TYPES 2N2639 THRU 2N2644
DUAL N-P-N SILICON TRANSISTORS
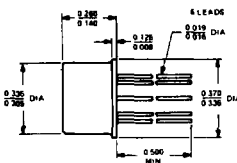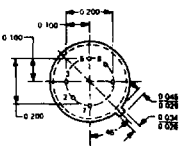
TWO TRANSISTORS IN ONE PACKAGE
RECOMMENDED FOR

- **Differential Amplifiers**
- **High-Gain, Low-Noise Audio Amplifiers**
- **Transducer Signal-Conditioner Amplifiers**
- **Low-Level Flip-Flops**

*mechanical data

ALL LEADS INSULATED FROM CASE

Dimensions without tolerance designate true position. Leads having maximum diameter (0.019") measured in gaging plane 0.054" +0.001" -0.000" below the seating plane of the device shall be within 0.007" of their true position relative to a maximum width tab.

1. COLLECTOR 1
2. BASE 1
3. EMITTER 1
5. EMITTER 2
6. BASE 2
7. COLLECTOR 2

ALL DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE SPECIFIED

*absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

	EACH TRIODE	TOTAL DEVICE
Collector-Base Voltage	45 V	
Collector-Emitter Voltage (See Note 1)	45 V	
Emitter-Base Voltage	5 V	
Continuous Collector Current	30 mA	
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 2)	0.3 W	0.6 W
Continuous Device Dissipation at (or below) 25°C Case Temperature (See Note 3)	0.6 W	1.2 W
Storage Temperature Range	−65°C to 200°C	
Lead Temperature 1/16 Inch from Case for 10 Seconds	← 300°C →	

NOTES: 1. This value applies when the emitter-base diode is open-circuited.
2. For each triode derate linearly to 175°C free-air temperature at the rate of 2 mW/°C.
3. For each triode derate linearly to 175°C case temperature at the rate of 4 mW/°C.

*JEDEC registered data. This data sheet contains all applicable registered data in effect at the time of publication.

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*electrical characteristics at 25°C free-air temperature (unless otherwise noted)

individual triode characteristics (see note 4)

PARAMETER		TEST CONDITIONS			2N2639 2N2640 2N2641 MIN	MAX	2N2642 2N2643 2N2644 MIN	MAX	UNIT
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10$ mA,	$I_B = 0$,	See Note 5	45		45		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 45$ V,	$I_E = 0$			10		10	nA
		$V_{CB} = 45$ V,	$I_E = 0$,	$T_A = 150°C$		10		10	μA
I_{CEO}	Collector Cutoff Current	$V_{CE} = 5$ V,	$I_B = 0$			10		10	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 5$ V,	$I_C = 0$			10		10	nA
h_{FE}	Static Forward Current Transfer Ratio	$V_{CE} = 5$ V,	$I_C = 10$ μA		50	300	100	300	
		$V_{CE} = 5$ V,	$I_C = 10$ μA,	$T_A = -55°C$	10		20		
		$V_{CE} = 5$ V,	$I_C = 100$ μA		55		110		
		$V_{CE} = 5$ V,	$I_C = 1$ mA		65		130		
V_{BE}	Base-Emitter Voltage	$I_B = 0.5$ mA,	$I_C = 10$ mA,		0.6	1	0.6	1	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_B = 0.5$ mA,	$I_C = 10$ mA			1		1	V
h_{ib}	Small-Signal Common-Base Input Impedance				25	32	25	32	Ω
h_{rb}	Small-Signal Common-Base Reverse Voltage Transfer Ratio	$V_{CB} = 5$ V,	$I_E = -1$ mA,	$f = 1$ kHz		6 x 10^{-4}		6 x 10^{-4}	
h_{ob}	Small-Signal Common-Base Output Admittance					1		1	μmho
h_{fe}	Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = 5$ V,	$I_C = 1$ mA,	$f = 1$ kHz	65	600	130	600	
$|h_{fe}|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = 5$ V,	$I_C = 1$ mA,	$f = 20$ MHz	4		4		dB
C_{obo}	Common-Base Open-Circuit Output Capacitance	$V_{CB} = 5$ V,	$I_E = 0$,	$f = 1$ MHz		8		8	pF

triode matching characteristics

PARAMETER		TEST CONDITIONS			2N2639 2N2642 MIN	MAX	2N2640 2N2643 MIN	MAX	UNIT
$\dfrac{h_{FE1}}{h_{FE2}}$	Static Forward-Current-Gain Balance Ratio	$V_{CE} = 5$ V,	$I_C = 10$ μA,	See Note 6	0.9	1	0.8	1	
$|V_{BE1} - V_{BE2}|$	Base-Emitter-Voltage Differential	$V_{CE} = 5$ V,	$I_C = 10$ μA			5		10	mV
$\dfrac{\Delta(V_{BE1} - V_{BE2})}{\Delta T_A}$	Base-Emitter-Voltage-Differential Temperature Gradient	$V_{CE} = 5$ V,	$I_C = 10$ μA	$\Delta T_A = [25°C - (-55°C)]$ and $[125°C - 25°C]$		10		20	μV/°C

*operating characteristics at 25°C free-air temperature

individual triode characteristics (see note 4)

PARAMETER		TEST CONDITIONS		ALL TYPES MAX	UNIT
$\overline{F}$	Average Noise Figure	$V_{CB} = 5$ V, $I_E = -10$ μA, $R_G = 10$ kΩ, Noise Bandwidth = 15.7 kHz, See Note 7		4	dB

NOTES: 4. The terminals of the triode not under test are open-circuited for the measurement of these characteristics.
5. This parameter must be measured using pulse techniques. $t_w = 300$ μs, duty cycle ≤ 2%.
6. The lower of the two h_{FE} readings is taken as h_{FE1}.
7. Average Noise Figure is measured in an amplifier with response down 3 dB at 10 Hz and 10 kHz and a high-frequency rolloff of 6 dB/octave.

*JEDEC registered data

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