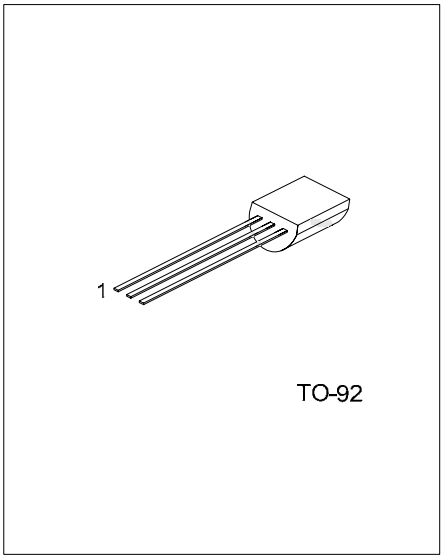
2N4403

PNP SILICON TRANSISTOR

PNP GENERAL PURPOSE AMPLIFIER



*Pb-free plating product number: 2N4403L

■ DESCRIPTION

The UTC **2N4403** is designed for use as a general purpose amplifier and switch requiring collector currents up to 500mA.

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
2N4403-T92-B	2N4403L-T92-B	TO-92	E	B	C	Tape Box
2N4403-T92-K	2N4403L-T92-K	TO-92	E	B	C	Bulk

2N4403L-T92-B (1)Packing Type (2)Package Type (3)Lead Plating	(1) B: Tape Box, K: Bulk (2) T92: TO-92 (3) L: Lead Free Plating, Blank: Pb/Sn

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current-Continuous	I_C	-600	mA
Total Device Dissipation	P_C	625	mW
Derate above 25°C		5.0	mW/°C
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

■ THERMAL DATA (Ta=25°C, unless otherwise specified)

CHARACTERISTIC	SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction to Ambient	θ_{JA}	200	°C/W
Thermal Resistance, Junction to Case	θ_{JC}	83.3	°C/W

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note)	BV_{CEO}	I_C=-1mA, I_B=0	-40			V
Collector-Base Breakdown Voltage	BV_{CBO}	Ic=-0.1mA, I_E=0	-40			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=-0.1mA, I_C=0	-5			V
Collector Cut-off Current	I_{CEX}	V_{CE}=-35V, V_{EB}=-0.4V			-0.1	μA
Base Cut-off Current	I_{BEX}	V_{CE}=-35V, V_{BE}=-0.4V			-0.1	μA
ON CHARACTERISTICS*						
DC Current Gain	h_{FE1}	V_{CE}=-1V,I_C=-0.1mA	30			
	h_{FE2}	V_{CE}=-1V,I_C=-1mA	60			
	h_{FE3}	V_{CE}=-1V,I_C=-10mA	100			
	h_{FE4}	V_{CE}=-2V, I_C=-150mA (Note)	100		300	
	h_{FE5}	V_{CE}=-2V, I_C=-500mA (Note)	20			
Collector-Emitter Saturation Voltage	$V_{CE(SAT1)}$	I_C=-150mA, I_B=-15mA			-0.4	V
	$V_{CE(SAT2)}$	I_C=-500mA, I_B=-50mA			-0.75	V
Base-Emitter Saturation Voltage	$V_{BE(SAT1)}$	I_C=-150mA, I_B=-15mA(Note)	-0.75		-0.95	V
	$V_{BE(SAT2)}$	I_C=-500mA, I_B=-50mA			-1.3	V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f_T	V_{CE}=-10V, I_C=-20mA, f=100MHz	200			MHz
Collector-Base Capacitance	Ccb	V_{CB}=-10V, I_E=0, f=140kHz			8.5	pF
Emitter-Base Capacitance	Ceb	V_{BE}=-0.5V, I_C=0, f=140kHz			30	pF
Input Impedance	h_{IE}	V_{CE}=-10V, I_C=-1mA, f=1kHz	1.5		15	kΩ
Voltage Feedback Ratio	h_{RE}	V_{CE}=-10V, I_C=-1mA, f=1kHz	0.1		8	$\times10^{-4}$
Small-Signal Current Gain	h_{FE}	V_{CE}=-10V, I_C=-1mA, f=1kHz	60		500	
Output Admittance	h_{OE}	V_{CE}=-10V, I_C=-1mA, f=1kHz	1.0		100	μmbos
SWITCHING CHARACTERISTICS						
Delay Time	t_D	V_{CC}=-30V, I_C=-150mA I_{B1}=-15mA			15	ns
Rise Time	t_R				20	ns
Storage Time	t_S	V_{CC}=-30V, I_C=-150mA			225	ns
Fall Time	t_F	I_{B1}= I_{B2}=-15mA			30	ns

Note: Pulse test: Pulse Width≤300μs, Duty Cycle≤2%

■ TEST CIRCUIT

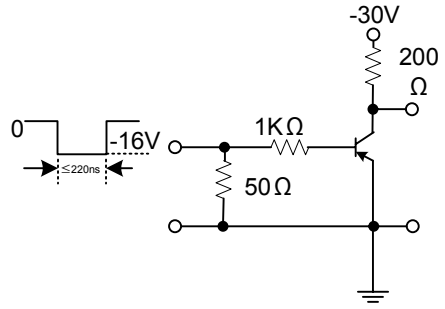


Figure 1. Saturated Turn-On Switching Timer

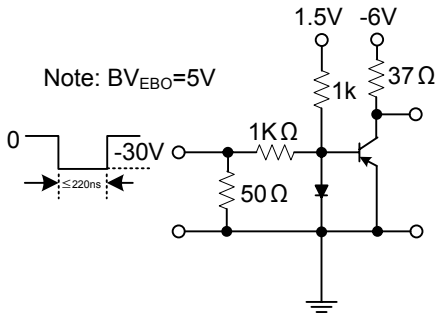
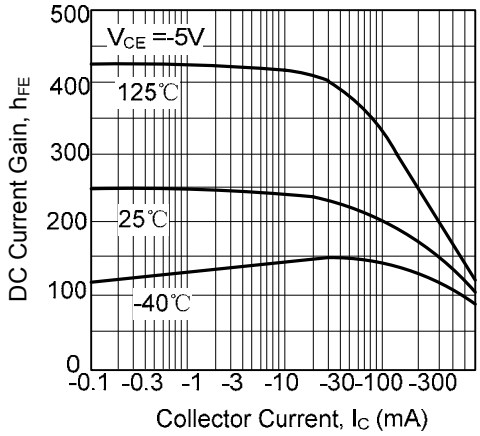


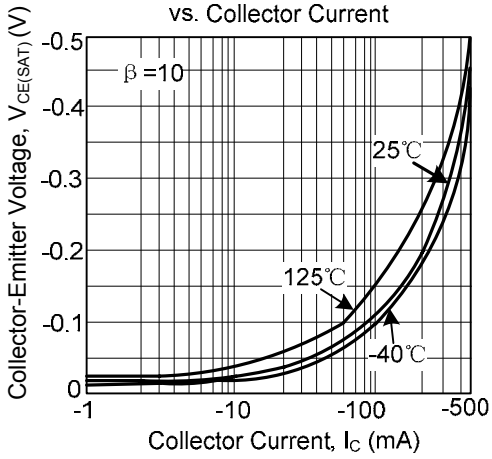
Figure 2. Saturated Turn-Off Switching Timer

■ TYPICAL CHARACTERISTICS

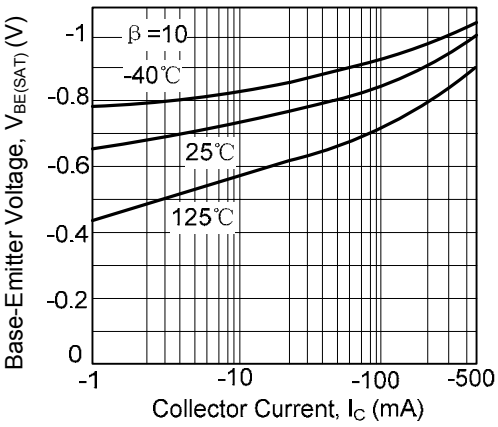
DC Current Gain
vs. Collector Current



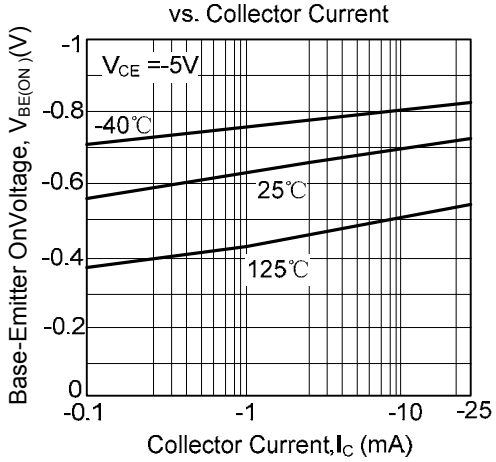
Collector-Emitter Saturation Voltage
vs. Collector Current



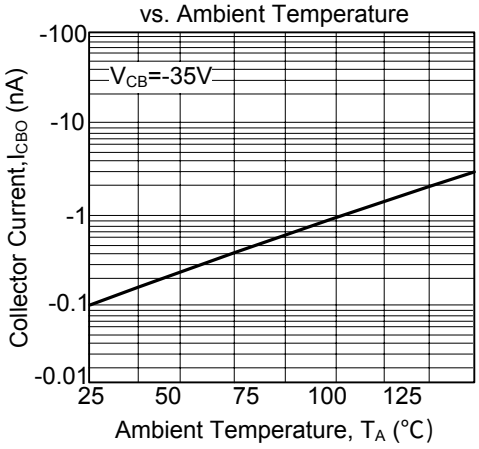
Base-Emitter Saturation Voltage
vs. Collector Current



Base-Emitter On Voltage
vs. Collector Current



Collector-Cutoff Current
vs. Ambient Temperature



Input and Output
Capacitance vs. Reverse Bias Voltage