



PN2222A

SMALL SIGNAL NPN TRANSISTOR

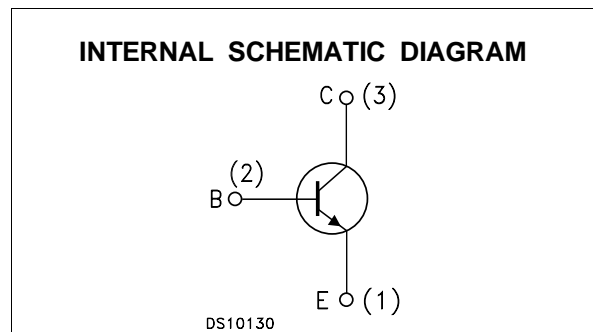
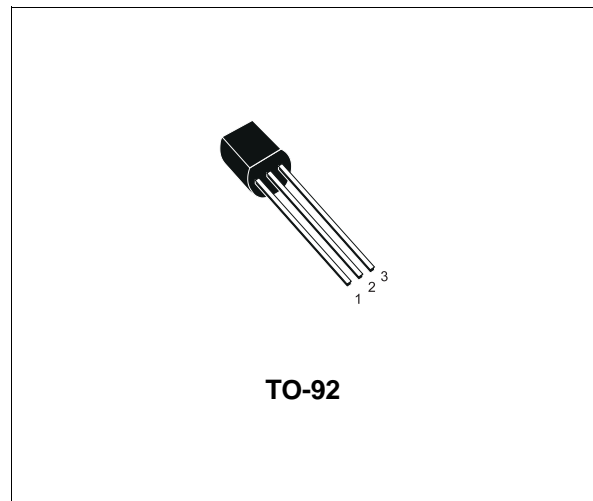
PRELIMINARY DATA

Type	Marking
PN2222A	PN2222A

- SILICON EPITAXIAL PLANAR NPN TRANSISTOR
- TO-92 PACKAGE SUITABLE FOR THROUGH-HOLE PCB ASSEMBLY
- THE PNP COMPLEMENTARY TYPE IS PN2907A

APPLICATIONS

- WELL SUITABLE FOR TV AND HOME APPLIANCE EQUIPMENT
- SMALL LOAD SWITCH TRANSISTOR WITH HIGH GAIN AND LOW SATURATION VOLTAGE



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Emitter Voltage ($I_E = 0$)	75	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	40	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	6	V
I_{CM}	Collector Peak Current	0.8	A
P_{tot}	Total Dissipation at $T_C = 25^\circ\text{C}$	500	mW
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

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THERMAL DATA

R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	250	°C/W
R _{thj-case}	Thermal Resistance Junction-Case	Max	83.3	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CEX}	Collector Cut-off Current (V _{BE} = -3 V)	V _{CE} = 60 V			10	nA
I _{BEX}	Base Cut-off Current (V _{BE} = -3 V)	V _{CE} = 60 V			20	nA
I _{CBO}	Collector Cut-off Current (I _E = 0)	V _{CB} = 75 V V _{CB} = 75 V T _C = 150 °C			10 10	nA μA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} = 3 V			15	nA
V _{(BR)CEO} *	Collector-Emitter Breakdown Voltage (I _B = 0)	I _C = 10 mA	40			V
V _{(BR)CBO}	Collector-Base Breakdown Voltage (I _E = 0)	I _C = 10 μA	75			V
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 μA	6			V
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 150 mA I _B = 15 mA I _C = 500 mA I _B = 50 mA			0.3 1	V V
V _{BE(sat)} *	Collector-Base Saturation Voltage	I _C = 150 mA I _B = 15 mA I _C = 500 mA I _B = 50 mA	0.6		1.2 2	V V
h _{FE} *	DC Current Gain	I _C = 0.1 mA V _{CE} = 10 V I _C = 1 mA V _{CE} = 10 V I _C = 10 mA V _{CE} = 10 V I _C = 150 mA V _{CE} = 10 V I _C = 150 mA V _{CE} = 1 V I _C = 500 mA V _{CE} = 10 V	35 50 75 100 50 40		300	
f _T	Transition Frequency	I _C = 20 mA V _{CE} = 20V f = 100MHz		270		MHz
C _{CBO}	Collector-Base Capacitance	I _E = 0 V _{CB} = 10 V f = 1 MHz		4	8	pF
C _{EBO}	Emitter-Base Capacitance	I _C = 0 V _{EB} = 0.5 V f = 1MHz		20	25	pF
NF	Noise Figure	I _C = 0.1 mA V _{CE} = 10 V f = 1 KHz Δf = 200 Hz R _G = 1 KΩ		4		dB
h _{ie} *	Input Impedance	V _{CE} = 10 V I _C = 1 mA f = 1 KHz V _{CE} = 10 V I _C = 10 mA f = 1 KHz	2 0.25		8 1.25	KΩ KΩ
h _{re} *	Reverse Voltage Ratio	V _{CE} = 10 V I _C = 1 mA f = 1 KHz V _{CE} = 10 V I _C = 10 mA f = 1 KHz			8 4	10 ⁻⁴ 10 ⁻⁴
h _{fe} *	Small Signal Current Gain	V _{CE} = 10 V I _C = 1 mA f = 1 KHz V _{CE} = 10 V I _C = 10 mA f = 1 KHz	50 75		300 375	
h _{oe} *	Output Admittance	V _{CE} = 10 V I _C = 1 mA f = 1 KHz V _{CE} = 10 V I _C = 10 mA f = 1 KHz	5 25		35 200	μS μS

* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

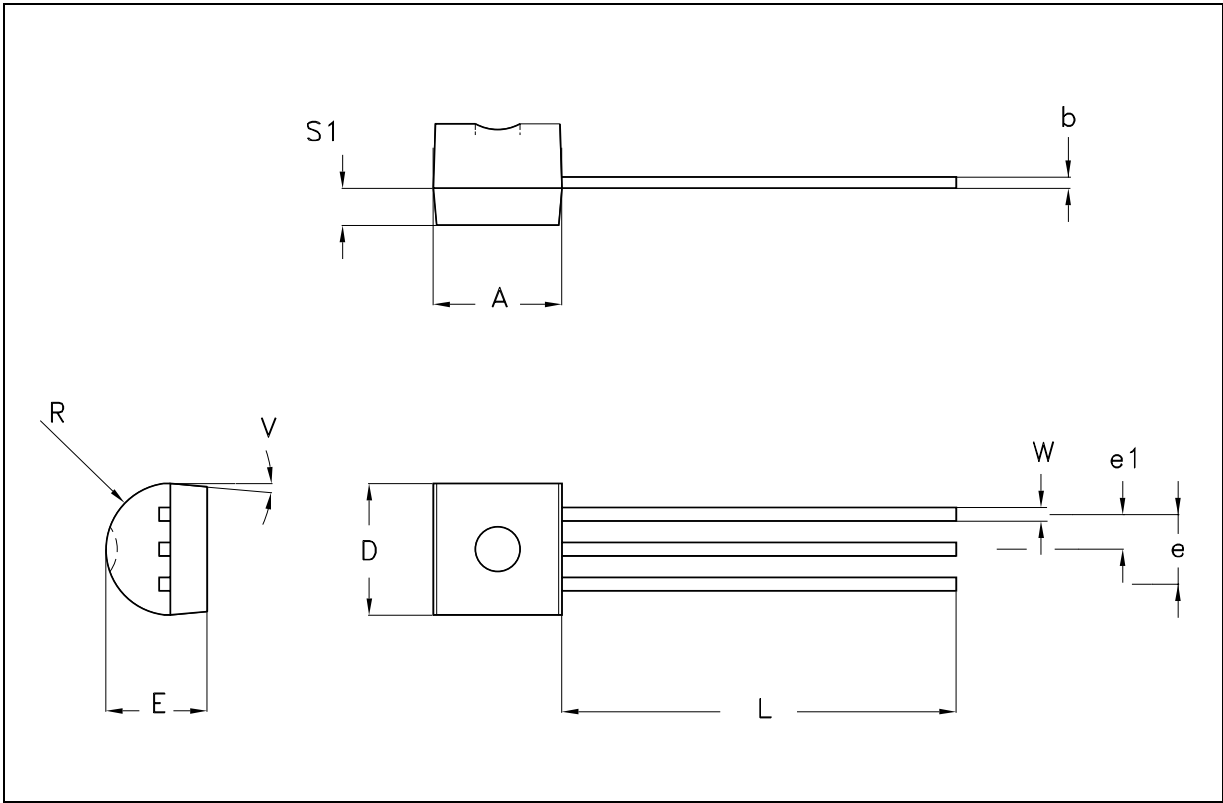
ELECTRICAL CHARACTERISTICS (Continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_d	Delay Time	$I_C = 150 \text{ mA}$ $I_B = 15 \text{ mA}$		5	10	ns
t_r	Rise Time	$V_{CC} = 30 \text{ V}$		12	25	ns
t_s	Storage Time	$I_C = 150 \text{ mA}$ $I_{B1} = - I_{B2} = 15 \text{ mA}$		185	225	ns
t_f	Fall Time	$V_{CC} = 30 \text{ V}$		24	60	ns

* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 2\%$

TO-92 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.32		4.95	0.170		0.195
b	0.36		0.51	0.014		0.020
D	4.45		4.95	0.175		0.194
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		0.609
R	2.16		2.41	0.085		0.094
S1	1.14		1.52	0.045		0.059
W	0.41		0.56	0.016		0.022
V	4 degree		6 degree	4 degree		6 degree



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