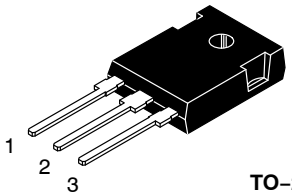
Silicon Power Transistors

MJW21195 (PNP)
MJW21196 (NPN)

16 AMPERES
COMPLEMENTARY
SILICON POWER TRANSISTORS
250 VOLTS, 200 WATTS

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



TO−247
CASE 340L

Features

- Total Harmonic Distortion Characterized
- High DC Current Gain − h_{FE} = 20 Min @ I_C = 8 Adc
- Excellent Gain Linearity
- High SOA: 2.25 A, 80 V, 1 Second
- Pb−Free Packages are Available*

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°C Derate Above 25°C	P_D	200 1.43	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +150	°C

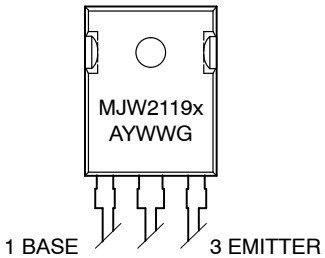
THERMAL CHARACTERISTICS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Pulse Test: Pulse Width = 5 μs, Duty Cycle ≤ 10%.

MARKING DIAGRAM



x = 5 or 6
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
MJW21195	TO−247	30 Units/Rail
MJW21195G	TO−247 (Pb−Free)	30 Units/Rail
MJW21196	TO−247	30 Units/Rail
MJW21196G	TO−247 (Pb−Free)	30 Units/Rail

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

May, 2024 − Rev. 4
Publication Order Number:
MJW21195/D

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

Characteristic	Symbol	Min	Typical	Max	Unit
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
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
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} h_{FE} unmatched (Matched pair h_{FE} = 50 @ 5 A/5 V) h_{FE} matched	T_{HD}	 – –	 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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

PNP MJW21195

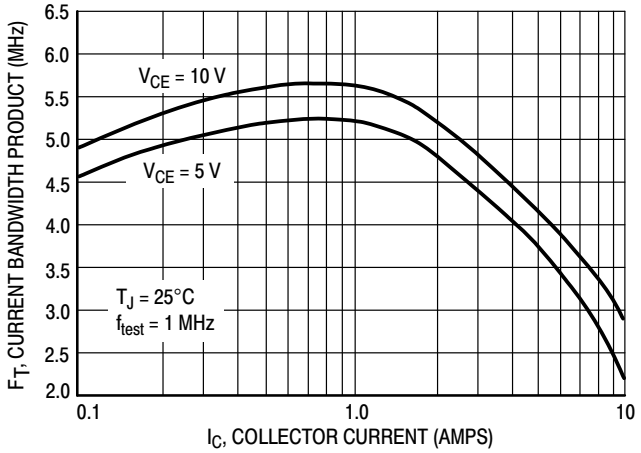


Figure 1. Typical Current Gain Bandwidth Product

NPN MJW21196

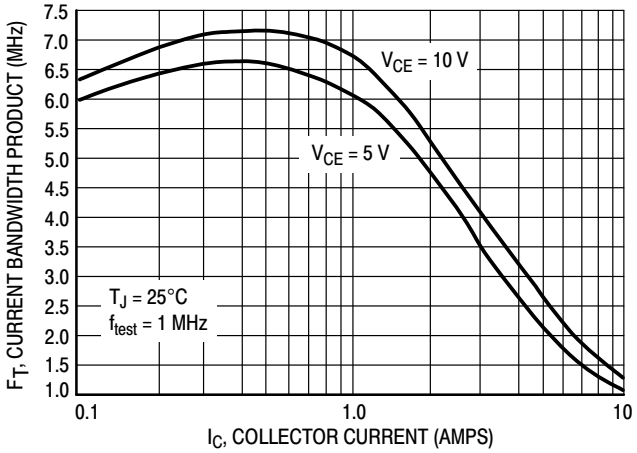


Figure 2. Typical Current Gain Bandwidth Product

PNP MJW21195

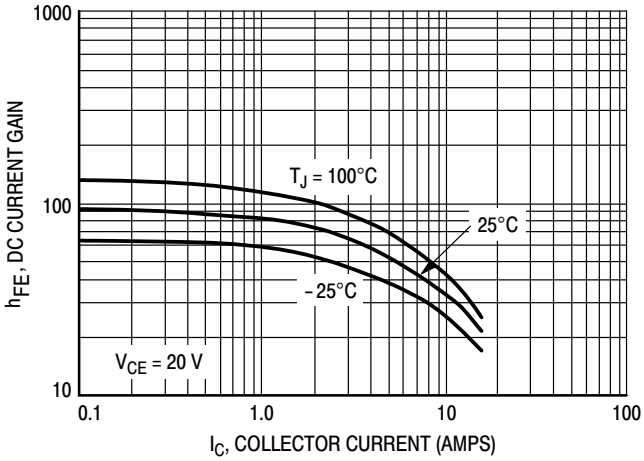


Figure 3. DC Current Gain, V_{CE} = 20 V

NPN MJW21196

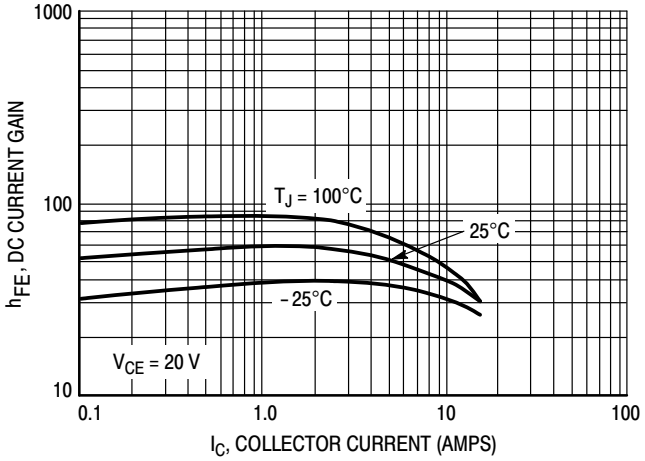


Figure 4. DC Current Gain, V_{CE} = 20 V

PNP MJW21195

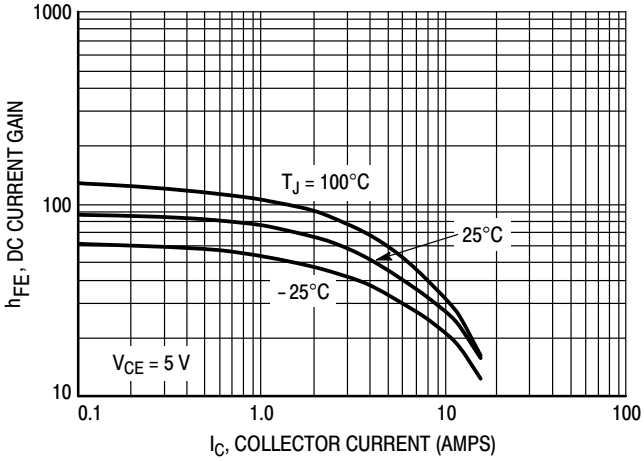


Figure 5. DC Current Gain, V_{CE} = 5 V

NPN MJW21196

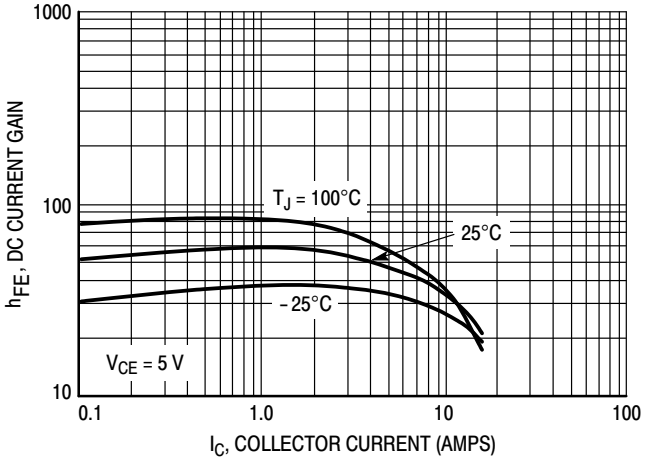


Figure 6. DC Current Gain, V_{CE} = 5 V

TYPICAL CHARACTERISTICS

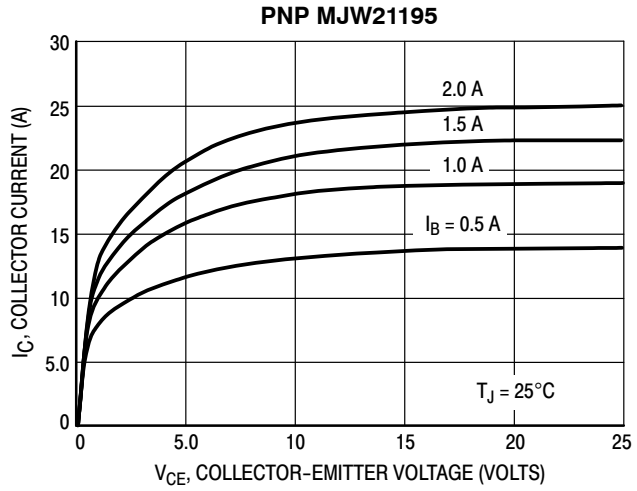


Figure 7. Typical Output Characteristics

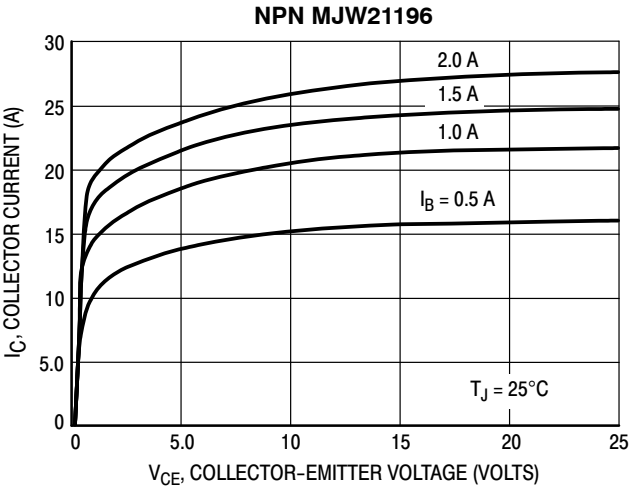


Figure 8. Typical Output Characteristics

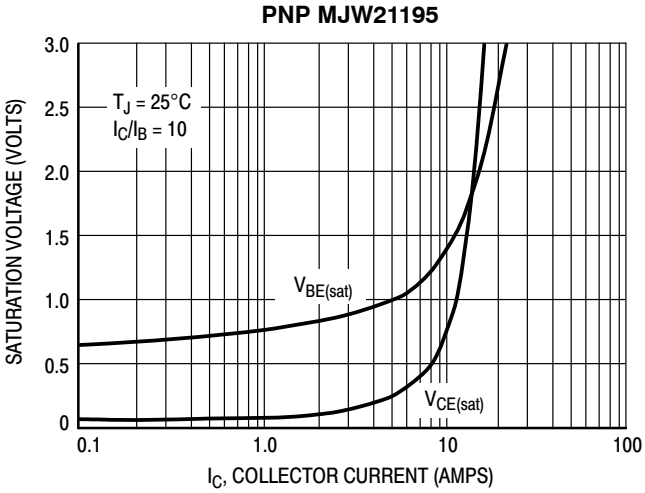


Figure 9. Typical Saturation Voltages

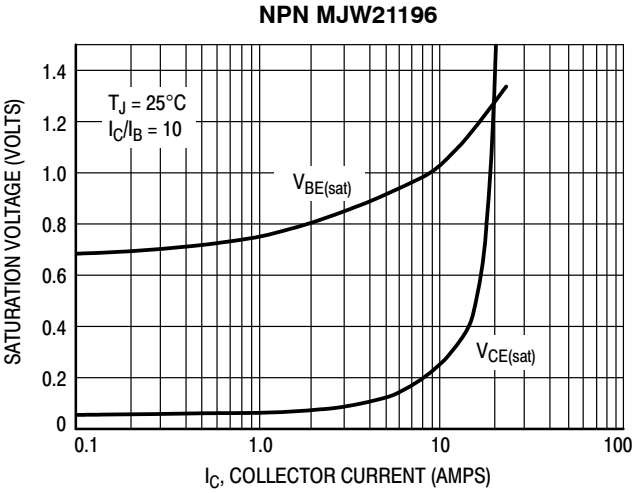


Figure 10. Typical Saturation Voltages

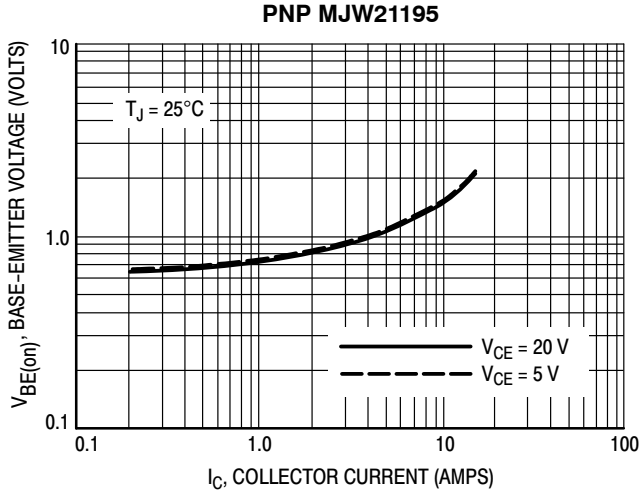


Figure 11. Typical Base−Emitter Voltage

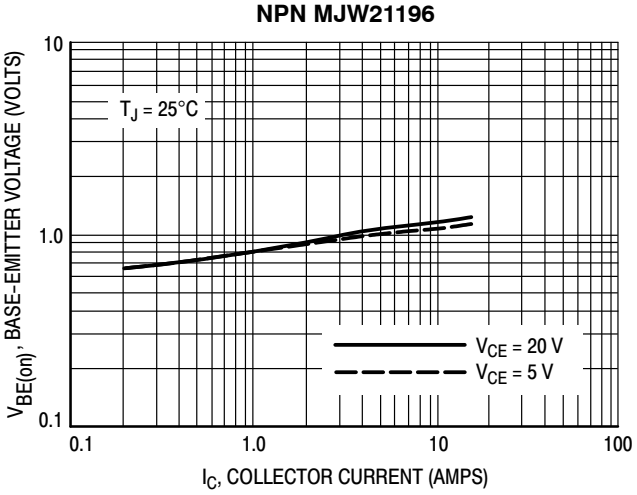


Figure 12. Typical Base−Emitter Voltage

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°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

PNP MJW21195

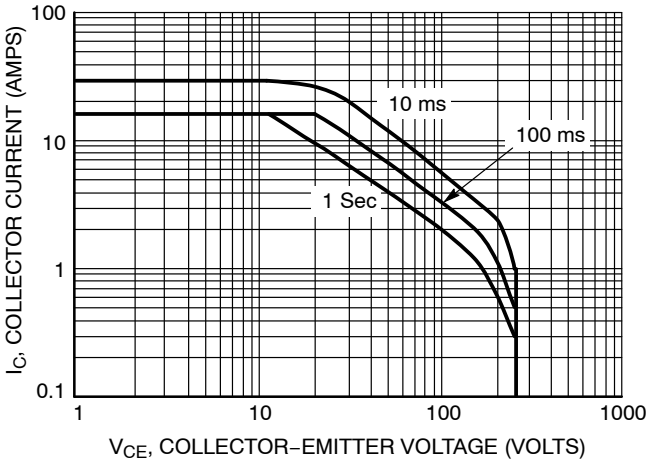


Figure 13. Active Region Safe Operating Area

NPN MJW21196

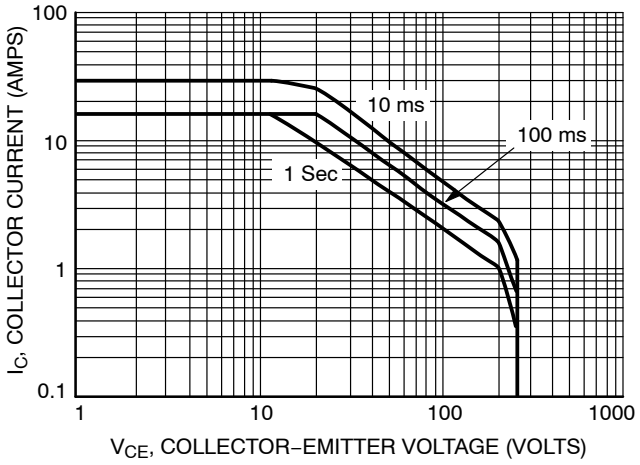


Figure 14. Active Region Safe Operating Area

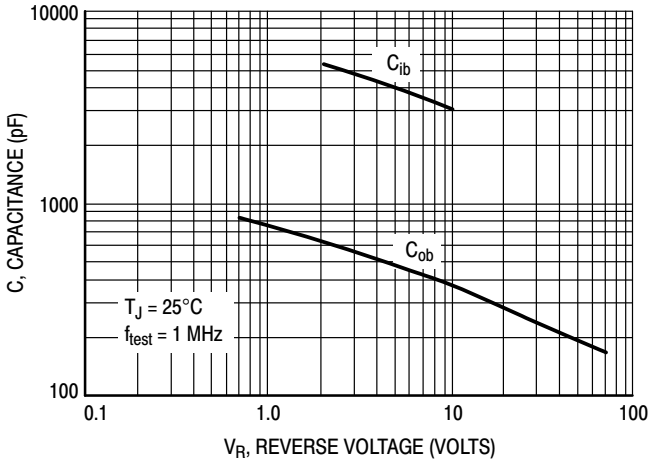


Figure 15. MJW21195 Typical Capacitance

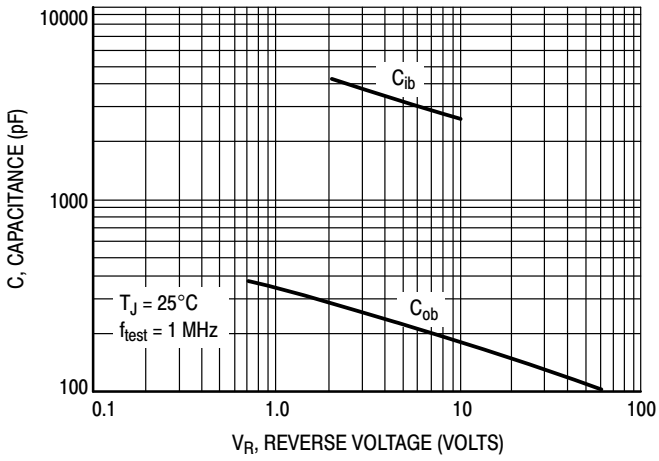


Figure 16. MJW21196 Typical Capacitance

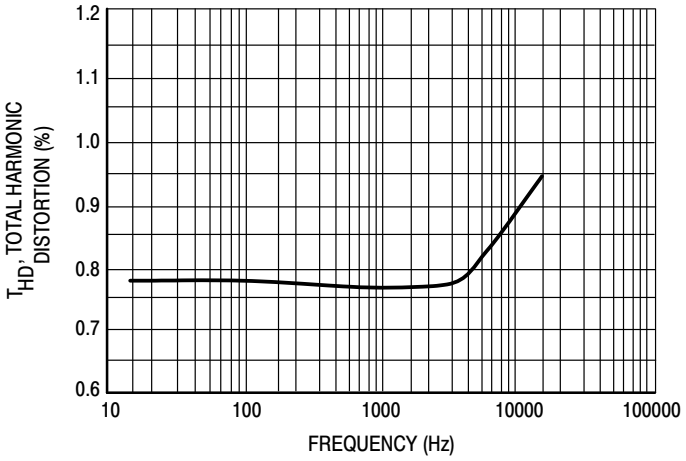


Figure 17. Typical Total Harmonic Distortion

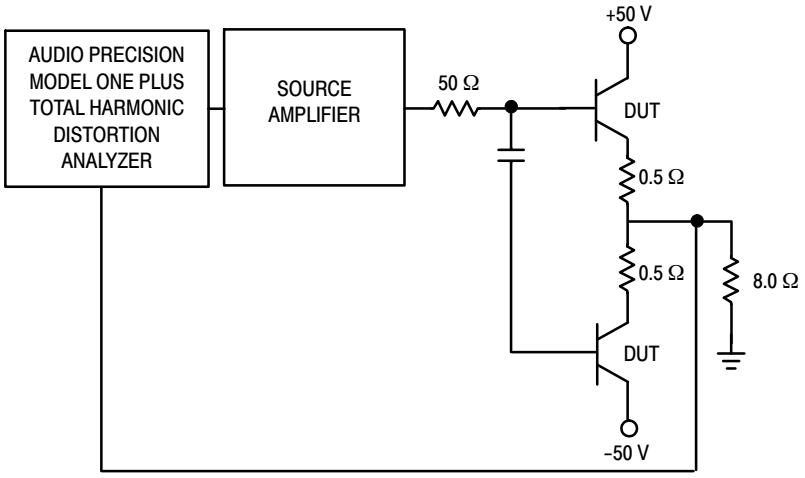
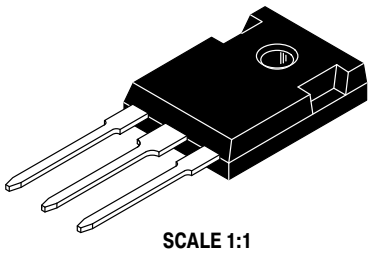


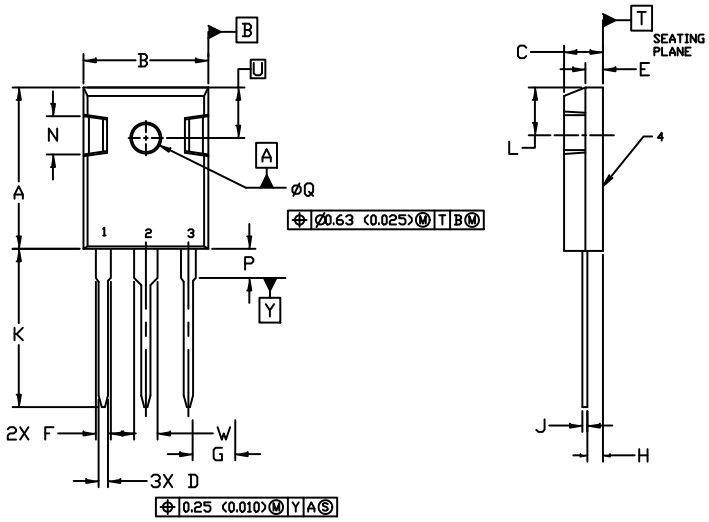
Figure 18. Total Harmonic Distortion Test Circuit



SCALE 1:1

TO−247
CASE 340L
ISSUE G

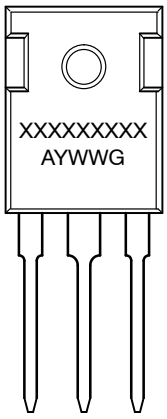
DATE 06 OCT 2021



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

	MILLIMETERS		INCHES	
DIM	MIN.	MAX.	MIN.	MAX.
A	20.32	21.08	0.800	0.830
B	15.75	16.26	0.620	0.640
C	4.70	5.30	0.185	0.209
D	1.00	1.40	0.040	0.055
E	1.90	2.60	0.075	0.102
F	1.65	2.13	0.065	0.084
G	5.45 BSC		0.215 BSC	
H	1.50	2.49	0.059	0.098
J	0.40	0.80	0.016	0.031
K	19.81	20.83	0.780	0.820
L	5.40	6.20	0.212	0.244
N	4.32	5.49	0.170	0.216
P	----	4.50	----	0.177
Q	3.55	3.65	0.140	0.144
U	6.15 BSC		0.242 BSC	
W	2.87	3.12	0.113	0.123

GENERIC MARKING DIAGRAM*



STYLE 1:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 2:
PIN 1. ANODE
2. CATHODE (S)
3. ANODE 2
4. CATHODES (S)

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

STYLE 4:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 5:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 6:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98ASB15080C**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−247**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

onsemi:

MJW21195 MJW21195G MJW21196 MJW21196G