Medium-Power Plastic NPN Silicon Transistors

2N4921G, 2N4922G, 2N4923G

These high−performance plastic devices are designed for driver circuits, switching, and amplifier applications.

Features

- Low Saturation Voltage
- Excellent Power Dissipation
- Excellent Safe Operating Area
- Complement to PNP 2N4920G
- These Devices are Pb−Free and are RoHS Compliant**

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}		Vdc
2N4921G		40	
2N4922G		60	
2N4923G		80	
Collector−Emitter Voltage	V_{CB}		Vdc
2N4921G		40	
2N4922G		60	
2N4923G		80	
Emitter Base Voltage	V_{EB}	5.0	Vdc
Collector Current − Continuous (Note 2)	I_C	1.0	Adc
Collector Current − Peak (Note 2)	I_{CM}	3.0	Adc
Base Current − Continuous	I_B	1.0	Adc
Total Power Dissipation	P_D		
@ $T_C = 25°C$		30	W
Derate above 25°C		0.24	mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +150	°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.

2. The 1.0 A maximum I_C value is based upon JEDEC current gain requirements. The 3.0 A maximum value is based upon actual current handling capability of the device (see Figures 5 and 6).

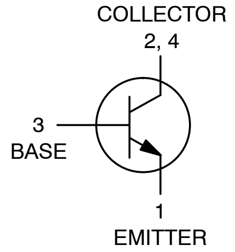
THERMAL CHARACTERISTICS (Note 3)

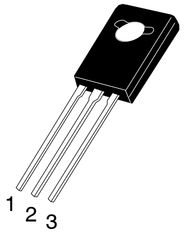
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	4.16	°C/W

3. Recommend use of thermal compound for lowest thermal resistance.

*Indicates JEDEC Registered Data.

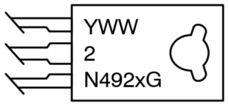
1.0 AMPERE GENERAL PURPOSE POWER TRANSISTORS 40−80 VOLTS, 30 WATTS





TO−225
CASE 77−09
STYLE 1

MARKING DIAGRAM



Y = Year
WW = Work Week
2N492x = Device Code
x = 1, 2, or 3
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
2N4922G	TO−225 (Pb−Free)	500 Units / Box
2N4923G	TO−225 (Pb−Free)	500 Units / Box

DISCONTINUED (Note 1)

Device	Package	Shipping
2N4921G	TO−225 (Pb−Free)	500 Units / Box

1. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

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

October, 2024 − Rev. 16

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Sustaining Voltage (Note 4) (I_C = 0.1 Adc, I_B = 0)	$V_{CEO(sus)}$			Vdc
2N4921G		40	–	
2N4922G		60	–	
2N4923G		80	–	
Collector Cutoff Current	I_{CEO}			mAdc
(V_{CE} = 20 Vdc, I_B = 0) 2N4921G		–	0.5	
(V_{CE} = 30 Vdc, I_B = 0) 2N4922G		–	0.5	
(V_{CE} = 40 Vdc, I_B = 0) 2N4923G		–	0.5	
Collector Cutoff Current	I_{CEX}			mAdc
(V_{CE} = Rated V_{CEO}, $V_{EB(off)}$ = 1.5 Vdc)		–	0.1	
(V_{CE} = Rated V_{CEO}, $V_{EB(off)}$ = 1.5 Vdc, T_C = 125°C)		–	0.5	
Collector Cutoff Current (V_{CB} = Rated V_{CB}, I_E = 0)	I_{CBO}	–	0.1	mAdc
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_C = 0)	I_{EBO}	–	1.0	mAdc
ON CHARACTERISTICS				
DC Current Gain (Note 4)	h_{FE}			–
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)		40	–	
(I_C = 500 mAdc, V_{CE} = 1.0 Vdc)		30	150	
(I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)		10	–	
Collector−Emitter Saturation Voltage (Note 4) (I_C = 1.0 Adc, I_B = 0.1 Adc)	$V_{CE(sat)}$	–	0.6	Vdc
Base−Emitter Saturation Voltage (Note 4) (I_C = 1.0 Adc, I_B = 0.1 Adc)	$V_{BE(sat)}$	–	1.3	Vdc
Base−Emitter On Voltage (Note 4) (I_C = 1.0 Adc, V_{CE} = 1.0 Vdc)	$V_{BE(on)}$	–	1.3	Vdc
SMALL−SIGNAL CHARACTERISTICS				
Current−Gain − Bandwidth Product (I_C = 250 mAdc, V_{CE} = 10 Vdc, f = 1.0 MHz)	f_T	3.0	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)	C_{ob}	–	100	pF
Small−Signal Current Gain (I_C = 250 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	25	–	–

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.

4. Pulse Test: PW ≈ 300 μs, Duty Cycle ≈ 2.0%.

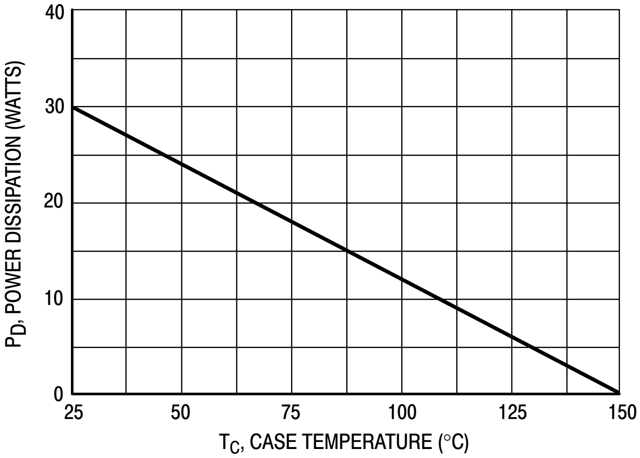


Figure 1. Power Derating

Safe Area Curves are indicated by Figure 5. All limits are applicable and must be observed.

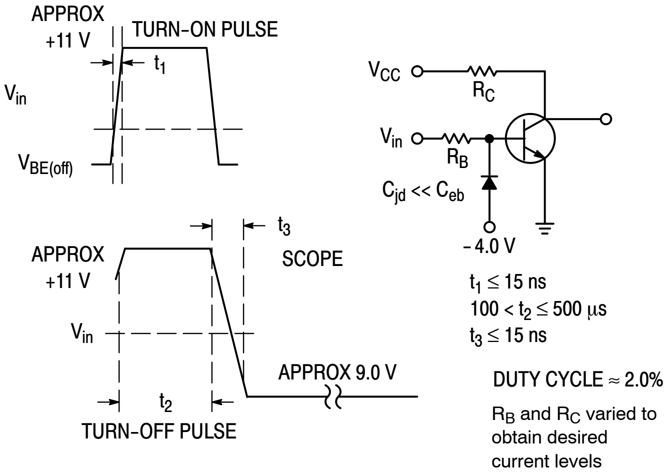


Figure 2. Switching Time Equivalent Circuit

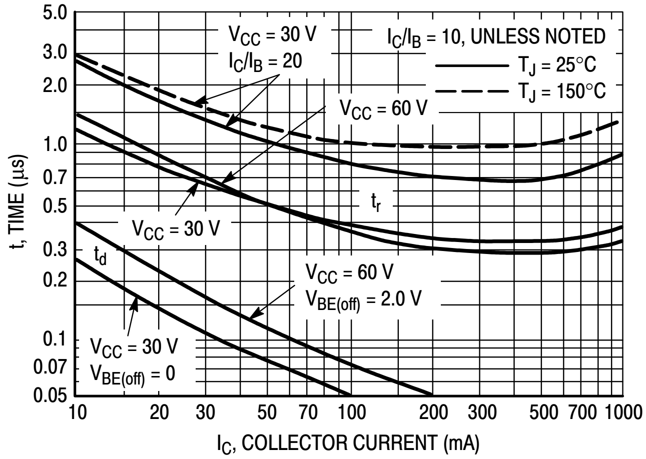


Figure 3. Turn−On Time

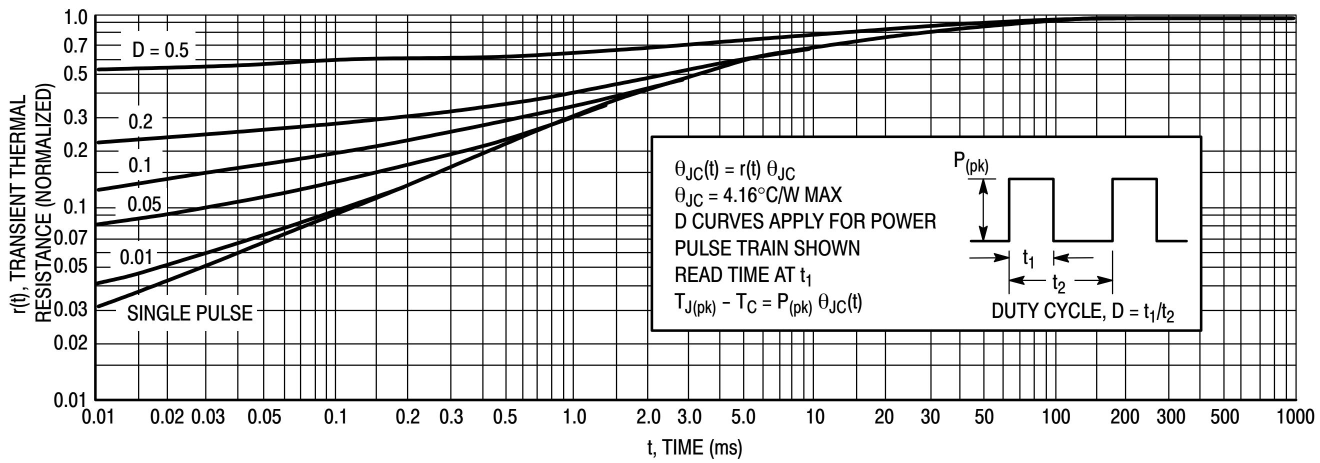


Figure 4. Thermal Response

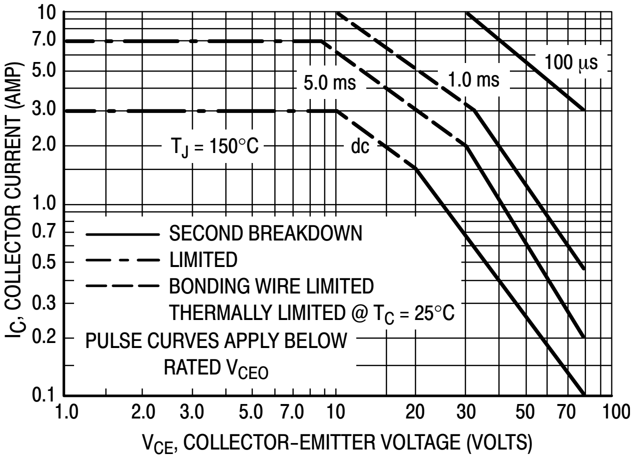


Figure 5. Active-Region Safe Operating Area

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

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

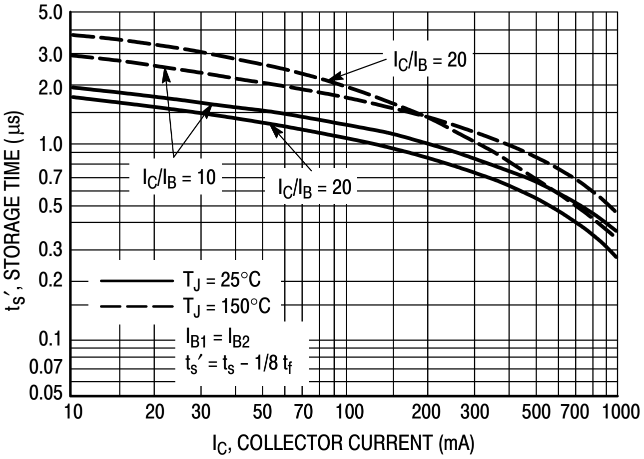


Figure 6. Storage Time

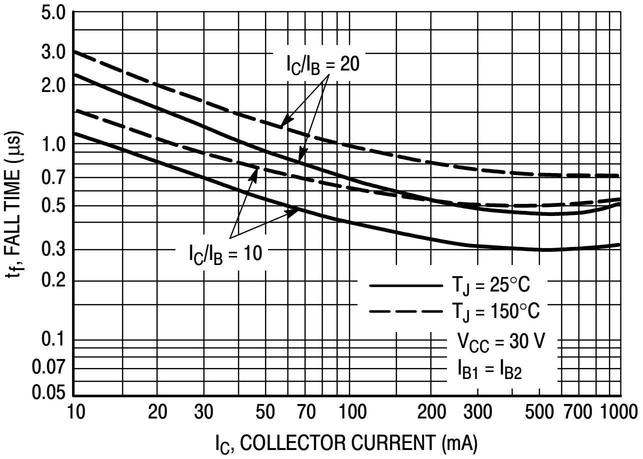


Figure 7. Fall Time

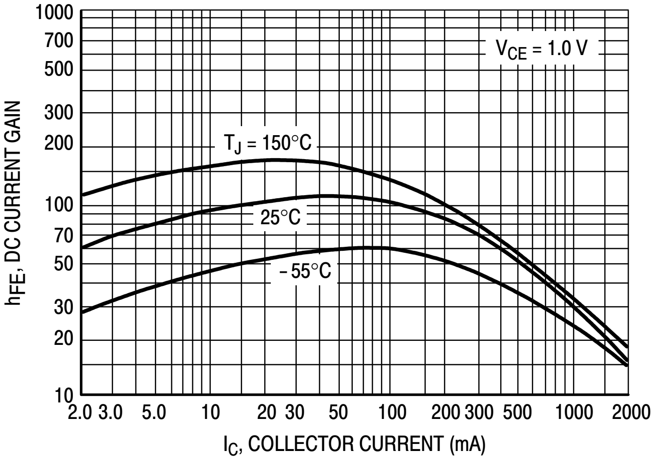


Figure 8. Current Gain

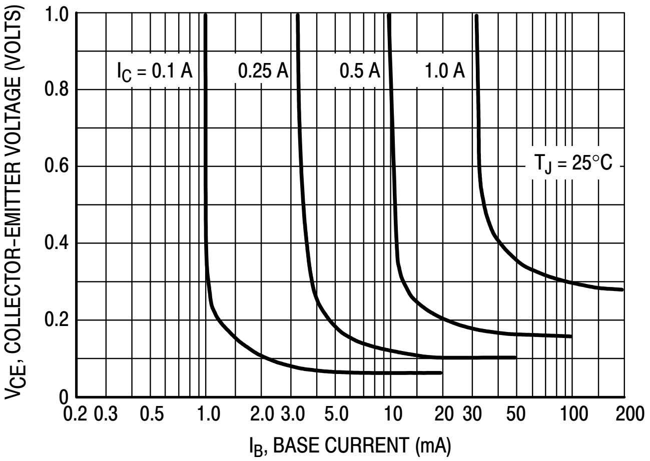


Figure 9. Collector Saturation Region

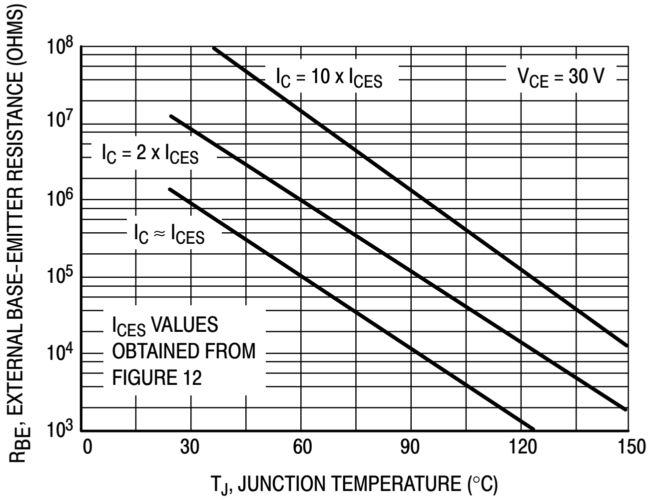


Figure 10. Effects of Base−Emitter Resistance

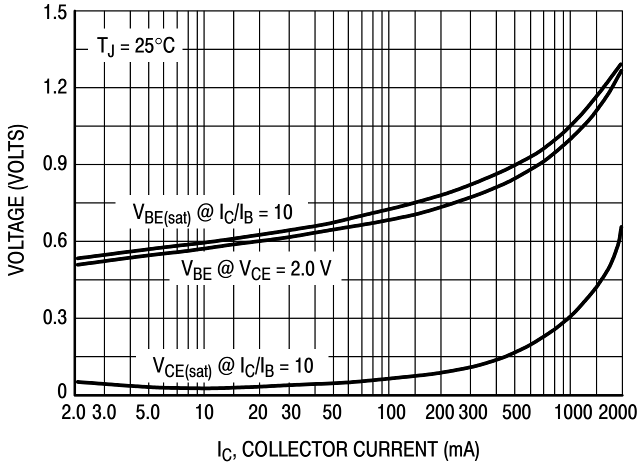


Figure 11. "On" Voltage

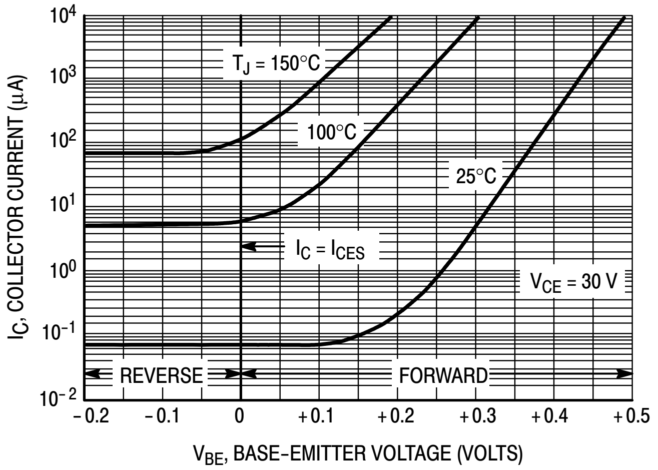


Figure 12. Collector Cut−Off Region

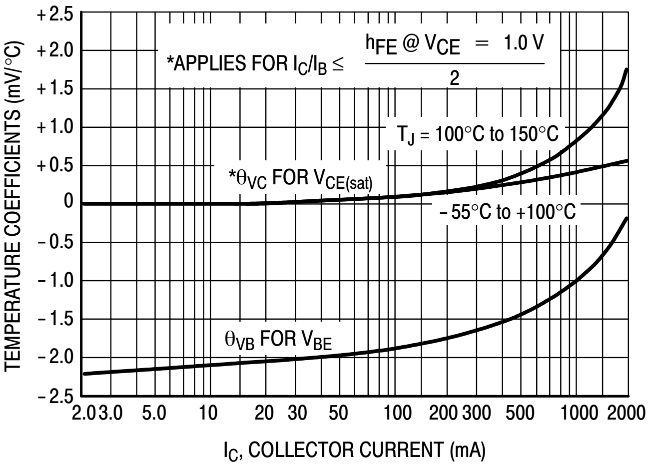


Figure 13. Temperature Coefficients

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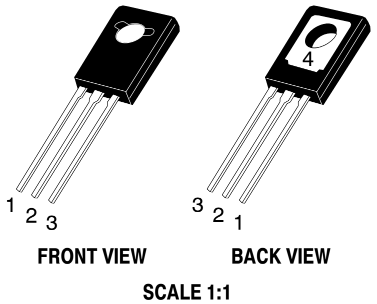
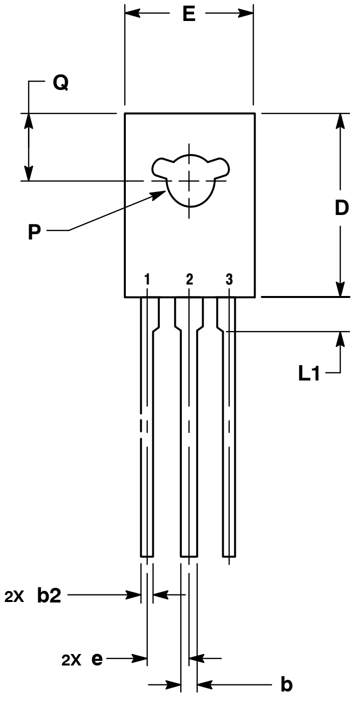
CASE 77−09
ISSUE AD

DATE 25 MAR 2015

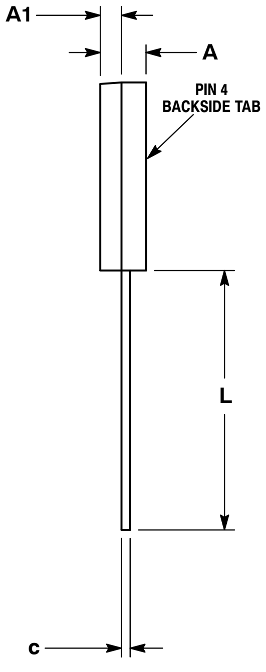


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

DIM	MILLIMETERS	
	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

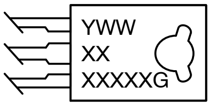


FRONT VIEW



SIDE VIEW

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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