



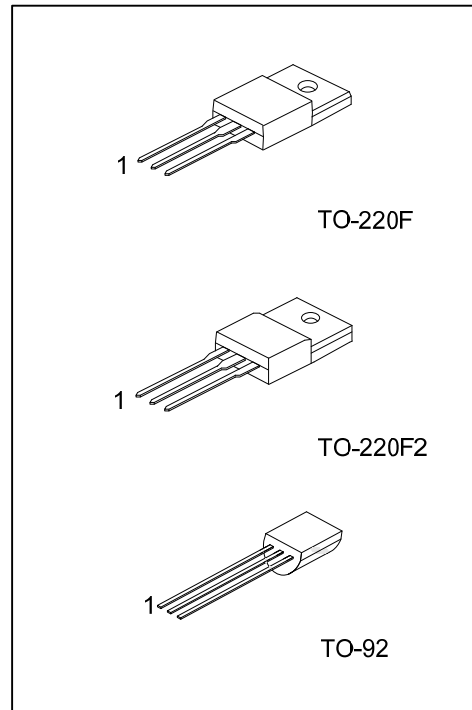
# X1049A

## NPN SILICON TRANSISTOR

### HIGH GAIN TRANSISTOR

■ FEATURES

- \*  $V_{CEV} = 80V$
- \* High Gain
- \* 20 Amps pulse current



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
X1049AL-TF3-T	X1049AG-TF3-T	TO-220F	B	C	E	Tube
X1049AL-TF2-T	X1049AG-TF2-T	TO-220F2	B	C	E	Tube
X1049AL-T92-B	X1049AG-T92-B	TO-92	E	B	C	Tape Box
X1049AL-T92-K	X1049AG-T92-K	TO-92	E	B	C	Bulk

Note: Pin Assignment: B: Base C: Collector E: Emitter

<p>X1049AG-TF3-T</p>	<p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, B: Tape Box, K: Bulk (2) TF3: TO-220F, TF2: TO-220F2, T92: TO-92 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

TO-220F / TO-220F2	TO-92

■ ABSOLUTE MAXIMUM RATING ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		$V_{CBO}$	80	V
Collector-Emitter Voltage		$V_{CEO}$	25	V
Emitter-Base Voltage		$V_{EBO}$	5	V
Collector Current	DC	$I_C$	4	A
	Pulse		20	A
Base Current		$I_B$	500	mA
Power Dissipation ( $T_A=25^{\circ}\text{C}$ )	TO-220F	$P_D$	2	W
	TO-220F2		2.1	
	TO-92		1	
Junction Temperature		$T_J$	125	$^{\circ}\text{C}$
Operating Temperature		$T_{OPR}$	-20 ~ +85	$^{\circ}\text{C}$
Storage Temperature		$T_{STG}$	-40 ~ +150	$^{\circ}\text{C}$

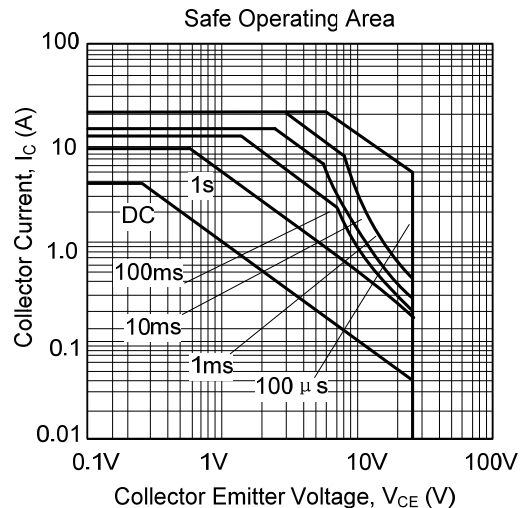
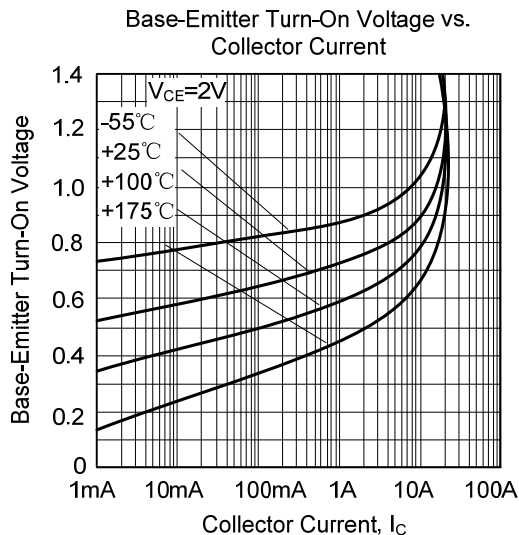
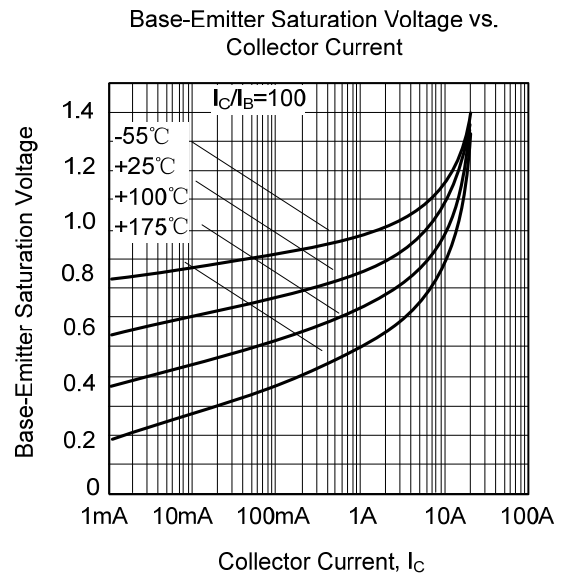
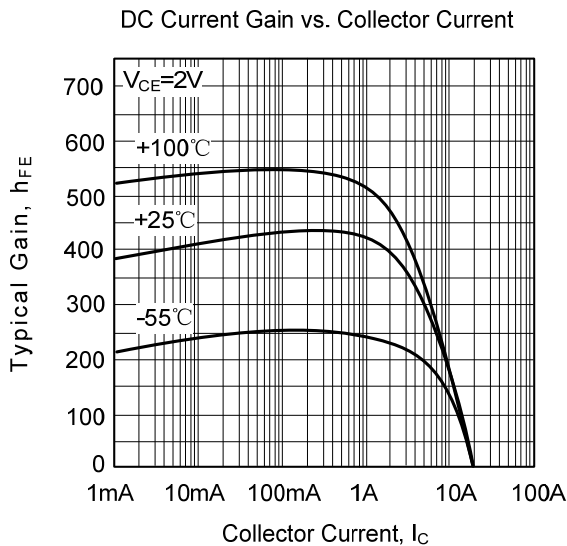
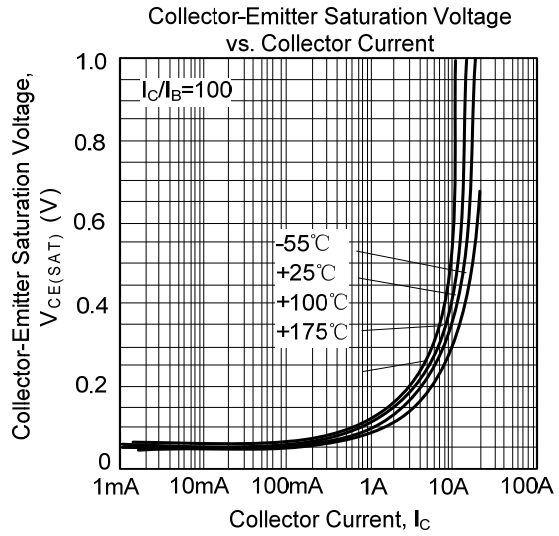
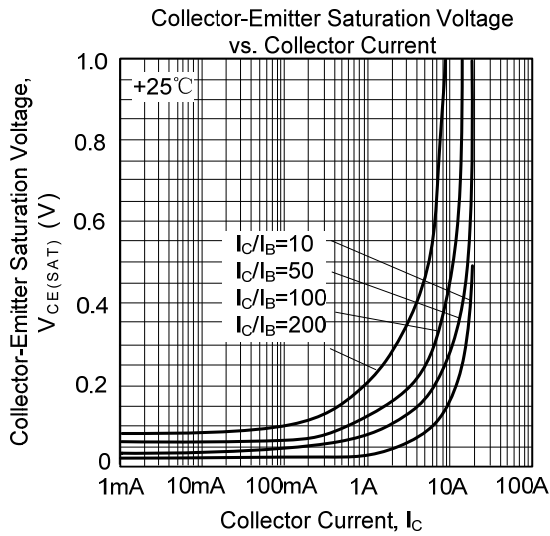
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

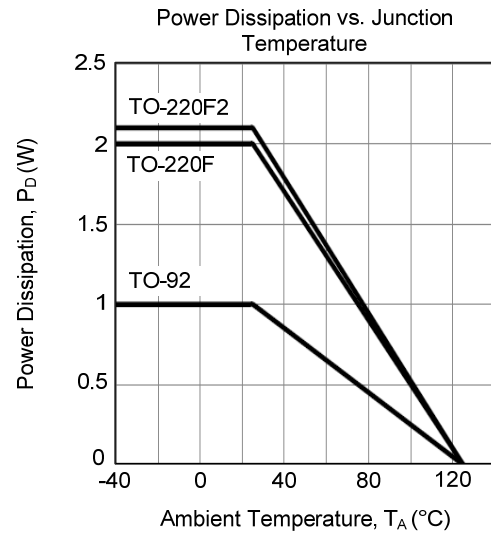
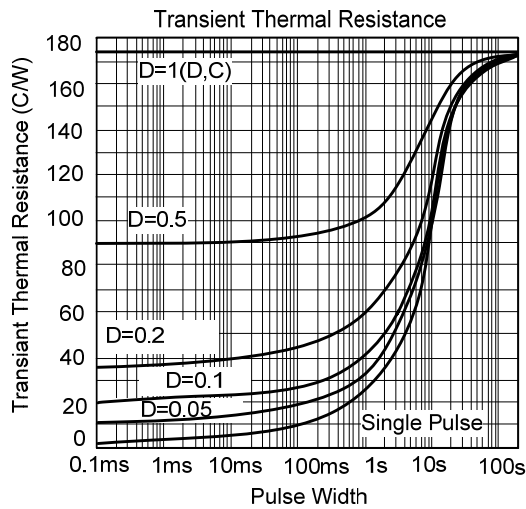
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$V_{CBO}$	$I_C=100\mu\text{A}$	80	120		V
Collector-Emitter Breakdown Voltage	$V_{CEO}$	$I_C=10\text{mA}$	25	35		V
Collector-Emitter Breakdown Voltage	$V_{CES}$	$I_C=100\mu\text{A}$	80	120		V
Collector-Emitter Breakdown Voltage	$V_{CEV}$	$I_C=100\mu\text{A}, V_{EB}=1\text{V}$	80	120		V
Emitter-Base Breakdown Voltage	$V_{EBO}$	$I_E=100\mu\text{A}$	5	8.75		V
Collector Cut-Off Current	$I_{CBO}$	$V_{CB}=50\text{V}$		0.3	10	nA
Emitter Cut-Off Current	$I_{EBO}$	$V_{EB}=4\text{V}$		0.3	10	nA
Collector Emitter Cut-Off Current	$I_{CES}$	$V_{CES}=50\text{V}$		0.3	10	nA
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=0.5\text{A}, I_B=10\text{mA}$		30	70	mV
		$I_C=1\text{A}, I_B=10\text{mA}$		60	130	
		$I_C=2\text{A}, I_B=10\text{mA}$		125	280	
		$I_C=4\text{A}, I_B=50\text{mA}$		155	400	
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=4\text{A}, I_B=50\text{mA}$		890	980	mV
Base-Emitter Turn-On Voltage (Note)	$V_{BE(ON)}$	$I_C=4\text{A}, V_{CE}=2\text{V}$		820	920	mV
DC Current Gain (Note)	$h_{FE}$	$I_C=10\text{mA}, V_{CE}=2\text{V}$	250	430		
		$I_C=0.5\text{A}, V_{CE}=2\text{V}$	300	450		
		$I_C=1\text{A}, V_{CE}=2\text{V}$	300	450	1200	
		$I_C=4\text{A}, V_{CE}=2\text{V}$	200	350		
		$I_C=20\text{A}, V_{CE}=2\text{V}$	7			
Transition Frequency	$f_T$	$I_C=50\text{mA}, V_{CE}=10\text{V}, f=50\text{MHz}$		180		MHz
Output Capacitance	$C_{OBO}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		45	60	pF
Turn-On Time	$t_{ON}$	$I_C=4\text{A}, I_B=40\text{mA}, V_{CC}=10\text{V}$		125		ns
Turn-Off Time	$t_{OFF}$	$I_C=4\text{A}, I_B=\pm 40\text{mA}, V_{CC}=10\text{V}$		380		ns

Note: Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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