

# MJW21192 (NPN), MJW21191 (PNP)

## Complementary Silicon Plastic Power Transistors

Specifically designed for power audio output, or high power drivers in audio amplifiers.

- DC Current Gain Specified up to 8.0 A at Temperature
- All On Characteristics at Temperature
- High SOA: 20 A, 18 V, 100 ms
- TO-247AE Package
- Pb-Free Packages are Available\*

### MAXIMUM RATINGS

Rating	Symbol	MJW21191 MJW21192	Unit
Collector-Emitter Voltage	$V_{CEO}$	150	Vdc
Collector-Base Voltage	$V_{CB}$	150	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current – Continuous – Peak	$I_C$	8.0 16	Adc
Base Current	$I_B$	2.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	125 0.65	W 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	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

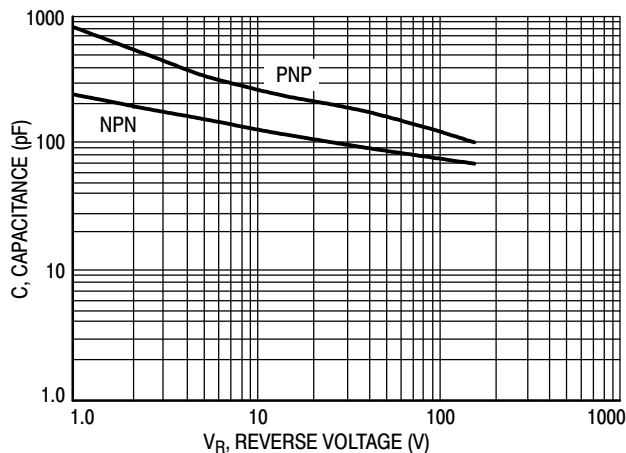


Figure 1. Typical Capacitance @  $25^\circ\text{C}$

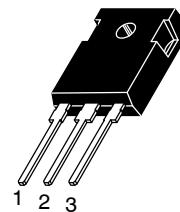
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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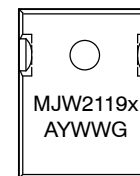
<http://onsemi.com>

**8.0 A**  
**POWER TRANSISTORS**  
**COMPLEMENTARY SILICON**  
**150 V, 125 W**



TO-247  
CASE 340L  
STYLE 3

### MARKING DIAGRAM



1 BASE  
2 COLLECTOR  
3 EMITTER

x = 1 or 2  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping
MJW21191	TO-247	30 Units/Rail
MJW21191G	TO-247 (Pb-Free)	30 Units/Rail
MJW21192	TO-247	30 Units/Rail
MJW21192G	TO-247 (Pb-Free)	30 Units/Rail

# MJW21192 (NPN), MJW21191 (PNP)

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage (Note 1) ( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )	$V_{CE(sus)}$	150	–	Vdc
Collector Cutoff Current ( $V_{CB} = 250\text{ Vdc}$ , $I_E = 0$ )	$I_{CES}$	–	10	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	10	$\mu\text{Adc}$
<b>ON CHARACTERISTICS (Note 1)</b>				
DC Current Gain ( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ ) ( $I_C = 8.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$h_{FE}$	15 5.0	100 –	–
Collector–Emitter Saturation Voltage ( $I_C = 4.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 1.6\text{ Adc}$ )	$V_{CE(sat)}$	– –	1.0 2.0	Vdc
Base–Emitter On Voltage ( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$V_{BE(on)}$	–	2.0	Vdc
<b>DYNAMIC CHARACTERISTICS</b>				
Current Gain – Bandwidth Product (Note 2) ( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )	$f_T$	4.0	–	MHz

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
2.  $f_T = |h_{fe}| \cdot f_{test}$ .

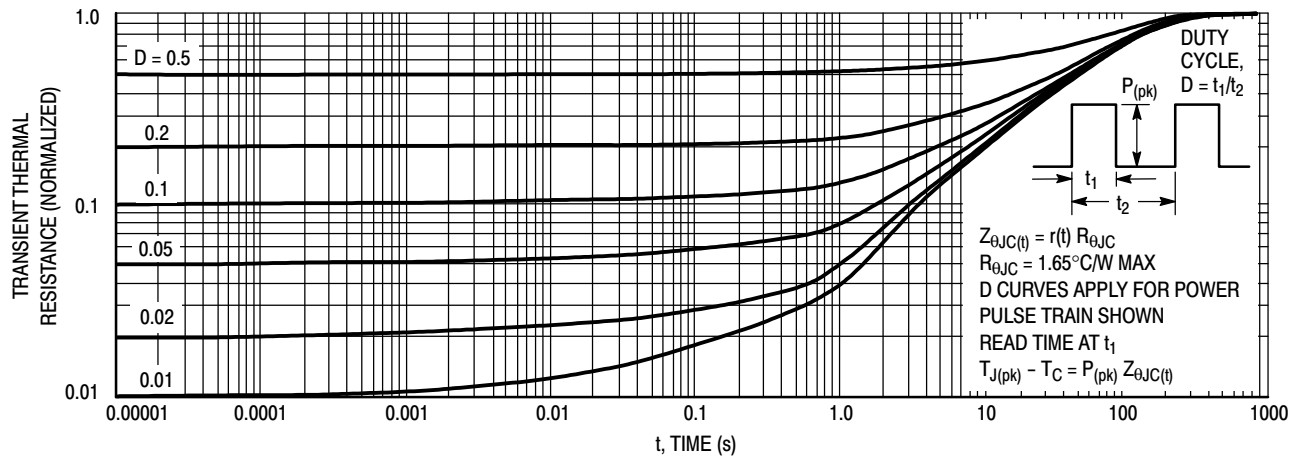


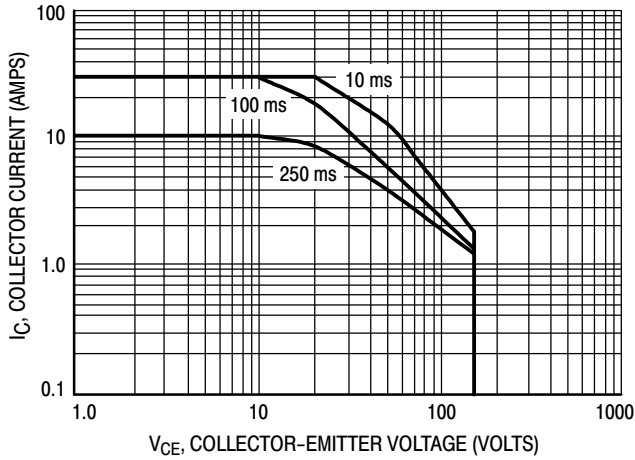
Figure 2. Thermal Response

There are two limitations on the power handling ability of a transistor: average junction temperature and second 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 Figures 3 and 4 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} < 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 2. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

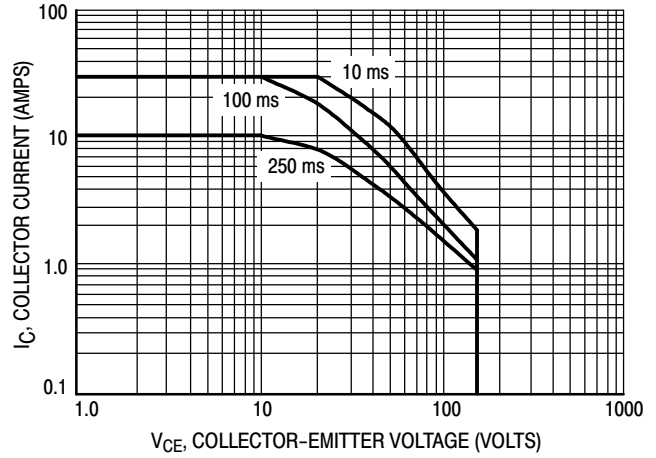
# MJW21192 (NPN), MJW21191 (PNP)

**NPN — MJW21192**



**Figure 3. NPN — MJW21192  
Safe Operating Area**

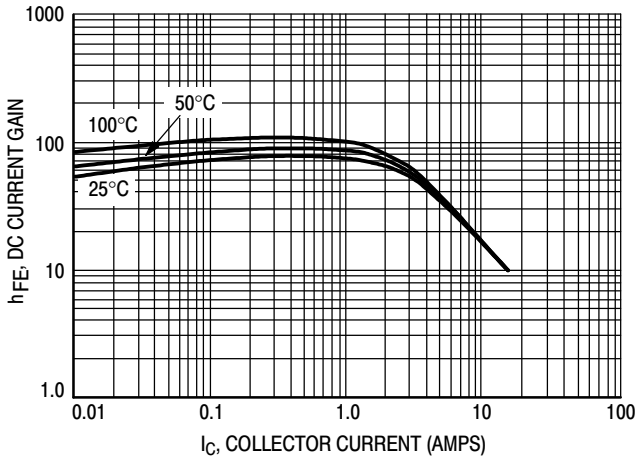
**PNP — MJW21191**



**Figure 4. PNP — MJW21191  
Safe Operating Area**

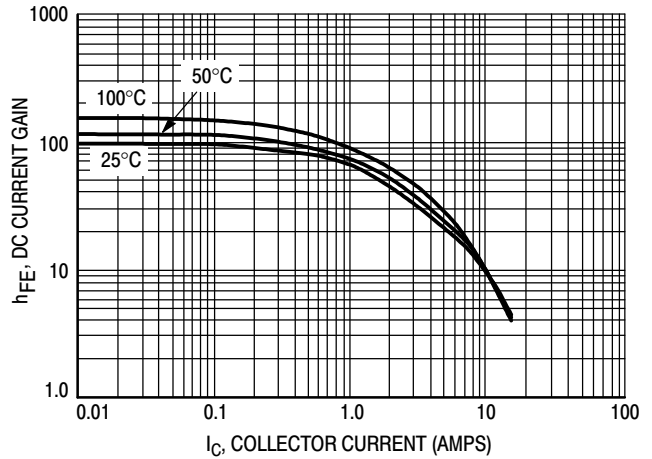
## TYPICAL CHARACTERISTICS

**NPN — MJW21192**



**Figure 5. NPN — MJW21192  
 $V_{CE} = 2.0$  V DC Current Gain**

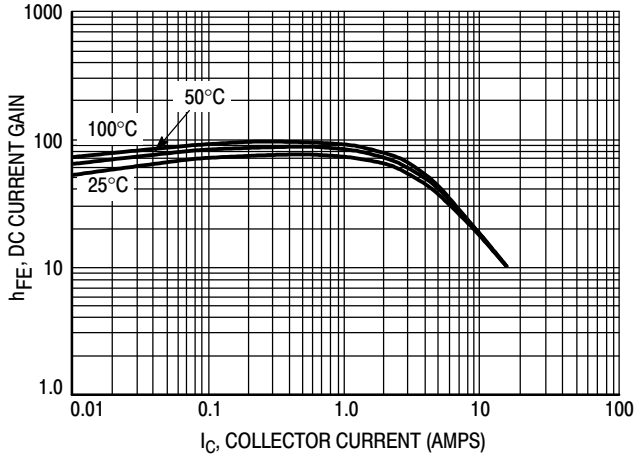
**PNP — MJW21191**



**Figure 6. PNP — MJW21191  
 $V_{CE} = 2.0$  V DC Current Gain**

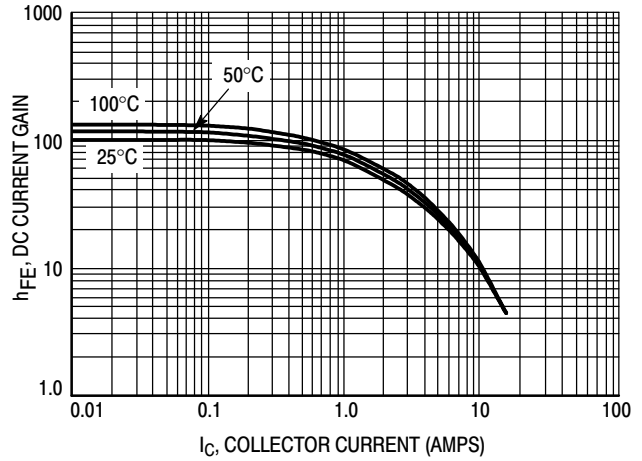
# MJW21192 (NPN), MJW21191 (PNP)

**NPN — MJW21192**

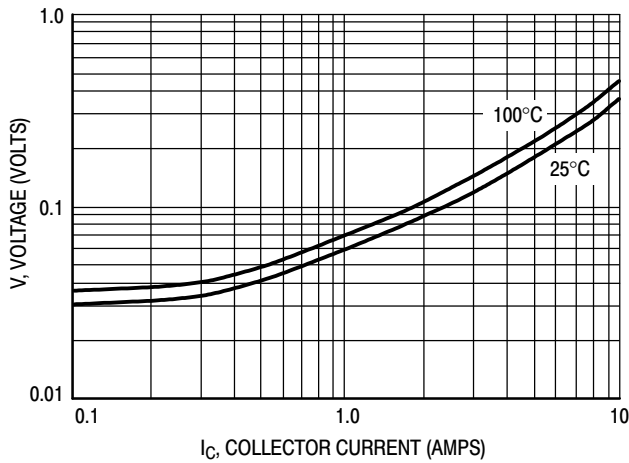


**Figure 7. NPN — MJW21192**  
 **$V_{CE} = 5.0$  V DC Current Gain**

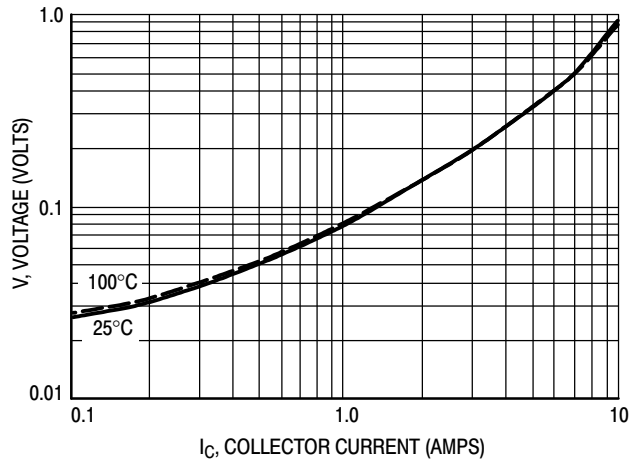
**PNP — MJW21191**



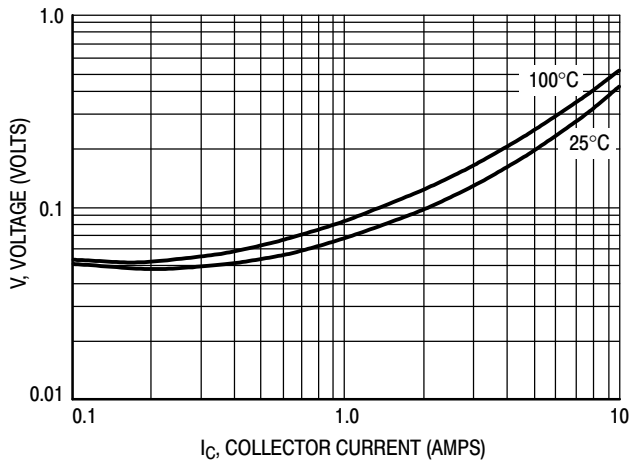
**Figure 8. PNP — MJW21191**  
 **$V_{CE} = 5.0$  V DC Current Gain**



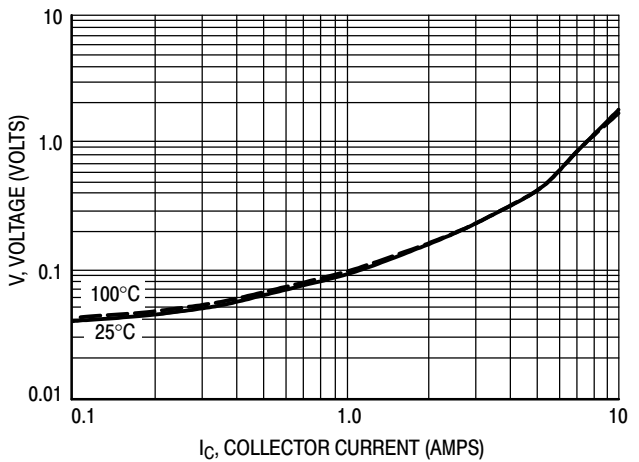
**Figure 9. NPN — MJW21192**  
 **$V_{CE(sat)}$   $I_C/I_B = 5.0$**



**Figure 10. PNP — MJW21191**  
 **$V_{CE(sat)}$   $I_C/I_B = 5.0$**



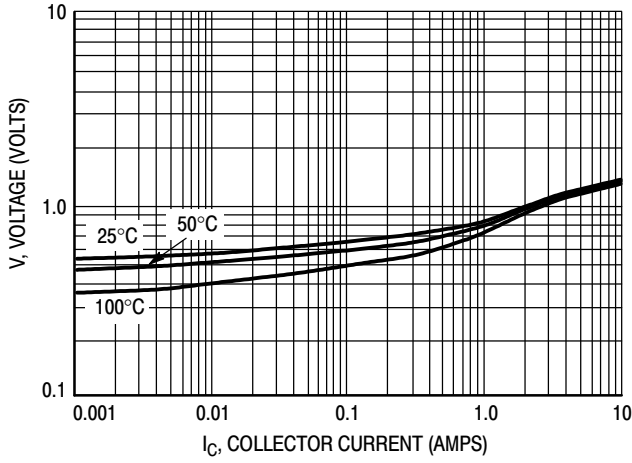
**Figure 11. NPN — MJW21192**  
 **$V_{CE(sat)}$   $I_C/I_B = 10$**



**Figure 12. PNP — MJW21191**  
 **$V_{CE(sat)}$   $I_C/I_B = 10$**

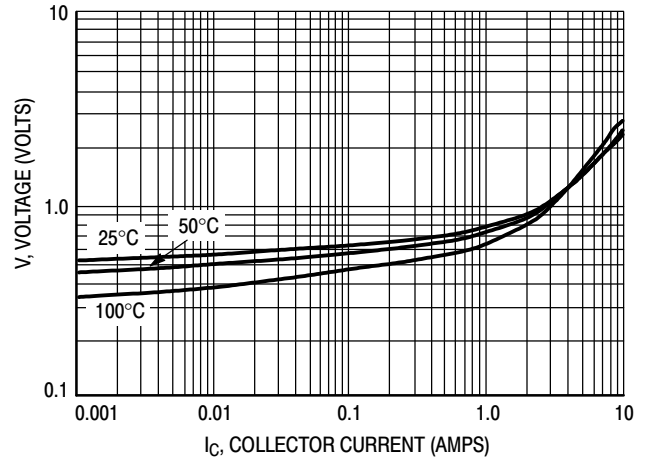
# MJW21192 (NPN), MJW21191 (PNP)

**NPN — MJW21192**



**Figure 13. NPN — MJW21192**  
 $V_{CE} = 2.0 \text{ V } V_{BE(on)}$  Curve

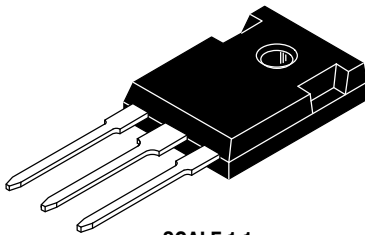
**PNP — MJW21191**



**Figure 14. PNP — MJW21191**  
 $V_{CE} = 2.0 \text{ V } V_{BE(on)}$  Curve

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

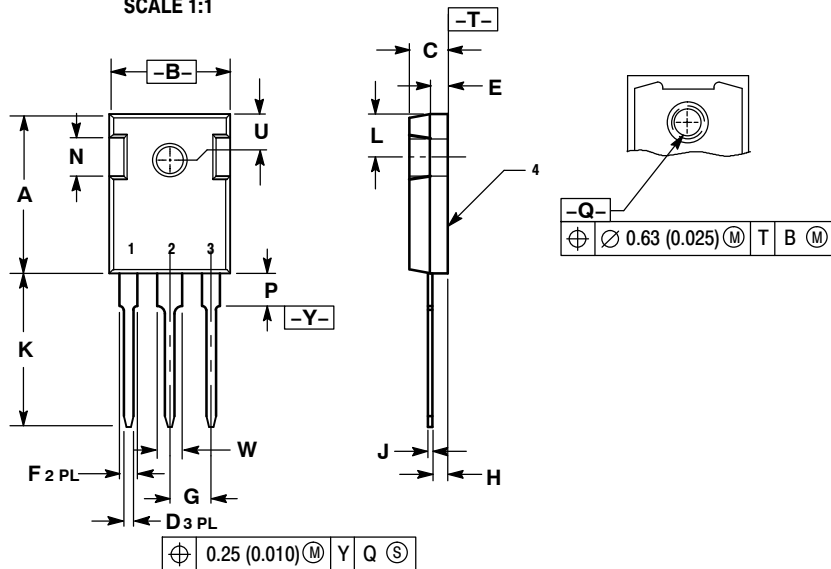
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TO-247  
CASE 340L-02  
ISSUE F

DATE 26 OCT 2011

SCALE 1:1

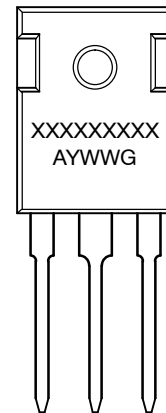


NOTES:

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

DIM	MILLIMETERS		INCHES	
	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\*



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

- 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

\*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.

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