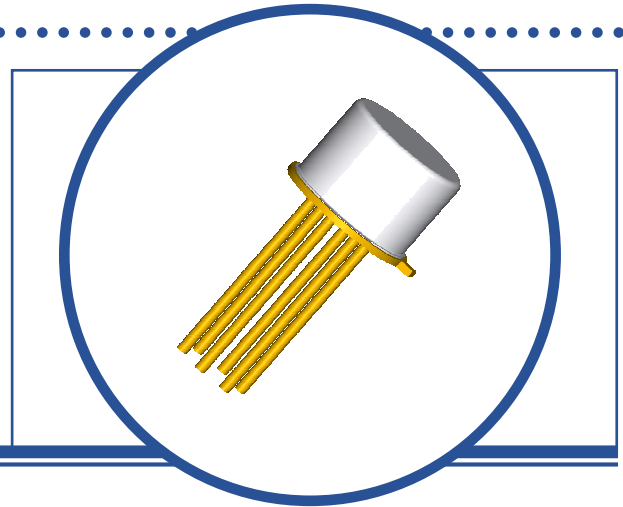


# DUAL MATCHED NPN SILICON TRANSISTOR

## 2N2060 / 2N2060A

- Matched Dual NPN Transistors
- Low Power
- Hermetically Sealed TO-77 Metal Package
- High Reliability Screening Options Available



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise stated)

$V_{CE0}$	Collector – Emitter Voltage	60V	
$V_{CER}$	Collector – Emitter Voltage	80V	
$V_{CBO}$	Collector – Base Voltage	100V	
$V_{EBO}$	Emitter – Base Voltage	7V	
$I_C$	Continuous Collector Current	500mA	
$P_D$	Total Power Dissipation at $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$ $T_C = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	<b>Per Side</b>	<b>Total Device</b>
		540 mW	600 mW
		3.08 mW/ $^\circ\text{C}$	3.48 mW/ $^\circ\text{C}$
		1.5W	2.12W
$T_J$	Junction Temperature Range	-65 to +200 $^\circ\text{C}$	
		$T_{stg}$	Storage Temperature Range

Semelab Limited reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.



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# DUAL MATCHED NPN SILICON TRANSISTOR 2N2060 / 2N2060A

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise stated)

Symbols	Parameters	Test Conditions	Min	Typ	Max	Units
$I_{CBO}$	Collector-Cut-Off Current	$V_{CB} = 80\text{V}$ $I_E = 0$			0.002	$\mu\text{A}$
		$T_A = 150^\circ\text{C}$			10	
$I_{EBO}$	Emitter Cut-off Current	$V_{BE} = 5\text{V}$ $I_C = 0$			2.0	nA
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}$ $I_E = 0$	100			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100\mu\text{A}$ $I_C = 0$	7			
$V_{(BR)CER}^{(1)}$	Collector – Emitter Breakdown Voltage	$I_C = 100\text{mA}$ $R_{BE} \leq 10\Omega$	80			
$V_{(BR)CEO}^{(1)}$	Collector – Emitter Breakdown Voltage	$I_C = 30\text{mA}$ $I_B = 0$	60			
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 50\text{mA}$ $I_B = 5\text{mA}$			0.9	
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	2N2060A $I_C = 50\text{mA}$ $I_B = 5\text{mA}$			0.6	
		2N2060 $I_C = 50\text{mA}$ $I_B = 5\text{mA}$			1.2	
$H_{FE}$	Forward-current transfer ratio	$I_C = 10\mu\text{A}$ $V_{CE} = 5\text{V}$	25		75	-
		$I_C = 100\mu\text{A}$ $V_{CE} = 5\text{V}$	30		90	
		$I_C = 1.0\text{mA}$ $V_{CE} = 5\text{V}$	40		120	
		$I_C = 10\text{mA}$ $V_{CE} = 5\text{V}$	50		150	

## DYNAMIC CHARACTERISTICS

$f_T$	Current Gain Bandwidth Product	$I_C = 50\text{mA}$ $V_{CE} = 10\text{V}$ $f = 20\text{MHz}$	60			MHz
$h_{fe}$	Small-Signal Current Gain	$I_C = 1.0\text{mA}$ $V_{CE} = 5\text{V}$ $f = 1.0\text{KHz}$	50		150	-
$h_{ie}^{(3)}$	Input Impedance	$I_C = 1.0\text{mA}$ $V_{CE} = 5\text{V}$ $f = 1.0\text{KHz}$	1000		4000	$\Omega$
$h_{ib}^{(3)}$	Input Impedance	$I_C = 1.0\text{mA}$ $V_{CB} = 10\text{V}$ $f = 1.0\text{KHz}$	20		30	
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{V}$ $I_E = 0$ $f = 1.0\text{MHz}$			15	pF
$C_{ibo}$	Input Capacitance	$V_{BE} = 0.5\text{V}$ $I_C = 0$ $f = 1.0\text{MHz}$			85	pF

### Notes

- (1) Pulse Width  $\leq 300\mu\text{s}$ ,  $\delta \leq 2\%$
- (2) The lowest  $H_{FE}$  reading is taken as  $H_{FE1}$  for this ratio
- (3) Parameter by design only

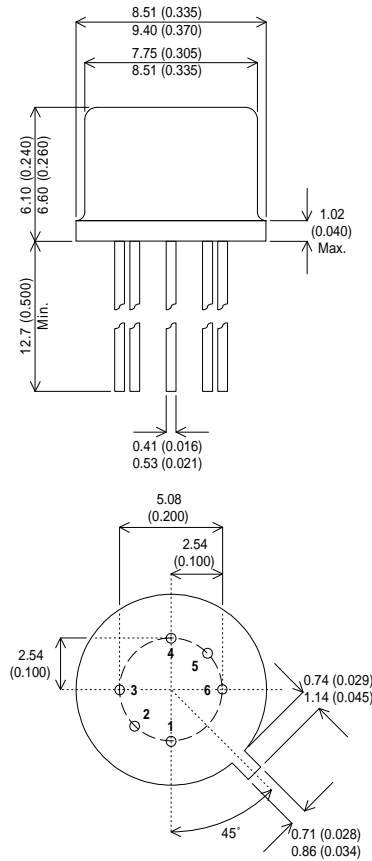
# DUAL MATCHED NPN SILICON TRANSISTOR 2N2060 / 2N2060A

## MATCHING CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise stated)

Symbols	Parameters	Test Conditions	Min	Typ	Max	Units
H <sub>FE1</sub> /H <sub>FE2</sub>	DC Current Gain Ratio <sup>(2)</sup>	I <sub>C</sub> = 100μA    V <sub>CE</sub> = 5V	0.9		1.0	-
		I <sub>C</sub> = 1.0mA    V <sub>CE</sub> = 5V	0.9		1.0	
V <sub>BE1</sub> - V <sub>BE2</sub>	Base - Emitter Voltage Differential	I <sub>C</sub> = 100μA    V <sub>CE</sub> = 5V			3.0	mV
		I <sub>C</sub> = 1.0mA    V <sub>CE</sub> = 5V			5.0	
$\Delta \frac{(V_{BE1} - V_{BE2})}{\Delta T}$	Base - Emitter Voltage Differential Change Due To Temperature	I <sub>C</sub> = 1.0mA    V <sub>CE</sub> = 5V T <sub>A</sub> = -55°C to +125°C			5.0	μV/°C

## MECHANICAL DATA

Dimensions in mm (inches)



### TO-77 (MO-002AF) METAL PACKAGE

PIN 1 - Collector                      PIN 4 - Emitter  
 PIN 2 - Base                            PIN 5 - Base  
 PIN 3 - Emitter                        PIN 6 - Collector