

MJW21195 (PNP) MJW21196 (NPN)

Preferred Devices

Silicon Power Transistors

The MJW21195 and MJW21196 utilize Perforated Emitter technology and are specifically designed for high power audio output, disk head positioners and linear applications.

- Total Harmonic Distortion Characterized
- High DC Current Gain –
 $h_{FE} = 20 \text{ Min @ } I_C = 8 \text{ Adc}$
- Excellent Gain Linearity
- High SOA: 2.25 A, 80 V, 1 Second

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	250	Vdc
Collector–Base Voltage	V_{CBO}	400	Vdc
Emitter–Base Voltage	V_{EBO}	5.0	Vdc
Collector–Emitter Voltage – 1.5 V	V_{CEX}	400	Vdc
Collector Current – Continuous – Peak (Note 1)	I_C	16 30	Adc
Base Current – Continuous	I_B	5.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate Above 25°C	P_D	200 1.43	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	$^\circ\text{C/W}$

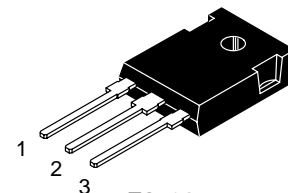
1. Pulse Test: Pulse Width = 5 μs , Duty Cycle $\leq 10\%$.



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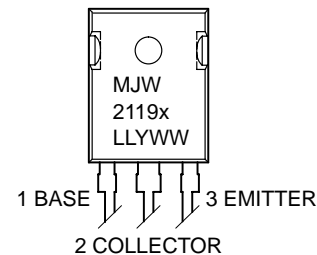
<http://onsemi.com>

**16 AMPERES
COMPLEMENTARY
SILICON POWER
TRANSISTORS
250 VOLTS
200 WATTS**



TO-247
CASE 340K
STYLE 3

MARKING DIAGRAM



MJW2119x = Device Code
x = 5 or 6
LL = Location Code
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJW21195	TO-247	30 Units/Rail
MJW21196	TO-247	30 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

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ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage (I _C = 100 mAdc, I _B = 0)	V _{CEO(sus)}	250	–	–	Vdc
Collector Cutoff Current (V _{CE} = 200 Vdc, I _B = 0)	I _{CEO}	–	–	100	μAdc

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typical	Max	Unit
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OFF CHARACTERISTICS

Emitter Cutoff Current (V _{CE} = 5 Vdc, I _C = 0)	I _{EBO}	–	–	50	μAdc
Collector Cutoff Current (V _{CE} = 250 Vdc, V _{BE(off)} = 1.5 Vdc)	I _{CEX}	–	–	50	μAdc

SECOND BREAKDOWN

Second Breakdown Collector Current with Base Forward Biased (V _{CE} = 50 Vdc, t = 1 s (non–repetitive)) (V _{CE} = 80 Vdc, t = 1 s (non–repetitive))	I _{S/b}	4.0 2.25	– –	– –	Adc
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ON CHARACTERISTICS

DC Current Gain (I _C = 8 Adc, V _{CE} = 5 Vdc) (I _C = 16 Adc, I _B = 5 Adc)	h _{FE}	20 8	– –	80 –	
Base–Emitter On Voltage (I _C = 8 Adc, V _{CE} = 5 Vdc)	V _{BE(on)}	–	–	2.0	Vdc
Collector–Emitter Saturation Voltage (I _C = 8 Adc, I _B = 0.8 Adc) (I _C = 16 Adc, I _B = 3.2 Adc)	V _{CE(sat)}	– –	– –	1.0 3	Vdc

DYNAMIC CHARACTERISTICS

Total Harmonic Distortion at the Output V _{RMS} = 28.3 V, f = 1 kHz, P _{LOAD} = 100 W _{RMS} (Matched pair h _{FE} = 50 @ 5 A/5 V)	THD	–	0.8 0.08	–	%
Current Gain Bandwidth Product (I _C = 1 Adc, V _{CE} = 10 Vdc, f _{test} = 1 MHz)	f _T	4	–	–	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _E = 0, f _{test} = 1 MHz)	C _{ob}	–	–	500	pF

PNP MJW21195

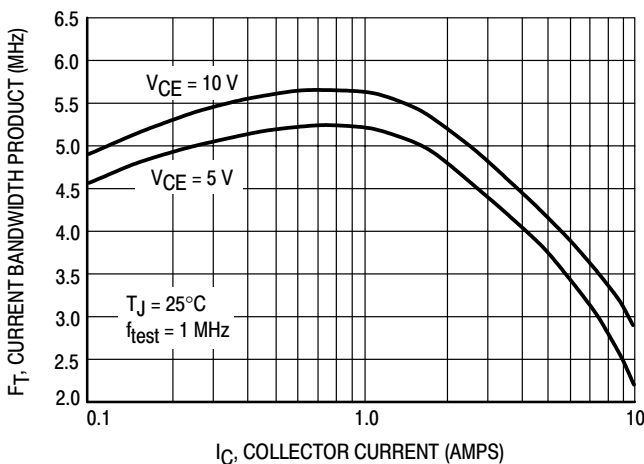


Figure 1. Typical Current Gain Bandwidth Product

NPN MJW21196

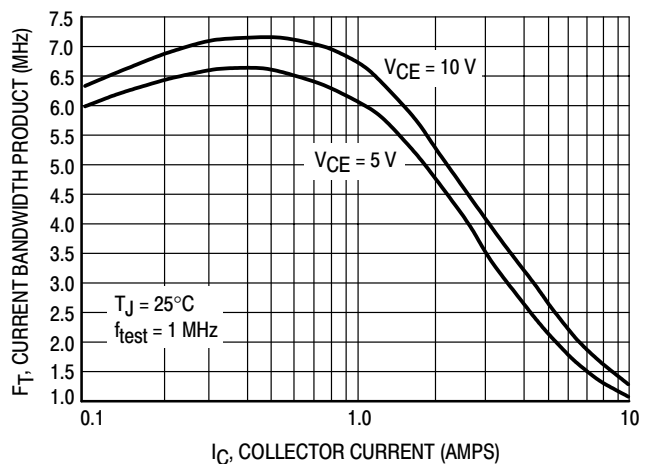


Figure 2. Typical Current Gain Bandwidth Product

MJW21195 (PNP) MJW21196 (NPN)

TYPICAL CHARACTERISTICS

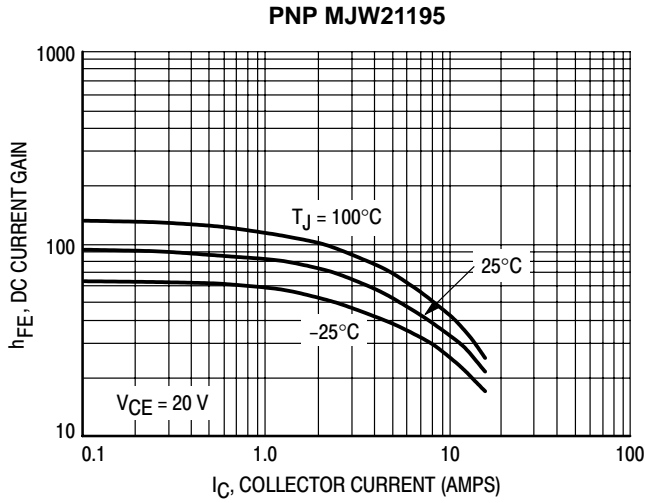


Figure 3. DC Current Gain, $V_{CE} = 20\text{ V}$

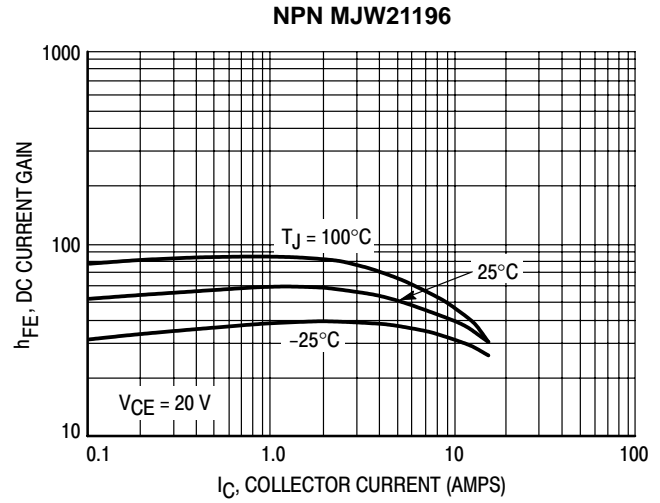


Figure 4. DC Current Gain, $V_{CE} = 20\text{ V}$

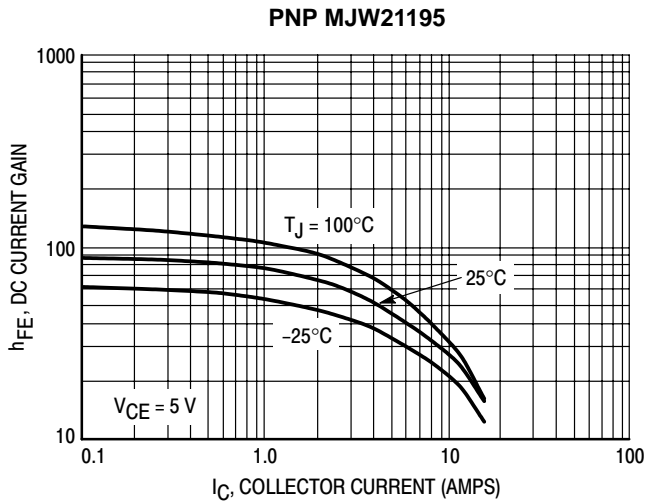


Figure 5. DC Current Gain, $V_{CE} = 5\text{ V}$

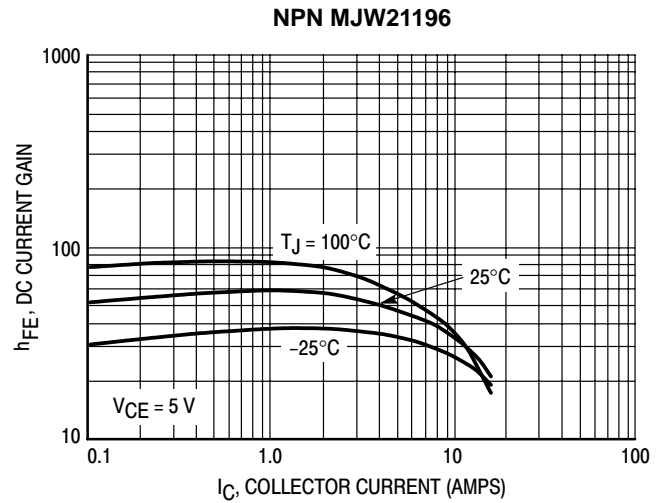


Figure 6. DC Current Gain, $V_{CE} = 5\text{ V}$

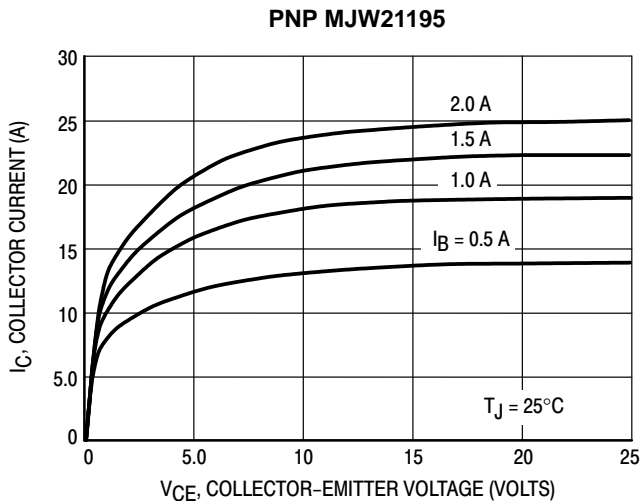


Figure 7. Typical Output Characteristics

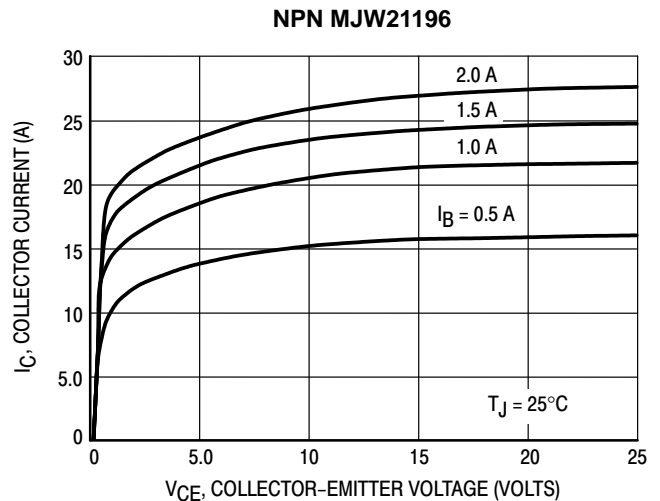


Figure 8. Typical Output Characteristics

MJW21195 (PNP) MJW21196 (NPN)

TYPICAL CHARACTERISTICS

PNP MJW21195

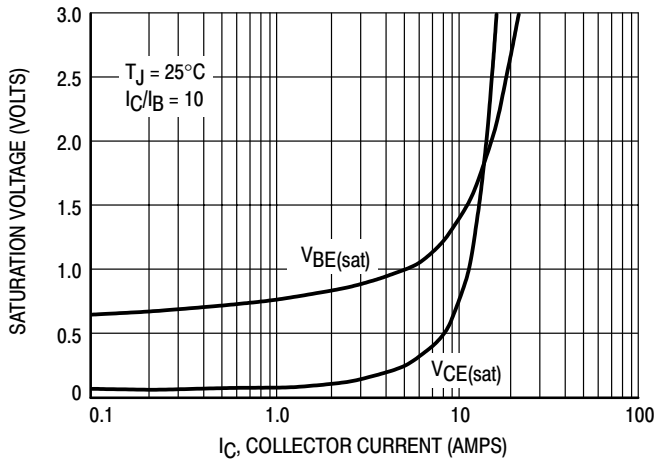


Figure 9. Typical Saturation Voltages

NPN MJW21196

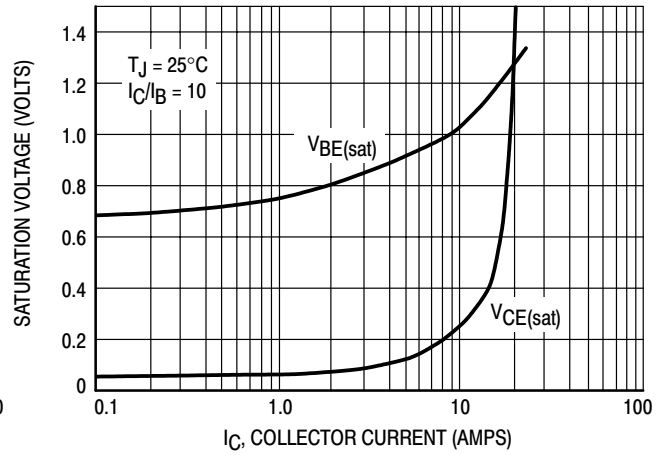


Figure 10. Typical Saturation Voltages

PNP MJW21195

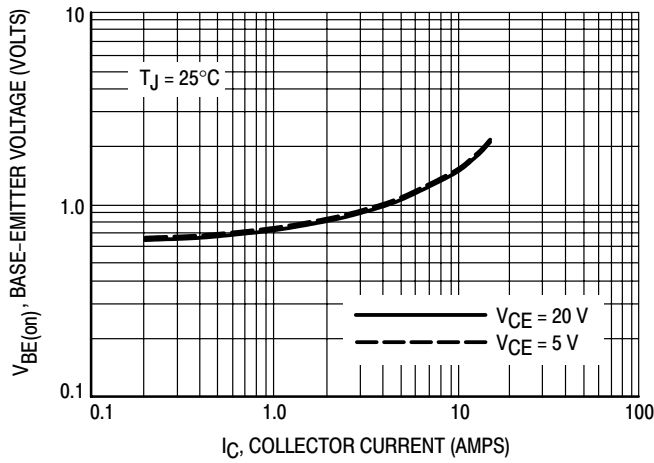


Figure 11. Typical Base-Emitter Voltage

NPN MJW21196

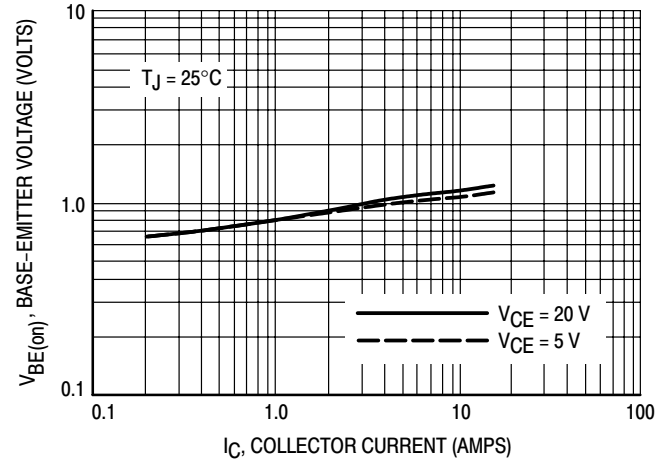


Figure 12. Typical Base-Emitter Voltage

MJW21195 (PNP) MJW21196 (NPN)

There are two limitations on the power handling ability of a transistor; average junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 13 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power than can be handled to values less than the limitations imposed by second breakdown.

TYPICAL CHARACTERISTICS

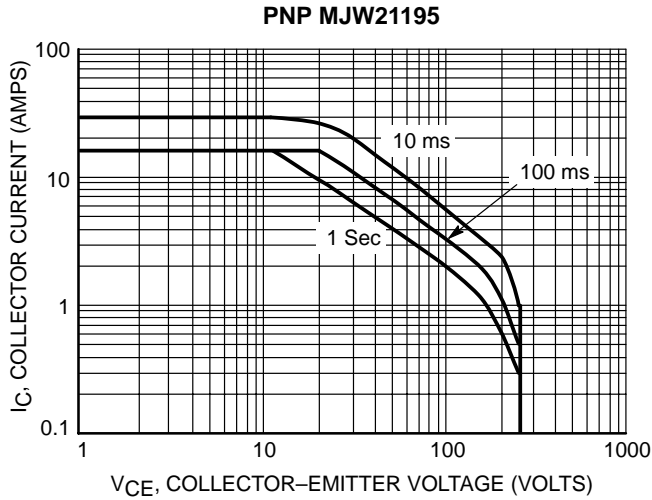


Figure 13. Active Region Safe Operating Area

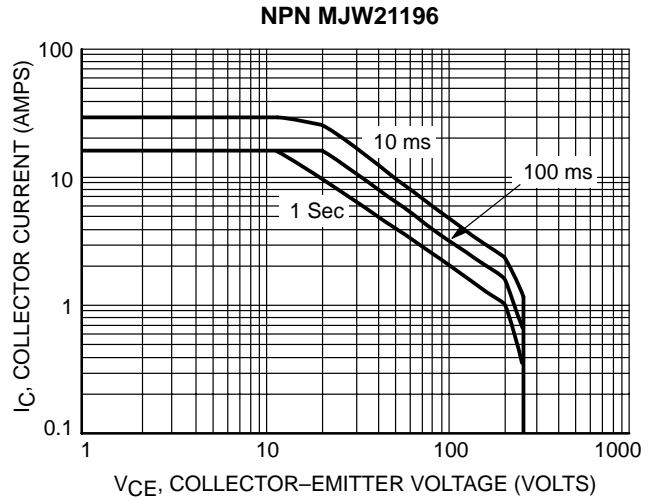


Figure 14. Active Region Safe Operating Area

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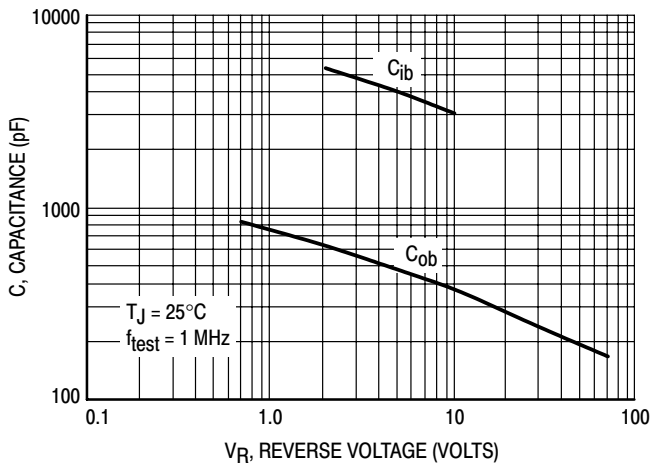


Figure 15. MJW21195 Typical Capacitance

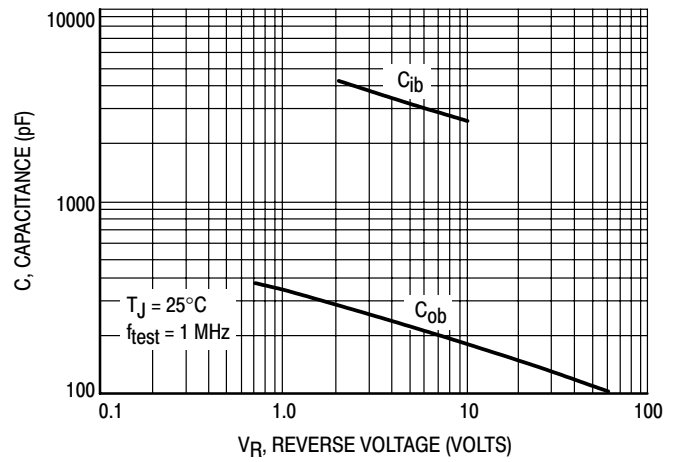


Figure 16. MJW21196 Typical Capacitance

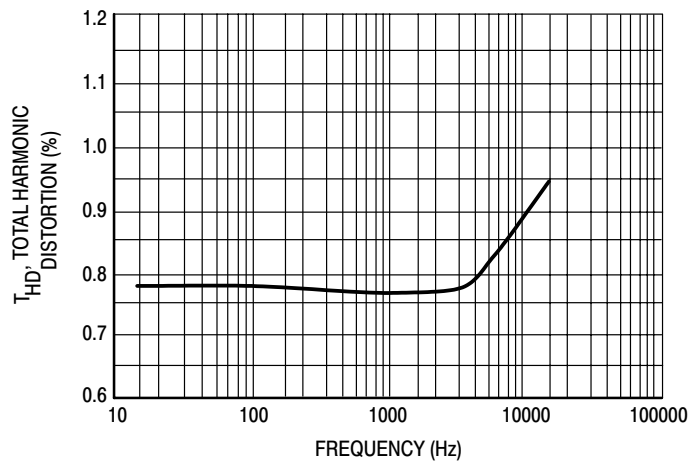


Figure 17. Typical Total Harmonic Distortion

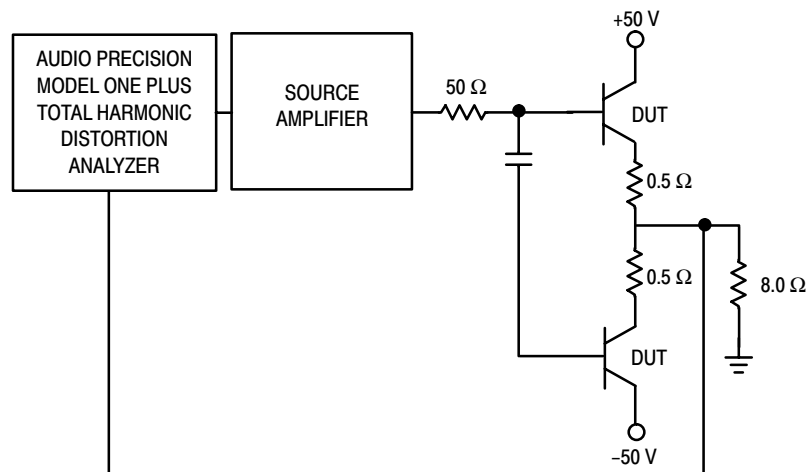
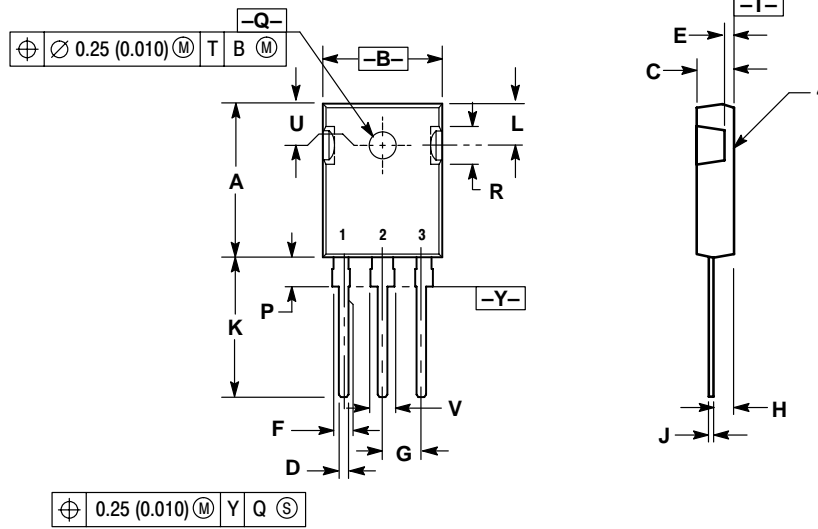


Figure 18. Total Harmonic Distortion Test Circuit

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PACKAGE DIMENSIONS

TO-247
CASE 340K-01
ISSUE C




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.7	20.3	0.776	0.799
B	15.3	15.9	0.602	0.626
C	4.7	5.3	0.185	0.209
D	1.0	1.4	0.039	0.055
E	1.27 REF		0.050 REF	
F	2.0	2.4	0.079	0.094
G	5.5 BSC		0.216 BSC	
H	2.2	2.6	0.087	0.102
J	0.4	0.8	0.016	0.031
K	14.2	14.8	0.559	0.583
L	5.5 NOM		0.217 NOM	
P	3.7	4.3	0.146	0.169
Q	3.55	3.65	0.140	0.144
R	5.0 NOM		0.197 NOM	
U	5.5 BSC		0.217 BSC	
V	3.0	3.4	0.118	0.134

- STYLE 3:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

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