

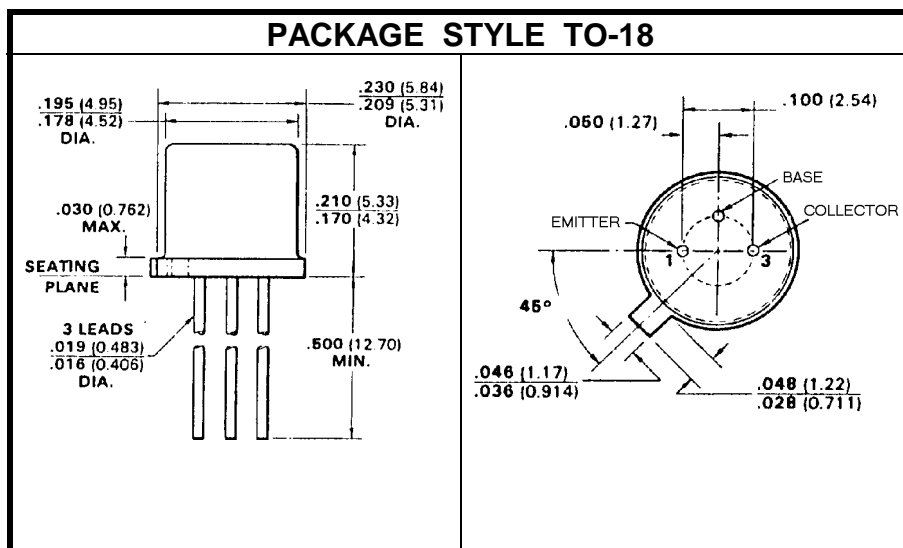
# SILICON NPN TRANSISTOR

## DESCRIPTION:

The **ASI 2N4013** is Designed for General Purpose Switching and Amplifier Applications.

## MAXIMUM RATINGS

$I_C$	1.0 A
$V_{CEO}$	30 V
$V_{CBO}$	50 V
$V_{EBO}$	6.0 V
$P_{DISS}$	1.4 W @ $T_C = 25^\circ\text{C}$
$T_J$	$-65^\circ\text{C}$ to $+200^\circ\text{C}$
$T_{STG}$	$-65^\circ\text{C}$ to $+200^\circ\text{C}$
$\theta_{JC}$	$125^\circ\text{C/W}$



## CHARACTERISTICS $T_C = 25^\circ\text{C}$

SYMBOL	TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNITS
$BV_{CEO}$	$I_C = 10\text{ mA}$		30			V
$BV_{CES}$	$I_C = 10\ \mu\text{A}$		50			V
$BV_{CBO}$	$I_C = 10\ \mu\text{A}$		50			V
$BV_{EBO}$	$I_E = 10\ \mu\text{A}$		6.0			V
$I_{CBO}$	$V_{CB} = 40\text{ V}$				1.7	$\mu\text{A}$
	$T_C = 100^\circ\text{C}$				120	$\mu\text{A}$
$I_{CES}$	$V_{CE} = 50\text{ V}$				10	$\mu\text{A}$
$h_{FE}$	$V_{CE} = 1.0\text{ V}$	$I_C = 10\text{ mA}$	30		150	---
	$V_{CE} = 1.0\text{ V}$	$I_C = 100\text{ mA}$	60			
	$V_{CE} = 1.0\text{ V}$	$I_C = 100\text{ mA}$	30			
	$V_{CE} = 1.0\text{ V}$	$I_C = 300\text{ mA}$	40			
	$V_{CE} = 1.0\text{ V}$	$I_C = 500\text{ mA}$	35			
	$V_{CE} = 1.0\text{ V}$	$I_C = 500\text{ mA}$	20			
	$V_{CE} = 1.0\text{ V}$	$I_C = 500\text{ mA}$	20			
$V_{CE} = 2.0\text{ V}$	$I_C = 800\text{ mA}$	25				
$V_{CE} = 5.0\text{ V}$	$I_C = 1.0\text{ A}$	30				

**DYNAMIC CHARACTERISTICS**  $T_C = 25\text{ }^\circ\text{C}$ 

SYMBOL	TEST CONDITIONS			MINIMUM	TYPICAL	MAXIMUM	UNITS
$V_{CE(SAT)}$	$I_C = 10\text{ mA}$	$I_B = 1.0\text{ mA}$				0.25	V
	$I_C = 100\text{ mA}$	$I_B = 10\text{ mA}$				0.20	
	$I_C = 300\text{ mA}$	$I_B = 30\text{ mA}$				0.32	
	$I_C = 500\text{ mA}$	$I_B = 50\text{ mA}$				0.42	
	$I_C = 800\text{ mA}$	$I_B = 80\text{ mA}$				0.65	
	$I_C = 1.0\text{ A}$	$I_B = 100\text{ mA}$				0.75	
$V_{BE(SAT)}$	$I_C = 10\text{ mA}$	$I_B = 1.0\text{ mA}$				0.76	V
	$I_C = 100\text{ mA}$	$I_B = 10\text{ mA}$				0.86	
	$I_C = 300\text{ mA}$	$I_B = 30\text{ mA}$		0.8		1.1	
	$I_C = 500\text{ mA}$	$I_B = 50\text{ mA}$				1.1	
	$I_C = 800\text{ mA}$	$I_B = 80\text{ mA}$				1.5	
	$I_C = 1.0\text{ A}$	$I_B = 100\text{ mA}$				1.7	
$f_t$	$V_{CE} = 10\text{ V}$	$I_C = 50\text{ mA}$	$f = 100\text{ MHz}$	300			MHz
$C_{ob}$	$V_{CB} = 10\text{ V}$		$f = 1.0\text{ MHz}$			12	pF
$C_{ib}$	$V_{EB} = 0.5\text{ V}$		$f = 1.0\text{ MHz}$			55	pF
$t_d$	$V_{CC} = 30\text{ V}$ $I_{B1} = 50\text{ mA}$	$I_C = 500\text{ mA}$	$V_{BE} = 3.8\text{ V}$		5.0	10	nS
$t_r$	$V_{CC} = 30\text{ V}$ $I_{B1} = 50\text{ mA}$	$I_C = 500\text{ mA}$	$V_{BE} = 3.8\text{ V}$		15	30	nS
$t_s$	$V_{CC} = 30\text{ V}$	$I_C = 500\text{ mA}$	$I_{B1} = 50\text{ mA}$		30	50	nS
$t_f$	$V_{CC} = 30\text{ V}$	$I_C = 500\text{ mA}$	$I_{B1} = 50\text{ mA}$		25	30	nS
$t_{on}$	$V_{CC} = 30\text{ V}$ $I_{B1} = 50\text{ mA}$	$I_C = 500\text{ mA}$	$V_{BE} = 3.8\text{ V}$		20	35	nS
$t_{off}$	$V_{CC} = 30\text{ V}$ $I_{B1} = 50\text{ mA}$	$I_C = 500\text{ mA}$	$V_{BE} = 3.8\text{ V}$		50	60	nS