2N4208
2N4209

JAN TX, TXV AVAILABLE
CASE 22-03, STYLE 1
TO-18 (TO-206AA)

SWITCHING TRANSISTOR

PNP SILICON

4

MAXIMUM RATINGS

Rating	Symbol	2N4208	2N4209	Unit
Collector-Emitter Voltage	V_{CEO}	12	15	Vdc
Collector-Base Voltage	V_{CBO}	12	15	Vdc
Emitter-Base Voltage	V_{EBO}	4.5		Vdc
Collector Current — Continuous	I_C	50–200		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.30–0.36 1.72–2.06		Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	0.70–1.2 4.0–6.9		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage(1) (I_C = 3.0 mAdc, I_B = 0)	2N4208	$V_{(BR)CEO}$	12	—	—	Vdc
	2N4209		15	—	—	
Collector-Emitter Breakdown Voltage (I_C = 100 μAdc, V_{BE} = 0)	2N4208	$V_{(BR)CES}$	12	—	—	Vdc
	2N4209		15	—	—	
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	2N4208	$V_{(BR)CBO}$	12	—	—	Vdc
	2N4209		15	—	—	
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		$V_{(BR)EBO}$	4.5	5.9	—	Vdc
Collector Cutoff Current (V_{CE} = 6.0 Vdc, V_{BE} = 0)	2N4208	I_{CES}	—	—	10	nAdc
(V_{CE} = 8.0 Vdc, V_{BE} = 0)	2N4209		—	—	10	
(V_{CE} = 6.0 Vdc, V_{BE} = 0, T_A = 125°C)	2N4208		—	—	5.0	μAdc
(V_{CE} = 8.0 Vdc, V_{BE} = 0, T_A = 125°C)	2N4209		—	—	5.0	
Base Current (V_{CE} = 6.0 Vdc, V_{BE} = 0)	2N4208	I_B	—	—	1.0	nAdc
(V_{CE} = 8.0 Vdc, V_{BE} = 0)	2N4209		—	—	1.0	
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				—
(I_C = 1.0 mAdc, V_{CE} = 0.5 Vdc)	2N4208		15	—	—	
	2N4209		35	—	—	
(I_C = 10 mAdc, V_{CE} = 0.3 Vdc)	2N4208		30	—	120	
	2N4209		50	—	120	
(I_C = 10 mAdc, V_{CE} = 0.3 Vdc, T_A = −55°C)	2N4208		12	—	—	
	2N4209		20	—	—	
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)(1)	2N4208		30	—	—	
	2N4209		40	—	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$				Vdc
(I_C = 1.0 mAdc, I_B = 0.1 mAdc)	2N4208		—	—	0.13	
	2N4209		—	—	0.15	
(I_C = 10 mAdc, I_B = 1.0 mAdc)	2N4208		—	—	0.15	
	2N4209		—	—	0.18	
(I_C = 50 mAdc, I_B = 5.0 mAdc)(1)	2N4208		—	—	0.5	
	2N4209		—	—	0.6	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$				Vdc
(I_C = 1.0 mAdc, I_B = 0.1 mAdc)			—	0.7	0.8	
(I_C = 10 mAdc, I_B = 1.0 mAdc)			0.75	0.86	0.90	
(I_C = 50 mAdc, I_B = 5.0 mAdc)(1)			—	1.1	1.5	

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

Characteristic		Symbol	Min	Typ	Max	Unit
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain — Bandwidth Product (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	2N4208 2N4209	f_T	 700 850	 1000 1100	 — —	MHz
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 140 kHz)		C_{obo}	—	2.0	3.0	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 140 kHz)		C_{ibo}	—	2.0	3.5	pF
SWITCHING CHARACTERISTICS						
Turn-On Time	(V_{CC} = 1.5 Vdc, V_{BE} = 0, I_C = 10 mAdc, I_{B1} = 1.0 mAdc)	t_{on}	—	10	15	ns
Delay Time		t_d	—	5.0	10	ns
Rise Time		t_r	—	5.0	15	ns
Turn-Off Time	(V_{CC} = 1.5 Vdc, I_C = 10 mAdc, I_{B1} = I_{B2} = 1.0 mAdc) 2N4208 2N4209	t_{off}	— —	12 16	15 20	ns
Storage Time	2N4208 2N4209	t_s	— —	12 17	15 20	ns
Fall Time	2N4208 2N4209	t_f	—	6.0 8.0	10 10	ns
Storage Time ($I_C \approx$ 10 mAdc, $I_{B1} \approx$ 10 mAdc, $I_{B2} \approx$ 10 mAdc)	2N4208 2N4209	t_s	 — —	 — —	 15 20	ns

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
(2) f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.