



2N3501UB

Silicon NPN Transistor

Data Sheet

Description

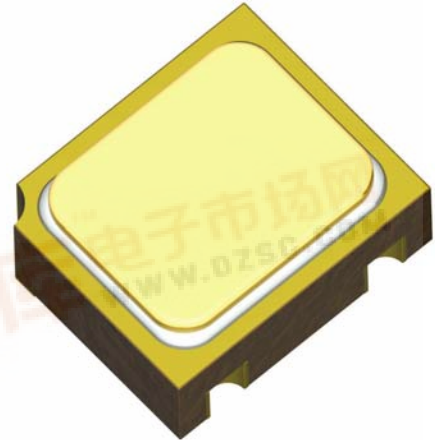
Semicoa Semiconductors offers:

- Screening and processing per MIL-PRF-19500 Appendix E
- JAN level (2N3501UBJ)
- JANTX level (2N3501UBJX)
- JANTXV level (2N3501UBJV)
- JANS level (2N3501UBJS)
- QCI to the applicable level
- 100% die visual inspection per MIL-STD-750 method 2072 for JANTXV and JANS
- Radiation testing (total dose) upon request

Please contact Semicoa for special configurations
www.SEMICOA.com or (714) 979-1900

Applications

- General purpose
- Low power
- NPN silicon transistor



Features

- Hermetically sealed TO-39 metal can
- Also available in chip configuration
- Chip geometry 5620
- Reference document: MIL-PRF-19500/366

Benefits

- Qualification Levels: JAN, JANTX, JANTXV and JANS
- Radiation testing available

Absolute Maximum Ratings

T_C = 25°C unless otherwise specified

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V _{CEO}	150	Volts
Collector-Base Voltage	V _{CBO}	150	Volts
Emitter-Base Voltage	V _{EBO}	6	Volts
Collector Current, Continuous	I _C	300	mA
Power Dissipation, T _A = 25°C Derate linearly above 25°C	P _T	.5 3.08	W mW/°C
Thermal Resistance	R _{θJA}	325	°C/W
Operating Junction Temperature	T _J	-65 to +200	°C
Storage Temperature	T _{STG}	-65 to +200	°C



ELECTRICAL CHARACTERISTICS

characteristics specified at $T_A = 25^\circ\text{C}$

Off Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}$	150			Volts
Collector-Base Cutoff Current	I_{CBO1}	$V_{CB} = 150\text{ Volts}$			10	μA
	I_{CBO2}	$V_{CB} = 75\text{ Volts}$			50	nA
	I_{CBO3}	$V_{CB} = 75\text{ Volts}, T_A = 150^\circ\text{C}$			50	μA
Collector-Emitter Cutoff Current	I_{CEO}	$V_{CE} = 120\text{ Volts}$			1	μA
Emitter-Base Cutoff Current	I_{EBO1}	$V_{EB} = 6\text{ Volts}$			10	μA
	I_{EBO2}	$V_{EB} = 4\text{ Volts}$			25	nA

On Characteristics

Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
DC Current Gain	h_{FE1}	$I_C = 0.1\text{ mA}, V_{CE} = 10\text{ Volts}$	35			
	h_{FE2}	$I_C = 1.0\text{ mA}, V_{CE} = 10\text{ Volts}$	50			
	h_{FE3}	$I_C = 10\text{ mA}, V_{CE} = 10\text{ Volts}$	75			
	h_{FE4}	$I_C = 1500\text{ mA}, V_{CE} = 10\text{ Volts}$	100		300	
	h_{FE5}	$I_C = 300\text{ mA}, V_{CE} = 10\text{ Volts}$	20			
	h_{FE7}	$I_C = 150\text{ mA}, V_{CE} = 10\text{ Volts}$ $T_A = -55^\circ\text{C}$	45			
Base-Emitter Saturation Voltage	V_{BEsat1}	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$			0.8	Volts
	V_{BEsat2}	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			1.2	
Collector-Emitter Saturation Voltage	V_{CEsat1}	$I_C = 10\text{ mA}, I_B = 1\text{ mA}$			0.2	Volts
	V_{CEsat2}	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			0.4	

Dynamic Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Magnitude – Common Emitter, Short Circuit Forward Current Transfer Ratio	$ h_{FE} $	$V_{CE} = 20\text{ Volts}, I_C = 20\text{ mA}, f = 100\text{ MHz}$	1.5		8	
Small Signal Short Circuit Forward Current Transfer Ratio	h_{FE}	$V_{CE} = 10\text{ Volts}, I_C = 10\text{ mA}, f = 1\text{ kHz}$	75		375	
Open Circuit Output Capacitance	C_{OBO}	$V_{CB} = 10\text{ Volts}, I_E = 0\text{ mA}, 100\text{ kHz} < f < 1\text{ MHz}$			8	pF
Open Circuit Input Capacitance	C_{IBO}	$V_{EB} = 0.5\text{ Volts}, I_C = 0\text{ mA}, 100\text{ kHz} < f < 1\text{ MHz}$			80	pF
Noise Figure	NF_1	$V_{CE} = 10\text{ Volts}, I_C = 0.5\text{ mA}, f = 1\text{ kHz}, R_g = 1\text{ k}\Omega$			16	dB
	NF_2	$V_{CE} = 10\text{ Volts}, I_C = 0.5\text{ mA}, f = 10\text{ kHz}, R_g = 1\text{ k}\Omega$			6	

Switching Characteristics

Saturated Turn-On Time	t_{ON}	$V_{EB} = 5\text{ Volts}, I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$			115	ns
Saturated Turn-Off Time	t_{OFF}	$I_C = 150\text{ mA}, I_{B1}=I_{B2}=15\text{ mA}$			1,150	ns