2N4029, 2N4033

Product Preview

Small Signal Switching Transistor

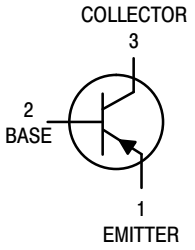
PNP Silicon

ON Semiconductor®

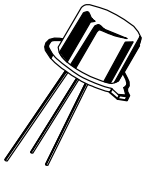
http://onsemi.com

Features

- MIL−PRF−19500/512 Qualified
- Available as JAN, JANTX, and JANTXV



TO−18
CASE 206AA
STYLE 1
2N4029



TO−39
CASE 205AB
STYLE 1
2N4033

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	−80	Vdc
Collector − Base Voltage	V_{CBO}	−80	Vdc
Emitter − Base Voltage	V_{EBO}	−5.0	Vdc
Collector Current − Continuous	I_C	1	Adc
Total Device Dissipation @ T_A = 25°C 2N4029 2N4033	P_T	 0.5 0.8	W
Total Device Dissipation @ T_C = 25°C 2N4029 2N4033	P_T	 1.0 4.0	W
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient 2N4029 2N4033	$R_{\theta JA}$	 325 195	°C/W
Thermal Resistance, Junction−to−Case 2N4029 2N4033	$R_{\theta JC}$	 150 40	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

ORDERING INFORMATION

Level	Device	Package	Shipping
JAN JANTX JANTXV	2N4029	TO−18	Bulk
	2N4033	TO−39	Bulk

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

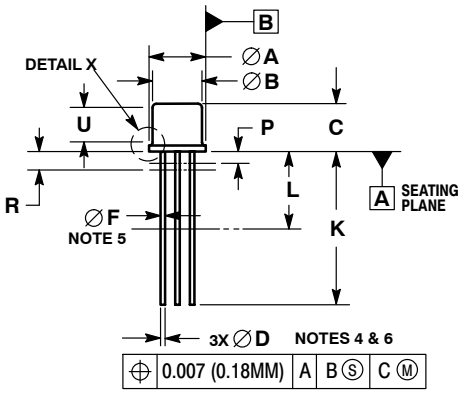
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

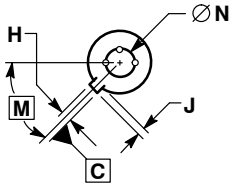
Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector – Emitter Breakdown Voltage (I_C = –10 mAdc)	$V_{(BR)CEO}$	–80	–	Vdc
Collector – Emitter Cutoff Current (V_{CE} = –60 Vdc)	I_{CES}	–	–25	nAdc
Collector–Base Cutoff Current (V_{CB} = –80 Vdc, I_E = 0) (V_{CB} = –60 Vdc, I_E = 0)	I_{CBO}	– –	–10 –10	μA nA
Emitter–Base Cutoff Current (V_{EB} = –5 Vdc) (V_{EB} = –3 Vdc)	I_{EBO}	– –	–10 –25	μA nA
ON CHARACTERISTICS (Note 1)				
DC Current Gain (I_C = –0.1 mAdc, V_{CE} = –5 Vdc) (I_C = –100 mAdc, V_{CE} = –5 Vdc) (I_C = –500 mAdc, V_{CE} = –5 Vdc) (I_C = –1 Adc, V_{CE} = –5 Vdc)	h_{FE}	50 100 70 25	– 300 – –	–
Collector – Emitter Saturation Voltage (I_C = –150 mAdc, I_B = –15 mAdc) (I_C = –500 mAdc, I_B = –50 mAdc) (I_C = –1 Adc, I_B = –100 mAdc)	$V_{CE(sat)}$	– – –	–0.15 –0.5 –1.0	Vdc
Base – Emitter Saturation Voltage (I_C = –150 mAdc, I_B = –15 mAdc) (I_C = –500 mAdc, I_B = –50 mAdc)	$V_{BE(sat)}$	– –	–0.9 –1.2	Vdc
SMALL–SIGNAL CHARACTERISTICS				
Magnitude of Small–Signal Current Gain (I_C = –50 mAdc, V_{CE} = –10 Vdc, f = 100 MHz)	$\|h_{fe}\|$	1.5	6.0	–
Output Capacitance (V_{CB} = –10 Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz)	C_{obo}	–	20	pF
Input Capacitance (V_{EB} = –0.5 Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz)	C_{ibo}	–	80	pF
SWITCHING CHARACTERISTICS				
Delay Time (Reference Figure in MIL–PRF–19500/512)	t_d	–	15	ns
Rise Time (Reference Figure in MIL–PRF–19500/512)	t_r	–	25	ns
Storage Time (Reference Figure in MIL–PRF–19500/512)	t_s	–	175	ns
Fall Time (Reference Figure in MIL–PRF–19500/512)	t_f	–	35	ns

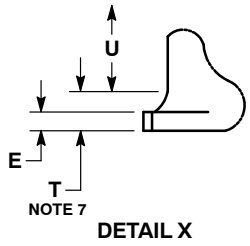
1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

PACKAGE DIMENSIONS

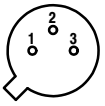
TO−18 3
CASE 206AA
ISSUE A







DETAIL X



LEAD IDENTIFICATION DETAIL

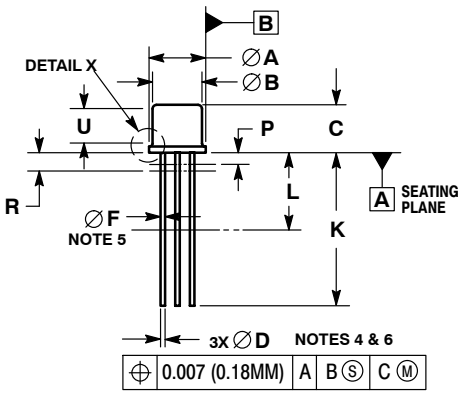
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION J MEASURED FROM DIAMETER A TO EDGE.
4. LEAD TRUE POSITION TO BE DETERMINED AT THE GUAGE PLANE DEFINED BY DIMENSION R.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L.
6. DIMENSION D APPLIES BETWEEN DIMENSION L AND K.
7. BODY CONTOUR OPTIONAL WITHIN ZONE DEFINED BY DIMENSIONS A, B, AND T.

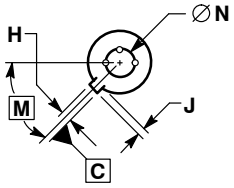
	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.53	0.016	0.021
E	---	0.76	---	0.030
F	0.41	0.48	0.016	0.019
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	19.05	0.500	0.750
L	6.35	---	0.250	---
M	45 ° BSC		45 ° BSC	
N	2.54 BSC		0.100 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

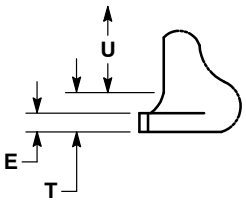
STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

PACKAGE DIMENSIONS

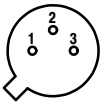
TO−39 3−Lead
CASE 205AB
ISSUE A







DETAIL X



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3. DIMENSION J MEASURED FROM DIAMETER A TO EDGE.
4. LEAD TRUE POSITION TO BE DETERMINED AT THE GUAGE PLANE DEFINED BY DIMENSION R.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L.
6. DIMENSION D APPLIES BETWEEN DIMENSION L AND K.
7. BODY CONTOUR OPTIONAL WITHIN ZONE DEFINED BY DIMENSIONS A, B, AND T.
8. DIMENSION B SHALL NOT VARY MORE THAN 0.010 IN ZONE P.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.48	0.016	0.019
E	0.23	3.18	0.009	0.125
F	0.41	0.48	0.016	0.019
H	0.71	0.86	0.028	0.034
J	0.73	1.02	0.029	0.040
K	12.70	14.73	0.500	0.580
L	6.35	---	0.250	---
M	45 ° BSC		45 ° BSC	
N	5.08 BSC		0.200 BSC	
P	---	1.27	---	0.050
R	1.37 BSC		0.054 BSC	
T	---	0.76	---	0.030
U	2.54	---	0.100	---

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

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