



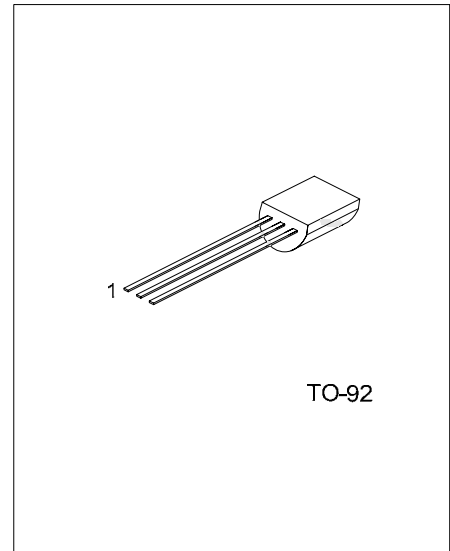
2N4403

PNP SILICON TRANSISTOR

PNP GENERAL PURPOSE AMPLIFIER

DESCRIPTION

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



\*Pb-free plating product number: 2N4403L

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

<p>2N4403L-T92-B</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) B: Tape Box, K: Bulk (2) T92: TO-92 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
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■ ABSOLUTE MAXIMUM RATINGS (Ta=25 , 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 Derate above 25	$P_C$	625	mW
		5.0	mW/
Junction Temperature	$T_J$	+150	
Storage Temperature	$T_{STG}$	-55 ~ +150	

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 , unless otherwise specified)

CHARACTERISTIC	SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction to Ambient	$\theta_{JA}$	200	/W
Thermal Resistance, Junction to Case	$\theta_{JC}$	83.3	/W

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Collector-Emitter Breakdown Voltage (Note)	$BV_{CEO}$	$I_C=-1mA, I_B=0$	-40			V
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C=-0.1mA, I_E=0$	-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	$\mu A$
Base Cut-off Current	$I_{BEX}$	$V_{CE}=-35V, V_{BE}=-0.4V$			-0.1	$\mu A$
<b>ON CHARACTERISTICS*</b>						
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
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	$V_{CE}=-10V, I_C=-20mA, f=100MHz$	200			MHz
Collector-Base Capacitance	$C_{cb}$	$V_{CB}=-10V, I_E=0, f=140kHz$			8.5	pF
Emitter-Base Capacitance	$C_{eb}$	$V_{BE}=-0.5V, I_C=0, f=140kHz$			30	pF
Input Impedance	$h_{iE}$	$V_{CE}=-10V, I_C=-1mA, f=1kHz$	1.5		15	k $\Omega$
Voltage Feedback Ratio	$h_{RE}$	$V_{CE}=-10V, I_C=-1mA, f=1kHz$	0.1			$\times 10^{-4}$
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	$\mu mhos$
<b>SWITCHING CHARACTERISTICS</b>						
Delay Time	$t_D$	$V_{CC}=-30V, I_C=-150mA, I_{B1}=-15mA$				ns
Rise Time	$t_R$					20
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 $\leq$ 300 $\mu s$ , Duty Cycle $\leq$ 2%

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■ TEST CIRCUIT

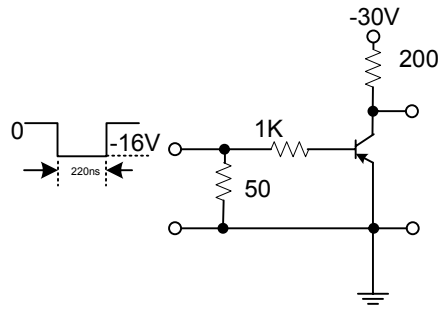


Figure 1. Saturated Turn-On Switching Timer

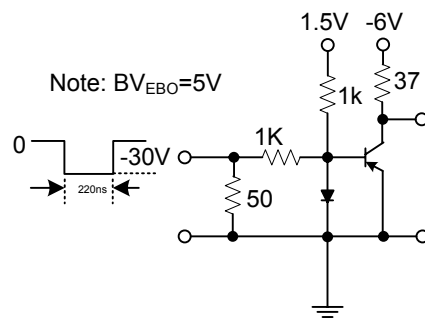
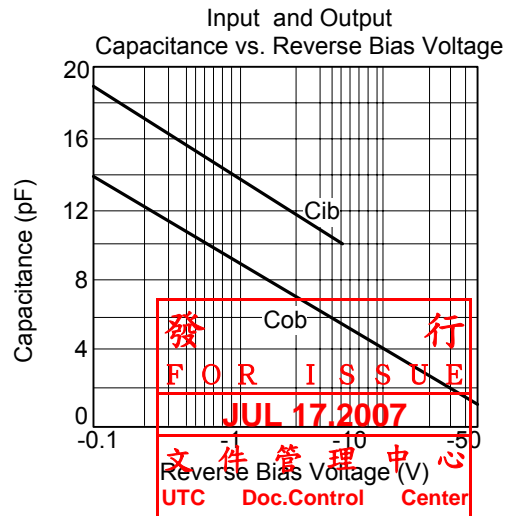
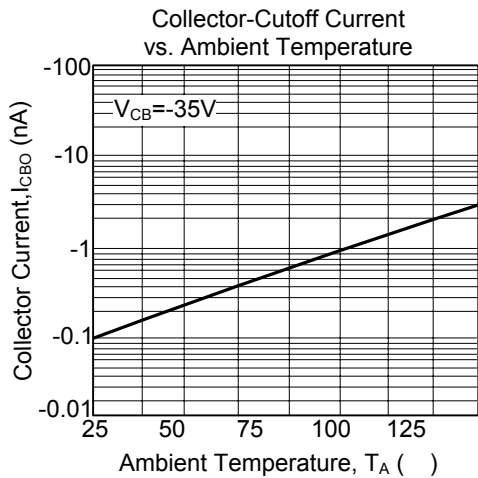
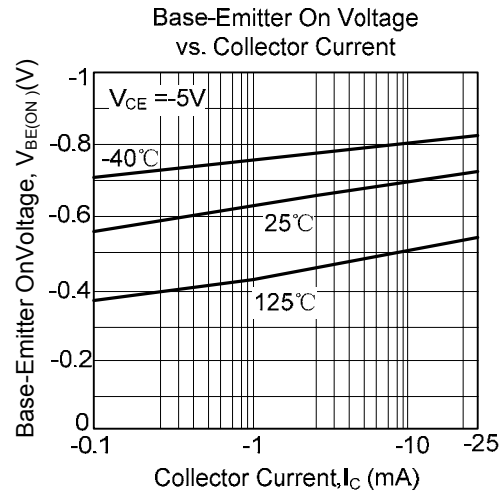
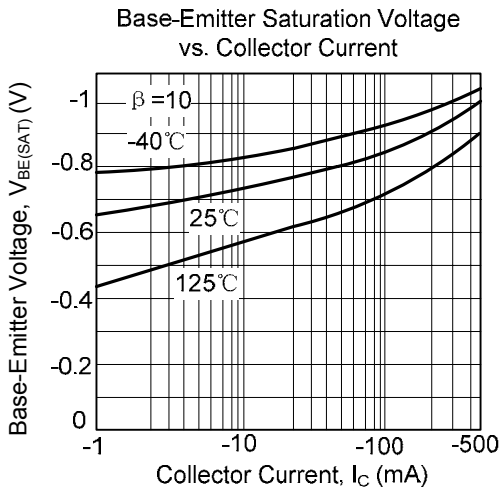
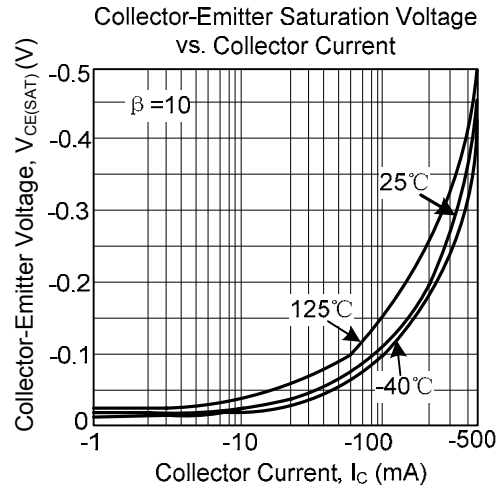
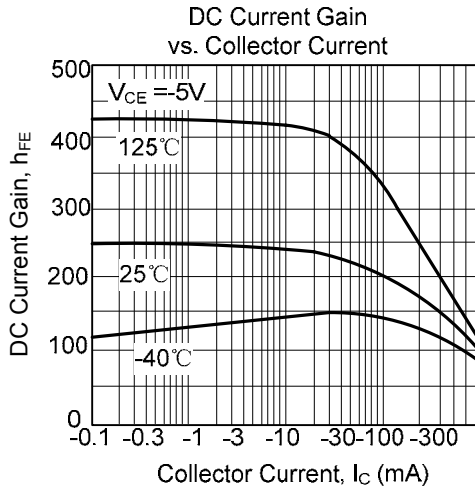


Figure 2. Saturated Turn-Off Switching Timer

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## TYPICAL CHARACTERISTICS



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