MOTOROLA
SEMICONDUCTOR TECHNICAL DATA

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by 2N3439JAN/D

2N3439JAN, JTX, JTXV
2N3440JTX, JTXV

Processed per MIL–S–19500/368

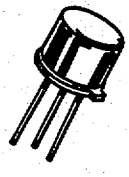
NPN Silicon
Small–Signal Transistors

CPTO
Commercial Plus Technologies Operation

. . .designed for high–voltage amplifier applications.

MAXIMUM RATINGS

Rating	Symbol	2N3439	2N3440	Unit
Collector–Emitter Voltage	V_{CEO}	350	250	Vdc
Collector–Base Voltage	V_{CBO}	450	300	Vdc
Collector–Base Voltage @ 100,000 Ft. Altitude	V_{CB}	300		Vdc
Emitter–Base Voltage	V_{EBO}	7.0		Vdc
Collector Current — Continuous	I_C	1.0		Adc
Power Dissipation @ T_A = 25°C Derate above 25°C @ T_C = 100°C Derate above 100°C	P_D	0.8 4.57 5.0 28.5		Watts mW/°C Watts W/°C
Operating Junction and Storage Temperature Range	T_J, T_{stg}	– 65 to 200		°C



CASE 79-04, STYLE 1
TO-205AD (TO-39)

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (I_C = 50 mAdc, I_B = 0)	2N3439 2N3440	$V_{(BR)CEO}$	 350 250	 — —	Vdc
Collector Cutoff Current (V_{CE} = 300 Vdc, I_B = 0) (V_{CE} = 200 Vdc, I_B = 0)	 2N3439 2N3440	I_{CEO}	 — —	 2.0 2.0	µAdc
Collector Cutoff Current (V_{CE} = Rated V_{CBO}, V_{BE} = –1.5 Vdc)		I_{CEX}	—	5.0	µAdc
Collector Cutoff Current (V_{CB} = 450 Vdc) (V_{CB} = 360 Vdc) (V_{CB} = 360 Vdc, T_A = 150°C) (V_{CB} = 300 Vdc) (V_{CB} = 250 Vdc) (V_{CB} = 250 Vdc, T_A = 150°C)	 2N3439 2N3440 	I_{CBO}	 — — — — — —	 5.0 2.0 100 5.0 2.0 100	µAdc µAdc
Emitter Cutoff Current (V_{BE} = 7.0 Vdc)		I_{EBO}	—	10	µAdc

(continued)

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ELECTRICAL CHARACTERISTICS — continued (T_A = 25°C unless otherwise noted.)				
Characteristic	**Symbol**	**Min**	**Max**	**Unit**
ON CHARACTERISTICS(1)				
DC Current Gain (I_C = 0.2 mAdc, V_{CE} = 10 Vdc) (I_C = 2.0 mAdc, V_{CE} = 10 Vdc) (I_C = 20 mAdc, V_{CE} = 10 Vdc) (I_C = 20 mAdc, V_{CE} = 10 Vdc, T_A = −55°C)	h_{FE}	 10 30 40 15	 — — 160 —	—
Collector–Emitter Saturation Voltage (I_C = 50 mAdc, I_B = 4.0 mAdc)	$V_{CE(sat)}$	—	0.5	Vdc
Base–Emitter Saturation Voltage (I_C = 50 mAdc, I_B = 4.0 mAdc)	$V_{BE(sat)}$	—	1.3	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Output Capacitance (V_{CB} = 10 Vdc, f = 0.1 to 1.0 MHz)	C_{obo}	—	10	pF
Input Capacitance (V_{BE} = 5.0 Vdc, f = 0.1 to 1.0 MHz)	C_{ibo}	—	75	pF
Current Gain (I_C = 5.0 mAdc, V_{CE} = 10 Vdc) f = 1.0 kHz	h_{fe}	25	—	—
Small–Signal Current Transfer Ratio, Magnitude (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 5.0 MHz)	$\|h_{fe}\|$	3.0	15	—
Real–Time Part of Input Impedance (I_C = 5.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 MHz)	$RE_{(hie)}$	—	300	ohms
SWITCHING CHARACTERISTICS (See Section 4, Figure 7) (I_{B1} = 0.6 Adc, I_{B2} = 1.5 Adc)				
Turn–On Time	t_{on}	—	1.0	µs
Turn–Off Time	t_{off}	—	10	µs

ASSURANCE TESTING (Pre/Post Burn–In) **Burn–In Conditions: T_A = 25 ±3°C, V_{CB} = 200 Vdc, P_D = 600 mW**				
Characteristics Tested	**Symbol**	**Initial and End Point Limits**		**Unit**
		Min	**Max**	
Collector Cutoff Current (V_{CE} = 300 Vdc) 2N3439 (V_{CE} = 200 Vdc) 2N3440	I_{CEO}	 — —	 20 20	µAdc
DC Current Gain(1) (I_C = 20 mAdc, V_{CE} = 10 Vdc)	h_{FE}	40	160	—

Delta from Pre–Burn–In Measured Values		**Min**	**Max**	
Delta Collector Cutoff Current	ΔI_{CBO}	—	±100 or ± 0.5 whichever is greater	% of Initial Value µAdc
Delta DC Current Gain(1)	Δh_{FE}	—	±20	% of Initial Value

(1) Pulsed. Pulse Width 250 to 350 µs, Duty Cycle 1.0 to 2.0%.

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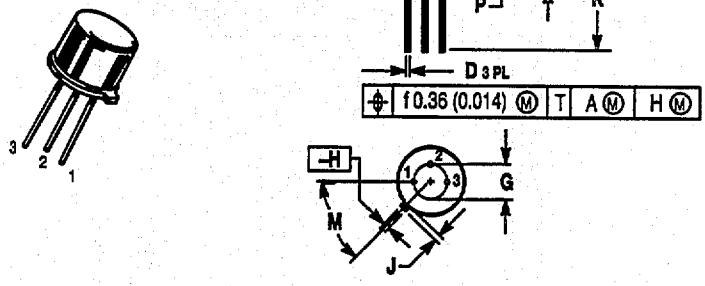
PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
4. DIMENSION B SHALL NOT VARY MORE THAN 0.25 (0.010) IN ZONE R. THIS ZONE CONTROLLED FOR AUTOMATIC HANDLING.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L. DIMENSION D APPLIES BETWEEN DIMENSION L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 3:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 4:
PIN 1. MAIN TERM. 1
2. GATE
3. MAIN TERM. 2

STYLE 5:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

STYLE 6:
PIN 1. SOURCE
2. GATE
3. DRAIN
(CASE)

STYLE 7:
PIN 1. DRAIN
2. GATE
3. SOURCE

STYLE 8:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 9:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 10:
PIN 1. COLLECTOR
2. EMITTER
3. BASE

STYLE 11:
PIN 1. ANODE
2. OPEN
3. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.53	0.016	0.021
E	0.23	1.04	0.009	0.041
F	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.72	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	19.05	0.500	0.750
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
P	–	1.27	–	0.050
R	2.54	–	0.100	–

CASE 79-04
TO-205AD
(TO-39)

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