

# New Jersey Semi-Conductor Products, Inc.

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## PNP GERMANIUM ALLOY JUNCTION POWER TRANSISTORS

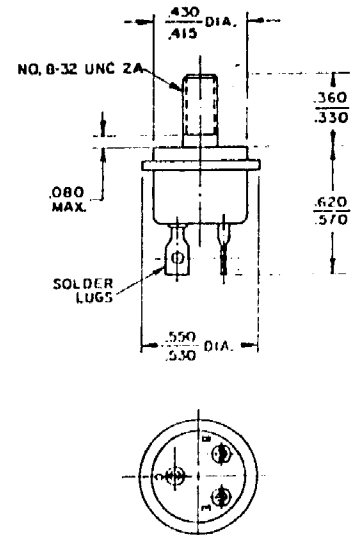
These hermetically sealed germanium PNP power transistors are designed for use in servo amplifiers, power converters, relay drives, voltage regulators, switching applications, etc. They are capable of dissipating 10 watts at a case temperature of 71°C and currents of 3 amp. Dynamic testing of electrical parameters assures conformance to users' requirements.

Welded construction of the TO 10 case and true hermetic seal of glass-to-metal terminal header provides assurance of performance in environmental extremes. Widely spaced terminal lugs are plated to facilitate lead attachment in production and are securely anchored to prevent possible damage in use. All heat sink surfaces are plated to avoid corrosion, which would otherwise introduce electrical or thermal discontinuities.

### DESIGN LIMITS

	2N538 2N538A	2N539 2N539A	2N540 2N540A
Collector-to-Base Voltage, $V_{CB}$	-80	-80	-80 Volts
Collector-to-Emitter Voltage, $V_{CE}$ Active Region (emitter forward biased)	-60	-55	-55 Volts
Cutoff Region (emitter reverse biased)	-80	-80	-80 Volts
Emitter-to-Base Voltage, $V_{EB}$	-28	-28	-28 Volts
Emitter Current (rms), $I_E$	-3.5	-3.5	-3.5 Amp.
Base Current (rms), $I_B$	-0.5	-0.5	-0.5 Amp.
Operating and Junction Temperature, $T_J$	-65 to +100	-65 to +100	-65 to +100°C
Thermal Resistance, Junction to Mounting Base $\theta$	2.2	2.2	2.2°C/W

2N538	2N539A
2N538A	2N540
2N539	2N540A



### CHARACTERISTICS AT 25° C

		Min.	Typ.	Max.	Unit
Current Gain, Common Emitter, $H_{FE}$ $I_C = -2a; V_{CE} = -2v$	2N538	20	30	50	—
	2N538A	20	30	50	—
	2N539	30	43	75	—
	2N539A	30	43	75	—
	2N540	45	64	113	—
	2N540A	45	64	113	—
Base-to-Emitter Voltage, $V_{BE}$ $I_C = -2a; V_{CE} = -2v$	2N538	-1.33	-2.2	-3.33	Volt
	2N538A	-1.33	-2.2	-3.33	Volt
	2N539	-1.0	-1.7	-2.5	Volt
	2N539A	-1.0	-1.7	-2.5	Volt
	2N540	-0.75	-1.3	-1.88	Volt
	2N540A	-0.75	-1.3	-1.88	Volt
Power Conductance- Common Emitter, $G_p$ $I_C = -2a; V_{CE} = -2v$	2N538A	17.5	27	52	Mho
	2N539A	35	51	105	Mho
	2N540A	71	100	213	Mho
Input Resistance- Common Emitter, $H_{ie}$ $I_C = -2a; V_{CE} = -2v$	2N538A	24	33	48	Ohm
	2N539A	27	37	54	Ohm
	2N540A	30	42	60	Ohm
Thermal Resistance, Junction-Mounting Base, $\theta$		—	1.7	2.2	°C/W
Time response of Junction Temperature, $\tau$		10	30	—	Ms

		Min.	Typ.	Max.	Unit
Collector Junction Leakage Current, $I_{CBO}$	$I_E = 0$	—	—	—	—
	$V_{CB} = -2v$	—	-0.04	-0.1	ma
	$V_{CB} = -28v$	—	-0.1	-1.0	ma
	$V_{CB} = -80v$	—	—	-2.0	ma
Alpha = 1 Voltage, Collector Junction, $V_{\alpha} = 1$	See Reverse side	-60	(2N538, 2N538A)	—	Volts
		-55	(2N539, 2N539A)	—	Volts
		-55	(2N540, 2N540A)	—	Volts
Emitter Floating Potential, $V_{EFF}$	$R_{EB} = 10K$	—	—	—	—
	$V_{CB} = 60V$	—	-0.1	-0.3	Volt
	$V_{CB} = -80V$	—	—	-0.5	Volt
Emitter Junction Leakage Current, $I_{EBO}$	$I_C = 0$	—	—	—	—
	$V_{EB} = -2V$	—	-0.03	-0.15	ma
	$V_{EB} = -28V$	—	-0.15	-2.0	ma
Collector Saturation Voltage, $V_s$	$I_C = -2a$ $I_B = -200ma$	—	-0.15	-0.6	Volt
Gain Bandwidth Product $f_{h\alpha} \cdot f_{\alpha\omega} (\approx f_{\alpha\omega})$	$I_C = -100ma$ $V_{CE} = -4v$ $I_B = -1ma$	200	—	—	KC

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