

Germanium PNP Transistor

2N278

30/50V / 15A

DATASHEET

OEM – Delco

Source: Delco Power Transistors 1958

DELCO RADIO DIVISION

GENERAL MOTORS CORPORATION

KOKOMO, INDIANA

2N278**POWER TRANSISTOR**

Distributed in the U.K. by
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ENGINEERING DATA SHEET
SUPERSEDES ALL PREVIOUS DATA SHEETS

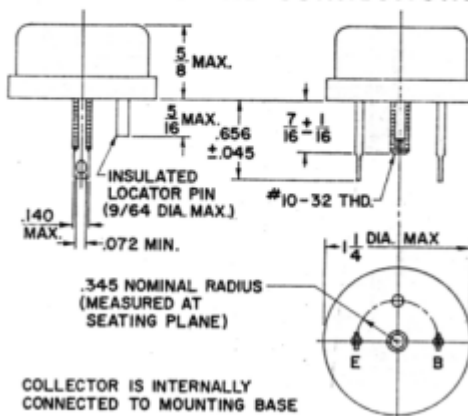
November 18, 1958

GENERAL DESCRIPTION

The improved Delco Radio Type 2N278 is a P-N-P germanium power transistor designed for general use with a 12 volt power supply. It is characterized by a new higher maximum emitter current of 15 amperes, a maximum collector diode voltage of 50 volts and a thermal resistance below 1° C per watt. A low saturation resistance will give higher efficiency in switching applications. The distortion is low both in class A operation and in class AB operation with matched pairs.

The case is hermetically sealed. The collector and the case are electrically connected.

The Delco 2N278 transistors will be supplied either in single units or in matched pairs.

DIMENSIONS AND CONNECTIONS**ABSOLUTE MAXIMUM RATINGS**

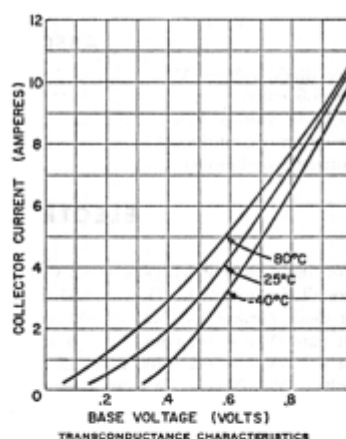
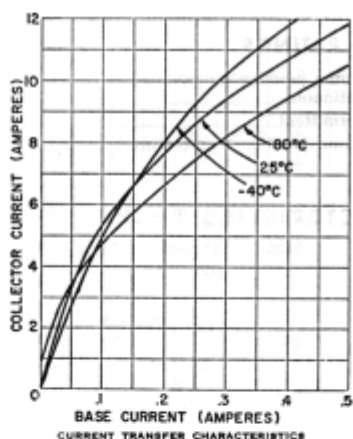
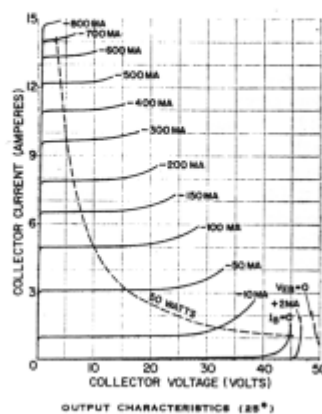
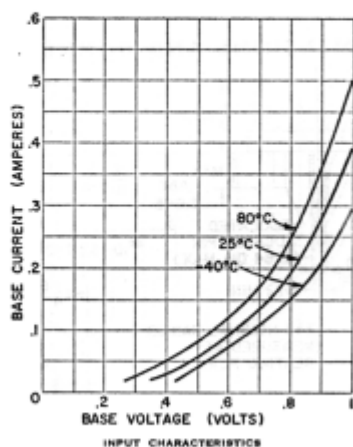
Collector diode voltage V_{CB} 50 volts	Maximum junction temperature	
($V_{EB} = -1.5$ volts)	Continuous	95°C
Emitter diode voltage V_{EB} 30 volts	Intermittent	100°C
Emitter current (continuous) 15 amp.	Minimum junction temperature	-65°C
Base current (continuous) 4 amp.		

ELECTRICAL CHARACTERISTICS $T = 25^\circ\text{C}$

	Min.	Typical	Max.	
Collector diode current I_{CO} ($V_{CB} = -2$ volts)		100		microamp
Collector diode current I_{CB} ($V_{CB} = -50$ volts)		2	8	ma
Emitter diode current I_{EO} ($V_{EB} = -30$ volts)		1	8	ma
Current gain ($V_{CB} = -2$ volts, $I_C = 5$ amps)	35		70	
Current gain ($V_{CB} = -2$ volts, $I_C = 12$ amps)		25		
Base voltage V_{EB} ($V_{CB} = -2$ volts, $I_C = 5$ amps)65		volt
Floating potential V_{EB} ($V_{CB} = -50$ volts, $I_E = 0$)			1	volt
Saturation voltage V_{BE} ($I_E = 2$ amp, $I_C = 12$ amps)3	1	volt
Punch through voltage	50			volts
Collector to emitter voltage V_{CES} ($I_C = 300$ ma d.c., $V_{EB} = 0$)	45			volts
Collector to emitter voltage V_{CE} ($I_C = 300$ ma d.c., $I_E = 0$)		45		volts
Common emitter current amplification cutoff frequency ($I_C = 5$ amp, $V_{CB} = -6$ volts)		10		kes
Rise time ("on" $I_C = 12$ Adc, $I_E = 2$ amp, $V_{CB} = -12$ volts)		15		microsec
Fall time ("off" $I_C = 0$, $V_{EB} = -6$ volts, $R_{EB} = 10$ ohms)		15		microsec

THERMAL CHARACTERISTICS

Thermal resistance (junction to mounting base)7	1	°C/watt
Thermal capacity for pulses in the 1 to 10 millisecond range075		watt sec/°C

2N278DELCO RADIO DIVISION
GENERAL MOTORS CORPORATION**TYPICAL CHARACTERISTICS, COMMON EMITTER****MECHANICAL DATA**

The 2N278 transistor has been designed to pass the following environmental tests: (The numbers refer to paragraphs of MIL-T-19500) Temperature Cycling (4.6.24), Glass Strain (4.6.25), Moisture Resistance (4.6.26), Shock (4.6.28), Vibration Fatigue (4.6.30), Vibration Noise (4.6.31), and Reduced Pressure (15 mm of mercury) (4.6.32). Maximum recommended torque on the mounting stud is twelve inch-pounds.

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KOKOMO, INDIANA

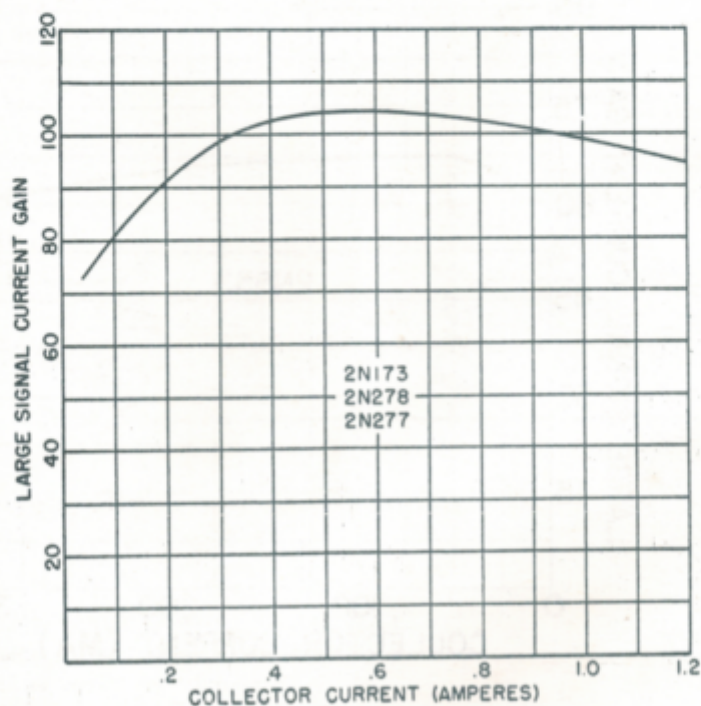
**LARGE SIGNAL CURRENT GAIN AT
LOW COLLECTOR CURRENTS**

APPLICATION NOTE 11-A

January 1, 1958

LARGE SIGNAL CURRENT GAIN AT LOW COLLECTOR CURRENTS

Many circuits using Delco power transistors draw currents less than one ampere. Because of the wide collector current range of the transistors, our engineering data sheets do not show in detail what typical current gain to expect at low values of collector current. The following graph shows the typical current gain of three of our transistors, when the collector current is less than 1.2 amperes.



**LARGE SIGNAL CURRENT GAIN
AT LOW COLLECTOR CURRENTS**

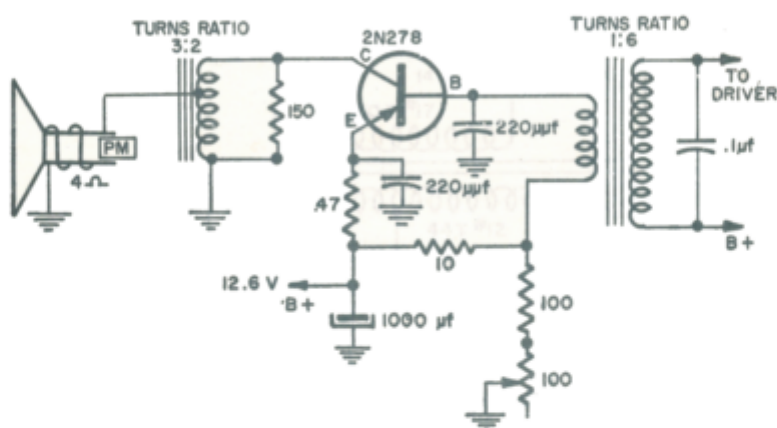
DELCO RADIO DIVISION
GENERAL MOTORS CORPORATION
KOKOMO, INDIANA

PONTIAC AUTOMOBILE RADIO - OUTPUT

APPLICATION NOTE 7-B

January 1, 1958

PONTIAC AUTOMOBILE RADIO - OUTPUT



1958-PONTIAC AUTOMOBILE RADIO — OUTPUT STAGE

THEORY OF OPERATION

Delco is currently producing automobile radios using a single ended transistor output stage. Because of the relative newness of this circuit, it is felt that a brief description of a typical output amplifier would be useful.

The stage is driven from a low voltage vacuum tube triode using transformer coupling. The transformer has a 6:1 turns ratio. The secondary winding connects the base of the transistor to a bias divider consisting of a ten ohm resistor and a 100 ohm resistor in series with a 100 ohm potentiometer. The potentiometer is used to control the DC bias of the transistor. The 0.47 ohm emitter resistor is used for stabilization, while the 150 ohm resistor across the auto-transformer is used to suppress inductive voltage spikes. The 1000 microfarad capacitor is used to filter the B supply, and the 220 micro-microfarad capacitors are used to reduce ignition noises. The 0.1 microfarad capacitor, across the primary of the transformer, is used to lower the resonant frequency of the transformer. The collector is connected to the speaker through an auto-transformer. The auto-transformer is used because the transistor will work better into a higher impedance load than the 4 ohms offered by the speaker.