

# Complementary Silicon Power Transistors

## MJE270G (NPN), MJE271G (PNP)

### Features

- High Safe Operating Area  
 $I_{S/B} @ 40 V, 1.0 s = 0.375 A$
- Collector–Emitter Sustaining Voltage  
 $V_{CEO(sus)} = 100 Vdc (Min)$
- High DC Current Gain  
 $h_{FE} @ 120 mA, 10 V = 1500 (Min)$
- These Devices are Pb–Free and are RoHS Compliant

### MAXIMUM RATINGS

| Rating                                                                       | Symbol         | Value        | Unit               |
|------------------------------------------------------------------------------|----------------|--------------|--------------------|
| Collector–Emitter Voltage                                                    | $V_{CEO}$      | 100          | Vdc                |
| Collector–Base Voltage                                                       | $V_{CB}$       | 100          | Vdc                |
| Emitter–Base Voltage                                                         | $V_{EB}$       | 5.0          | Vdc                |
| Collector Current – Continuous                                               | $I_C$          | 2.0          | Adc                |
| Collector Current – Peak                                                     | $I_{CM}$       | 4.0          | Adc                |
| Base Current                                                                 | $I_B$          | 0.1          | Adc                |
| Total Power Dissipation<br>@ $T_C = 25^\circ C$<br>Derate above $25^\circ C$ | $P_D$          | 15<br>0.12   | W<br>W/ $^\circ C$ |
| Total Power Dissipation<br>@ $T_A = 25^\circ C$<br>Derate above $25^\circ C$ | $P_D$          | 1.5<br>0.012 | W<br>W/ $^\circ C$ |
| Operating and Storage Junction<br>Temperature Range                          | $T_J, T_{stg}$ | –65 to +150  | $^\circ C$         |

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.

### THERMAL CHARACTERISTICS

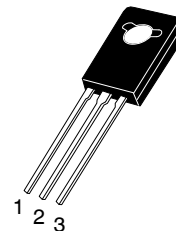
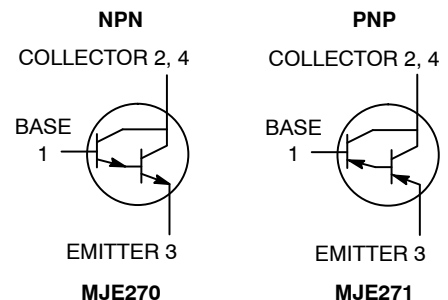
| Characteristic                          | Symbol          | Max  | Unit         |
|-----------------------------------------|-----------------|------|--------------|
| Thermal Resistance, Junction–to–Case    | $R_{\theta JC}$ | 8.33 | $^\circ C/W$ |
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 83.3 | $^\circ C/W$ |



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## 2.0 AMPERE COMPLEMENTARY POWER DARLINGTON TRANSISTORS 100 VOLTS, 15 WATTS



TO-225  
CASE 77-09  
STYLE 3

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
JE27x = Specific Device Code  
x = 0 or 1  
G = Pb–Free Package

### ORDERING INFORMATION

| Device   | Package             | Shipping        |
|----------|---------------------|-----------------|
| MJE270G  | TO-225<br>(Pb–Free) | 500 Units / Box |
| MJE270TG | TO-225<br>(Pb–Free) | 50 Units / Rail |
| MJE271G  | TO-225<br>(Pb–Free) | 500 Units / Box |

# MJE270G (NPN), MJE271G (PNP)

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                         |                |     |     |      |
|-----------------------------------------------------------------------------------------|----------------|-----|-----|------|
| Collector-Emitter Sustaining Voltage (Note 1)<br>( $I_C = 10\text{ mAdc}$ , $I_B = 0$ ) | $V_{CEO(sus)}$ | 100 | –   | Vdc  |
| Collector Cutoff Current<br>( $V_{CE} = 100\text{ Vdc}$ , $I_B = 0$ )                   | $I_{CEO}$      | –   | 1.0 | mAdc |
| Collector Cutoff Current<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ )                   | $I_{CBO}$      | –   | 0.3 | mAdc |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )                     | $I_{EBO}$      | –   | 0.1 | mAdc |

### SECOND BREAKDOWN

|                                                                                                                                  |           |     |   |     |
|----------------------------------------------------------------------------------------------------------------------------------|-----------|-----|---|-----|
| Second Breakdown Collector Current with Base Forward Biased<br>( $V_{CE} = 40\text{ Vdc}$ , $t = 1.0\text{ s}$ , Non-repetitive) | $I_{S/b}$ | 375 | – | Adc |
|----------------------------------------------------------------------------------------------------------------------------------|-----------|-----|---|-----|

### ON CHARACTERISTICS (Note 1)

|                                                                                                                                                       |               |             |            |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|------------|-----|
| DC Current Gain<br>( $I_C = 20\text{ mAdc}$ , $V_{CE} = 3.0\text{ Vdc}$ )<br>( $I_C = 120\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )                   | $h_{FE}$      | 500<br>1500 | –<br>–     | –   |
| Collector-Emitter Saturation Voltage<br>( $I_C = 20\text{ mAdc}$ , $I_B = 0.2\text{ mAdc}$ )<br>( $I_C = 120\text{ mAdc}$ , $I_B = 1.2\text{ mAdc}$ ) | $V_{CE(sat)}$ | –<br>–      | 2.0<br>3.0 | Vdc |
| Base-Emitter On Voltage<br>( $I_C = 120\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )                                                                     | $V_{BE(on)}$  | –           | 2.0        | Vdc |

### DYNAMIC CHARACTERISTICS

|                                                                                                                                    |       |     |   |     |
|------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|
| Current Gain – Bandwidth Product (Note 2)<br>( $I_C = 0.05\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ ) | $f_T$ | 6.0 | – | MHz |
|------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|

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.

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

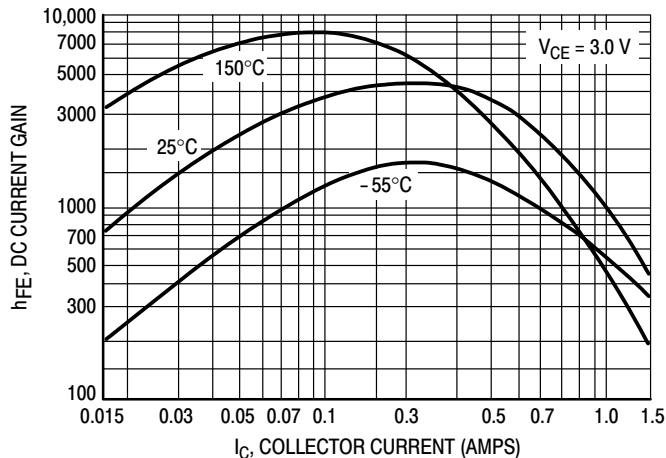


Figure 1. DC Current Gain

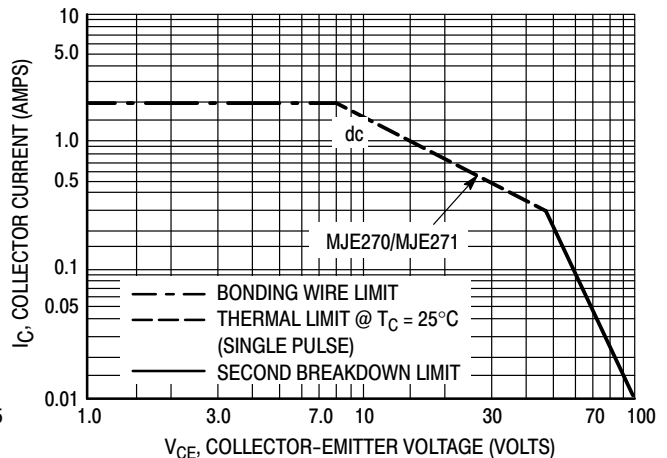
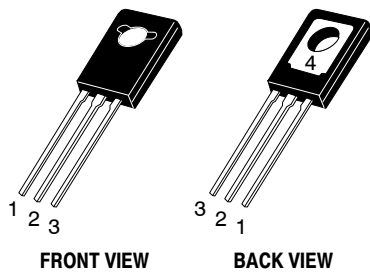


Figure 2. Safe Operating Area

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

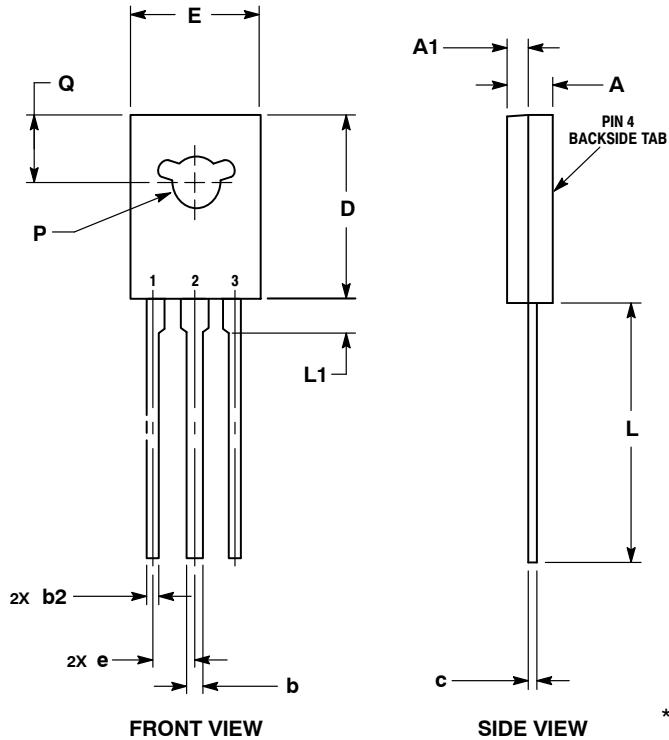
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SCALE 1:1

TO-225  
CASE 77-09  
ISSUE AD

DATE 25 MAR 2015

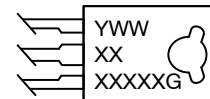


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

| MILLIMETERS |       |       |
|-------------|-------|-------|
| DIM         | MIN   | MAX   |
| A           | 2.40  | 3.00  |
| A1          | 1.00  | 1.50  |
| b           | 0.60  | 0.90  |
| b2          | 0.51  | 0.88  |
| c           | 0.39  | 0.63  |
| D           | 10.60 | 11.10 |
| E           | 7.40  | 7.80  |
| e           | 2.04  | 2.54  |
| L           | 14.50 | 16.63 |
| L1          | 1.27  | 2.54  |
| P           | 2.90  | 3.30  |
| Q           | 3.80  | 4.20  |

## GENERIC MARKING DIAGRAM\*



Y = Year  
WW = Work Week  
XXXXX = Device Code  
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.

|                                                           |                                                       |                                                           |                                                         |                                                       |
|-----------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|
| STYLE 1:<br>PIN 1. EMITTER<br>2., 4. COLLECTOR<br>3. BASE | STYLE 2:<br>PIN 1. CATHODE<br>2., 4. ANODE<br>3. GATE | STYLE 3:<br>PIN 1. BASE<br>2., 4. COLLECTOR<br>3. EMITTER | STYLE 4:<br>PIN 1. ANODE 1<br>2., 4. ANODE 2<br>3. GATE | STYLE 5:<br>PIN 1. MT 1<br>2., 4. MT 2<br>3. GATE     |
| STYLE 6:<br>PIN 1. CATHODE<br>2., 4. GATE<br>3. ANODE     | STYLE 7:<br>PIN 1. MT 1<br>2., 4. GATE<br>3. MT 2     | STYLE 8:<br>PIN 1. SOURCE<br>2., 4. GATE<br>3. DRAIN      | STYLE 9:<br>PIN 1. GATE<br>2., 4. DRAIN<br>3. SOURCE    | STYLE 10:<br>PIN 1. SOURCE<br>2., 4. DRAIN<br>3. GATE |

|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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