMBER 1994

FEATURES

* Guaranteed h_{FE} specified up to 5 Amps
* Low collector-emitter saturation voltage
  - 0.11V Maximum at 1A
  - 0.45V Maximum at 5A

The high gain and very low saturation voltage produce a more effective solution than monolithic options

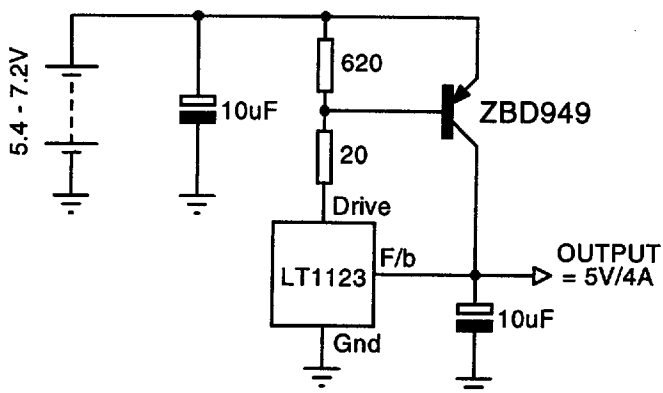


TO126

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-30	V
Emitter-Base Voltage	V_{EBO}	-6	V
Peak Pulse Current	I_{CM}	-20	A
Continuous Collector Current	I_C	-5	A
Power Dissipation at T_{amb}=25°C	P_{tot}	2	W
Power Dissipation at T_{case}=25°C	P_{tot}	25	W
Operating and Storage Temperature Range	T_j:T_{stg}	-55 to +200	°C

TYPICAL APPLICATION



5V Low Dropout Regulator

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ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

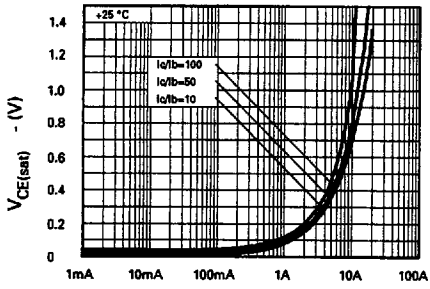
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	-80		V	I_C=-100μA
Collector-Emitter Breakdown Voltag	$V_{(BR)CER}$	-50	-80		V	I_C=-1μA, RB ≤1KΩ
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-30	-45		V	I_C=-10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-6	-8		V	I_E=-100μA
Collector Cut-Off Current	I_{CBO}			-50 -1	nA μA	V_{CB}=-40V V_{CB}=-40V, T_{amb}=100°C
Collector Cut-Off Current	I_{CER} R ≤1KΩ			-50 -1	nA μA	V_{CB}=-40V V_{CB}=-40V, T_{amb}=100°C
Emitter Cut-Off Current	I_{EBO}			-10	nA	V_{EB}=-6V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			-60 -110 -170 -450	mV mV mV mV	I_C=-0.5A, I_B=-20mA* I_C=-1A, I_B=-20mA* I_C=-2A, I_B=-200mA* I_C=-5A, I_B=-300mA*
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-1000	-1150	mV	I_C=-5A, I_B=-300mA*
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-950	-1100	mV	I_C=-5A, V_{CE}=-1V*
Static Forward Current Transfer Ratio	h_{FE}	100 100 75	200 200 140 35	350 300 300		I_C=-10mA, V_{CE}=-1V* I_C=-1A, V_{CE}=-1V* I_C=-5A, V_{CE}=-1V* I_C=-20A, V_{CE}=-1V*
Transition Frequency	f_T		100		MHz	I_C=-100mA, V_{CE}=-10V f=50MHz

*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤2%

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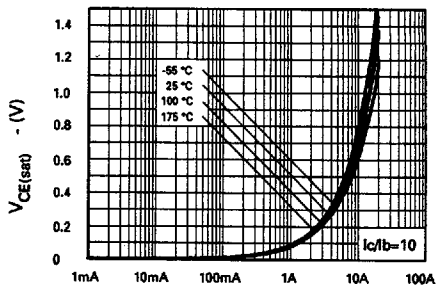
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TYPICAL CHARACTERISTICS



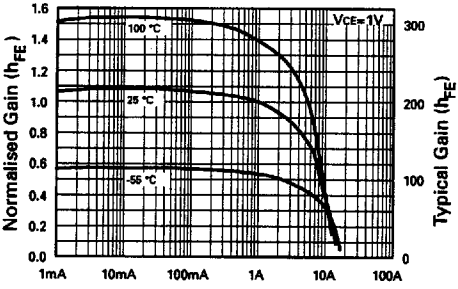
Ic - Collector Current

$V_{CE(sat)}$ v I_C



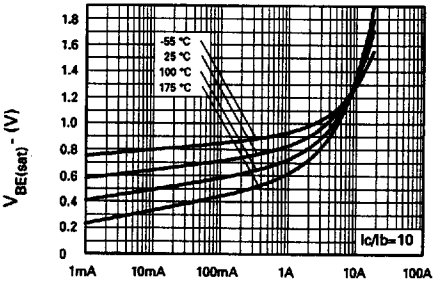
Ic - Collector Current

$V_{CE(sat)}$ v I_C



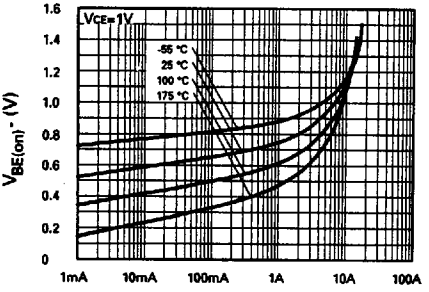
Ic - Collector Current

h_{FE} v I_C



Ic - Collector Current

$V_{BE(sat)}$ v I_C

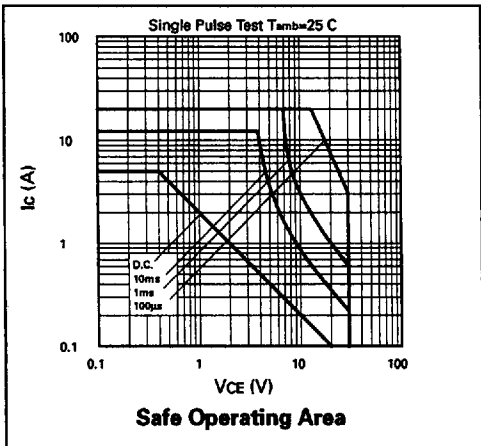


Ic - Collector Current

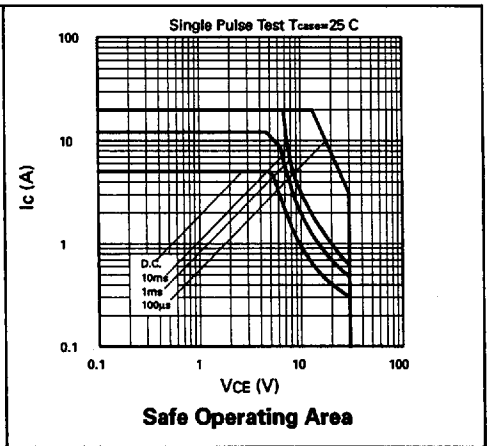
$V_{BE(on)}$ v I_C

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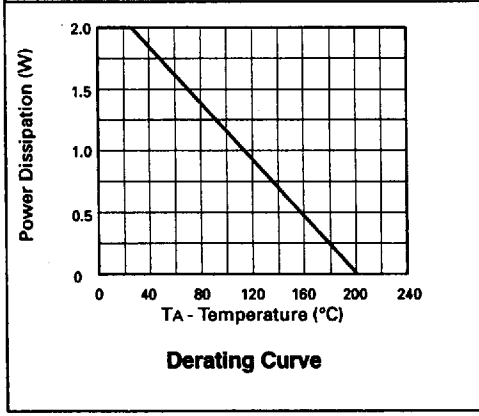
TYPICAL CHARACTERISTICS



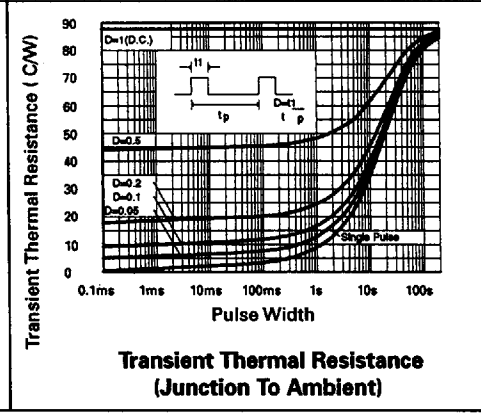
Safe Operating Area



Safe Operating Area



Derating Curve



Transient Thermal Resistance (Junction To Ambient)

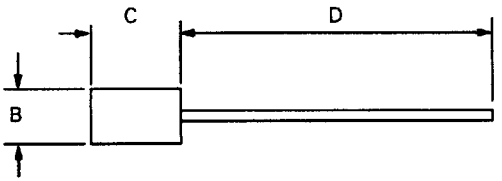
THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX	UNIT
Thermal resistance Junction to ambient Junction to case	 $R_{th(j\text{-}amb)}$ $R_{th(j\text{-}case)}$	 87.5 7	 °C/W °C/W

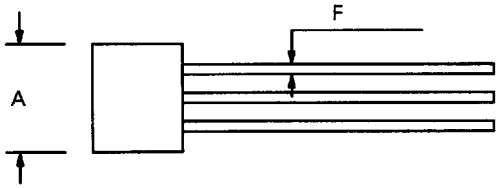
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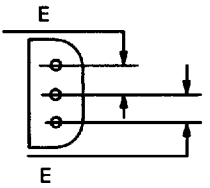
E-Line Package Dimensions

3 Pin Device



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.37	4.77	0.172	0.188
B	2.16	2.41	0.085	0.095
C	3.61	4.01	0.142	0.158
D	13.00	13.97	0.512	0.550
E	NOM 1.27		NOM 0.05	
F	0.37	0.495	0.016	0.0195

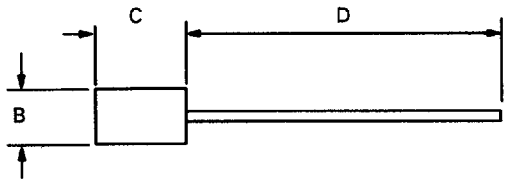




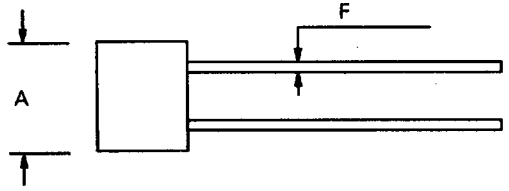
Leads to pass through a hole 0.7mm dia.

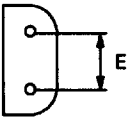
Various lead forms are offered, details of which are available on request.

2 Pin Device



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.37	4.77	0.172	0.188
B	2.16	2.41	0.085	0.095
C	3.61	4.01	0.142	0.158
D	13.00	13.97	0.512	0.550
E	NOM 2.54		NOM 0.10	
F	0.37	0.495	0.016	0.0195

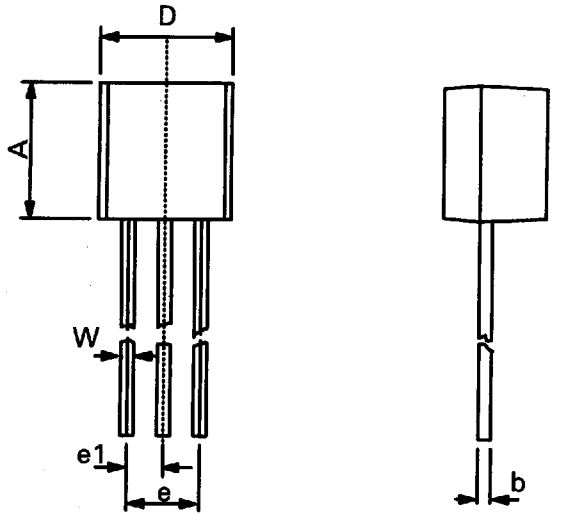




Leads to pass through a hole 0.7mm dia.

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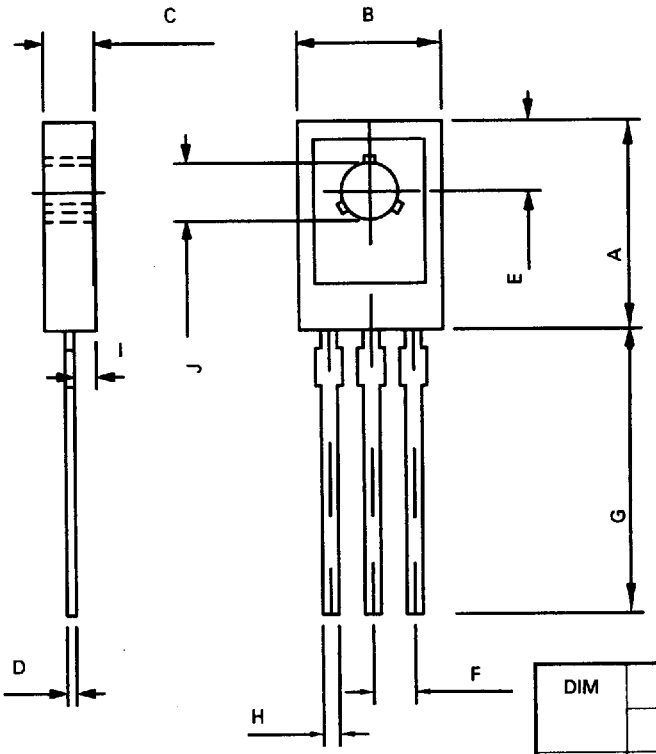
TO92 Package Dimensions



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.32	4.95	0.170	0.195
b	0.36	0.51	0.014	0.020
E	3.30	3.94	0.130	0.155
e	2.41	2.67	0.095	0.105
e1	1.14	1.40	0.045	0.055
L	12.70	15.49	0.500	0.610
R	2.16	2.41	0.085	0.095
S1	1.14	1.52	0.045	0.060
W	0.41	0.56	0.016	0.022
D	4.45	4.95	0.175	0.195
*°	4°	6°	4°	6°

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TO126 Package Dimensions



DIM	Millimeters	
	Min	Max
A		11.1
B		7.80
C		2.80
D	0.50 typical	
E	3.75 typical	
F	2.29 typical	
G	15.3	
H		0.88
I	1.2 typical	
J	3.00	3.20

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