

# Complementary Silicon Power Plastic Transistors MJE243G (NPN), MJE253G (PNP)

These devices are designed for low power audio amplifier and low-current, high-speed switching applications.

## Features

- High Collector–Emitter Sustaining Voltage
- High DC Current Gain
- Low Collector–Emitter Saturation Voltage
- High Current Gain Bandwidth Product
- Annular Construction for Low Leakages
- These Devices are Pb–Free and are RoHS Compliant\*

## MAXIMUM RATINGS

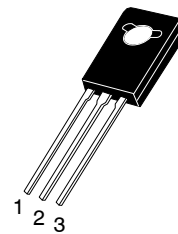
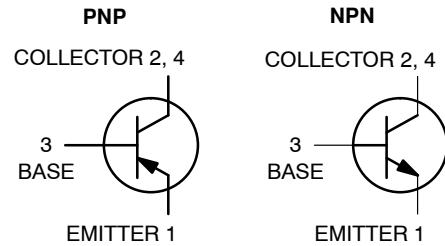
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	100	Vdc
Collector–Base Voltage	$V_{CB}$	100	Vdc
Emitter–Base Voltage	$V_{EB}$	7.0	Vdc
Collector Current – Continuous	$I_C$	4.0	Adc
Collector Current – Peak	$I_{CM}$	8.0	Adc
Base Current	$I_B$	1.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	15 120	W mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +150	$^\circ\text{C}$

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

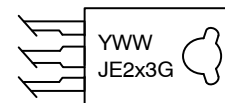
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	8.34	$^\circ\text{C/W}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	83.4	$^\circ\text{C/W}$

## 4.0 AMPERES POWER TRANSISTORS COMPLEMENTARY SILICON 100 VOLTS, 15 WATTS



TO-225  
CASE 77-09  
STYLE 1

## MARKING DIAGRAM



Y = Year  
 WW = Work Week  
 JE2x3 = Device Code  
 x = 4 or 5  
 G = Pb–Free Package

## ORDERING INFORMATION

Device	Package	Shipping
MJE243G	TO-225 (Pb–Free)	500 Units/Box
MJE253G	TO-225 (Pb–Free)	500 Units/Box

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

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

## MJE243G (NPN),

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

Characteristic	Symbol	Min	Max	Unit
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#### OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )	$V_{CEO(sus)}$	100	–	V
Collector Cutoff Current ( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CE} = 100\text{ Vdc}$ , $I_E = 0$ , $T_C = 125^\circ\text{C}$ )	$I_{CBO}$	– –	0.1 0.1	$\mu\text{A}$ mA
Emitter Cutoff Current ( $V_{BE} = 7.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	0.1	$\mu\text{Adc}$

#### ON CHARACTERISTICS

DC Current Gain ( $I_C = 200\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 1.0\text{ Vdc}$ )	$h_{FE}$	40 15	180 –	–
Collector–Emitter Saturation Voltage ( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ ) ( $I_C = 1.0\text{ Adc}$ , $I_B = 100\text{ mAdc}$ )	$V_{CE(sat)}$	– –	0.3 0.6	V
Base–Emitter Saturation Voltage ( $I_C = 2.0\text{ Adc}$ , $I_B = 200\text{ mAdc}$ )	$V_{BE(sat)}$	–	1.8	V
Base–Emitter On Voltage ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )	$V_{BE(on)}$	–	1.5	V

#### DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product ( $I_C = 100\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 10\text{ MHz}$ )	$f_T$	40	–	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 0.1\text{ MHz}$ )	$C_{ob}$	–	50	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.

# MJE243G (NPN),

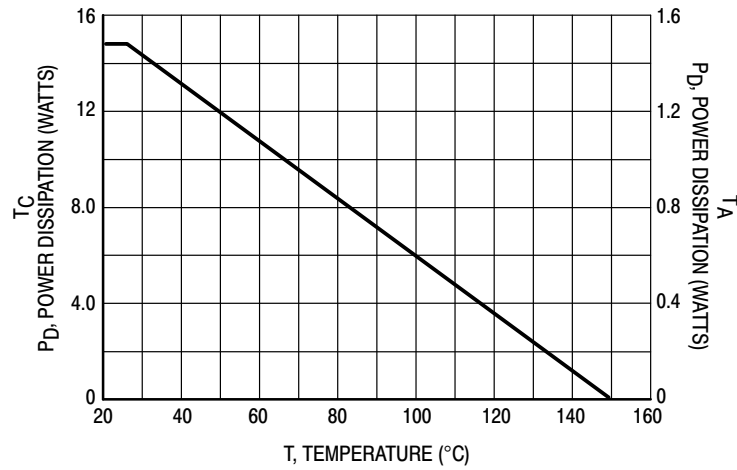


Figure 1. Power Derating

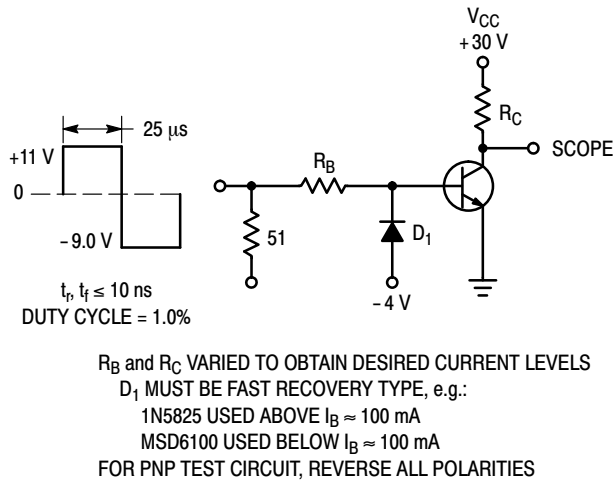


Figure 2. Switching Time Test Circuit

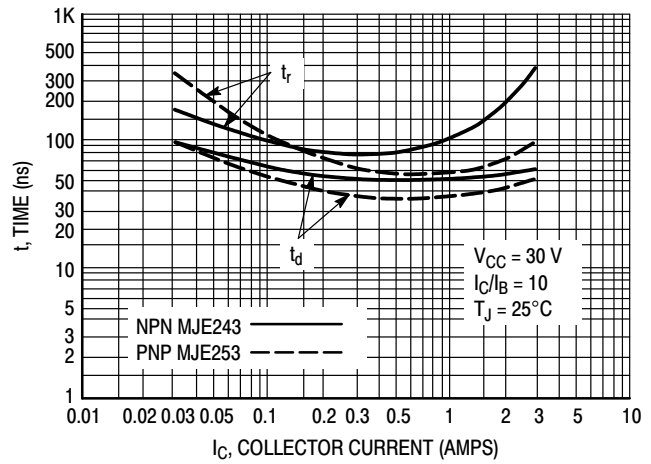


Figure 3. Turn-On Time

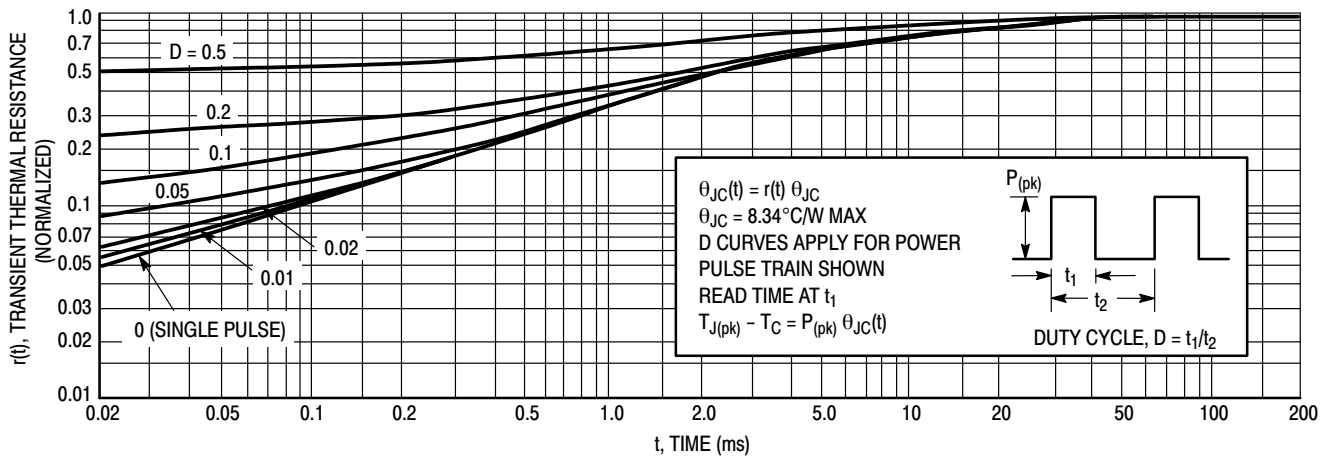


Figure 4. Thermal Response

## MJE243G (NPN),

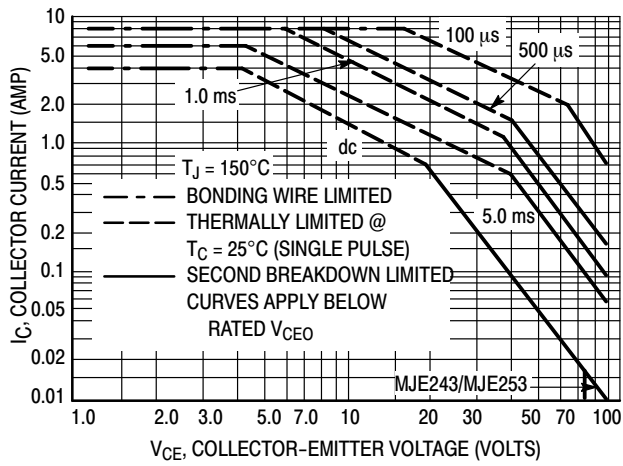


Figure 5. Active Region Safe Operating Area

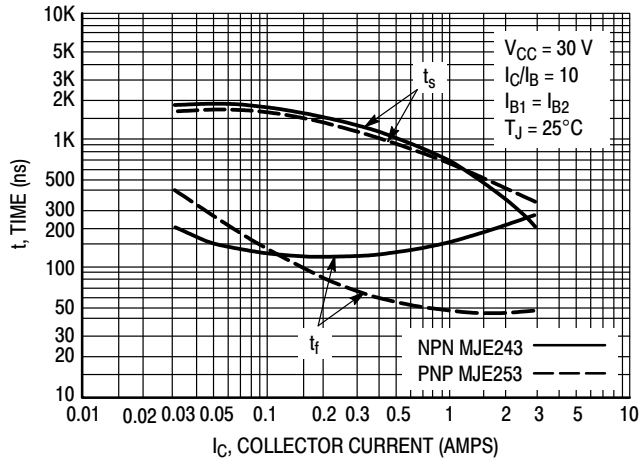


Figure 6. Turn-Off Time

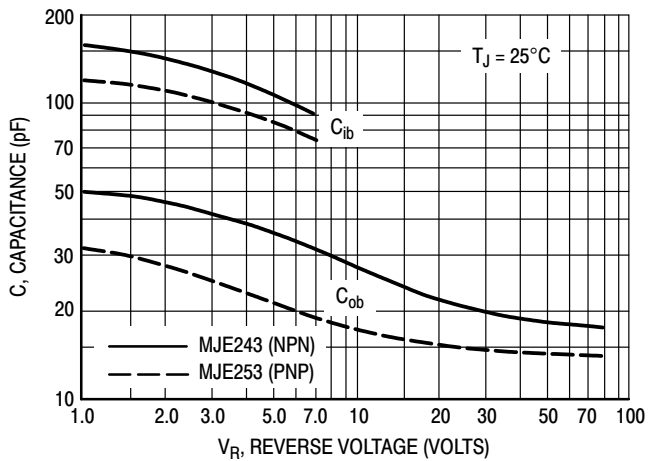


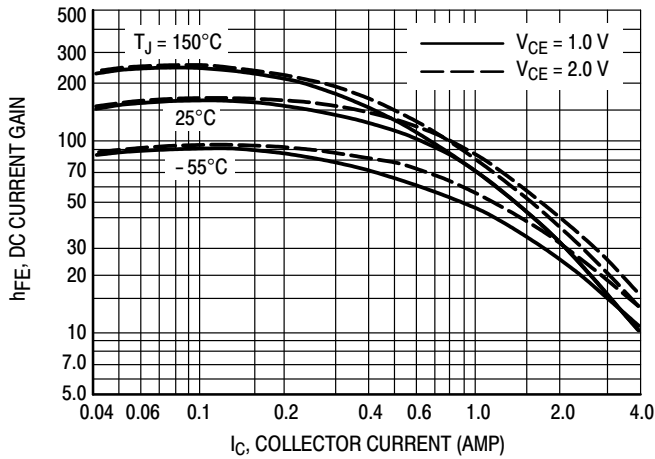
Figure 7. Capacitance

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.

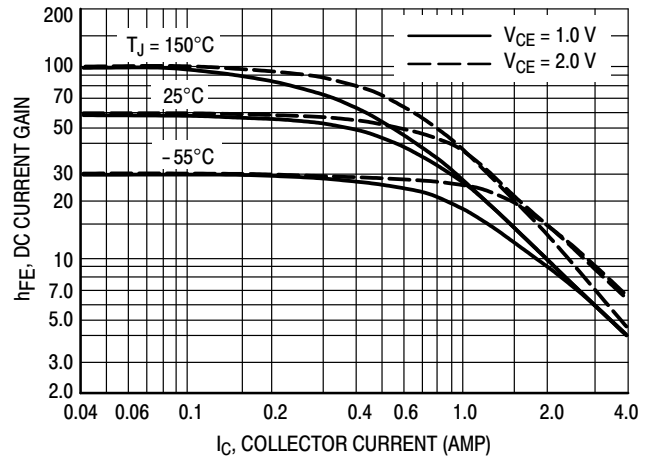
The data of Figure 5 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

# MJE243G (NPN),

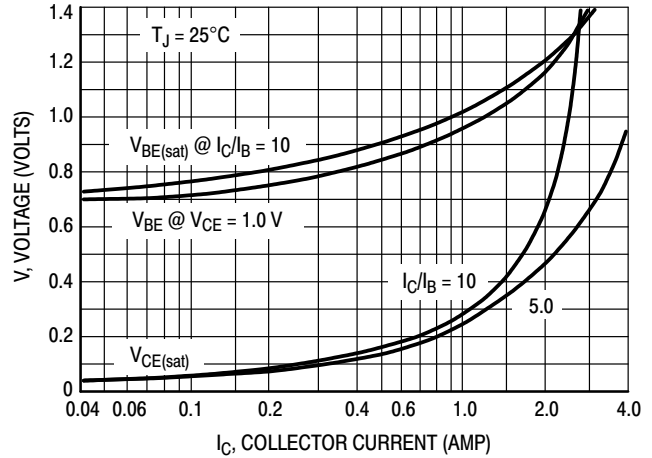
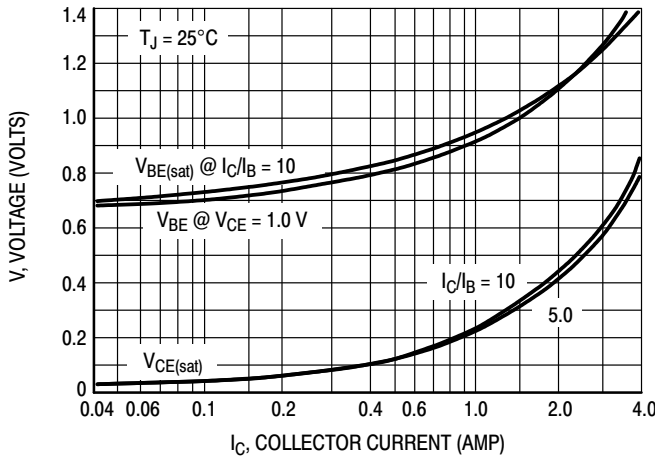
**NPN  
MJE243**



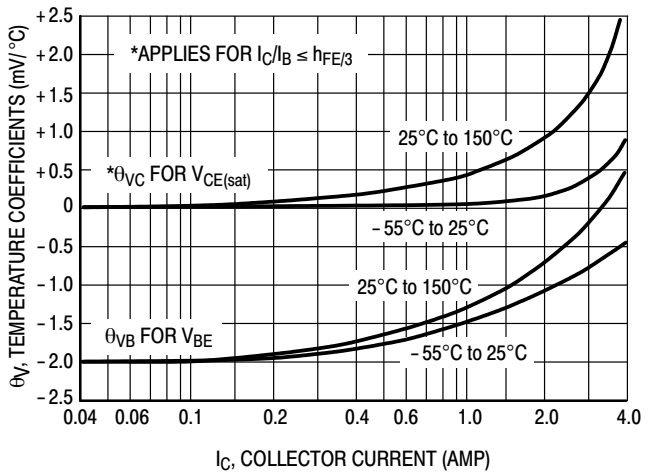
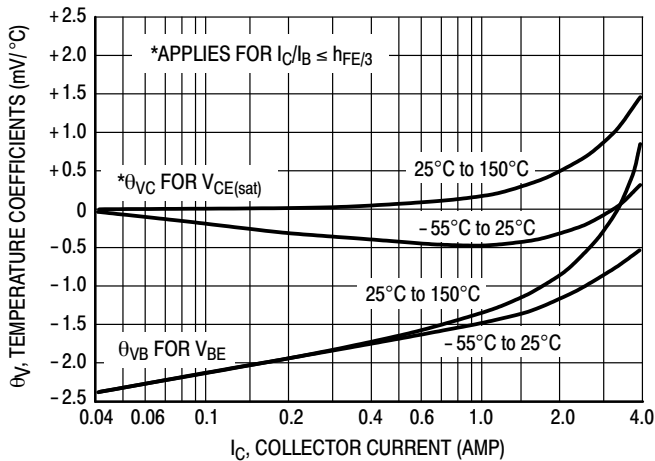
**PNP  
MJE253**



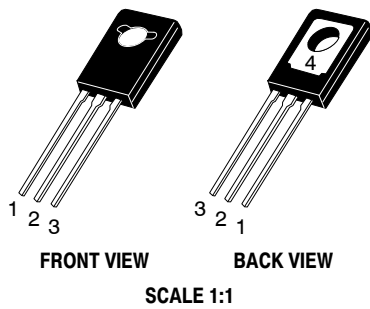
**Figure 8. DC Current Gain**



**Figure 9. "On" Voltages**

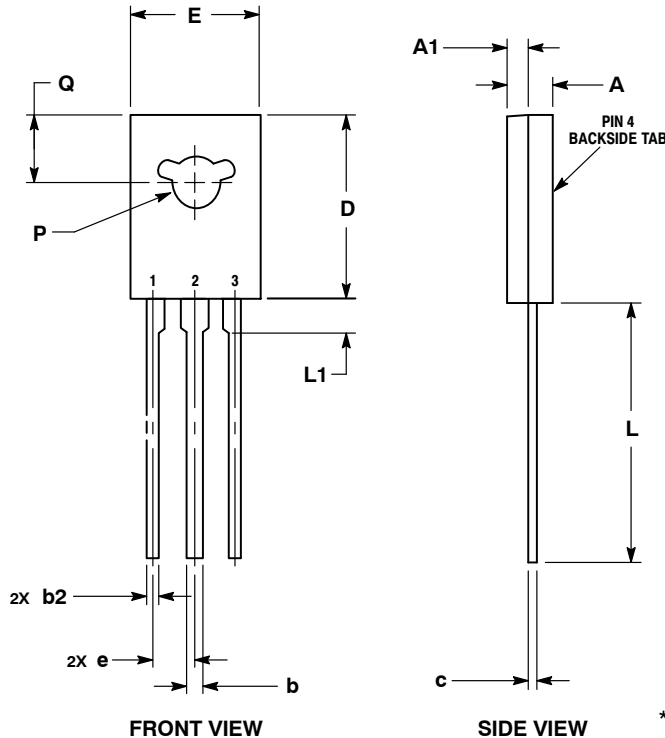


**Figure 10. Temperature Coefficients**



TO-225  
CASE 77-09  
ISSUE AD

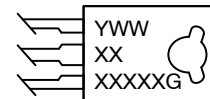
DATE 25 MAR 2015



- 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. Some products may not follow the Generic Marking.

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

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DESCRIPTION:	TO-225	PAGE 1 OF 1

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