

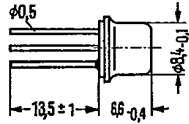
NPN Silicon Planar Transistors

2 N 2218
2 N 2219
2 N 2218 A
2 N 2219 A

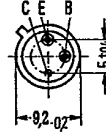
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2 N 2218, 2 N 2219, 2 N 2218 A, and 2 N 2219 A are epitaxial NPN silicon planar transistors in TO 39 case (5 C 3 DIN 41873). The collector is electrically connected to the case. The transistors are particularly suitable for use as high-speed switches of medium performance.

Type	Ordering code
2 N 2218	Q62702-F109
2 N 2219	Q62702-F133
2 N 2218 A	Q62702-S29
2 N 2219 A	Q62702-F59



Approx. weight 1.5 g



Dimensions in mm

Maximum ratings

	2 N 2218 2 N 2219	2 N 2218 A 2 N 2219 A	
Collector-base voltage	60	75	V
Collector-emitter voltage	30	40	V
Emitter-base voltage	5	6	V
Collector current	0.8	0.8	A
Junction temperature	175	175	°C
Storage temperature range	-65 to +200		°C
Total power dissipation ($T_{amb} \leq 25\text{ °C}$)	0.8	0.8	W
Total power dissipation ($T_{case} \leq 25\text{ °C}$)	3	3	W

Thermal resistance

Junction to ambient air	R_{thJA}	≤ 188	≤ 188	K/W
Junction to case	R_{thJC}	≤ 50	≤ 50	K/W

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Static characteristics ($T_{amb} = 25^\circ\text{C}$)

		2 N 2218	2 N 2219	
Collector-emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{CEsat}	≤ 0.4	≤ 0.4	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{CEsat}	≤ 1.6	≤ 1.6	V
Base emitter saturation voltage ($I_C = 150\text{ mA}$; $I_B = 15\text{ mA}$)	V_{BEsat}	0.6 to 2	0.6 to 2	V
($I_C = 500\text{ mA}$; $I_B = 50\text{ mA}$)	V_{BEsat}	≤ 2.6	≤ 2.6	V
Collector cutoff current ($V_{CBO} = 50\text{ V}$)	I_{CBO}	≤ 0.01	≤ 0.01	μA
($V_{CBO} = 50\text{ V}$; $T_{amb} = 150^\circ\text{C}$)	I_{CBO}	≤ 10	≤ 10	μA
Collector-emitter breakdown voltage ($I_C = 10\text{ mA}$; $I_B = 0$)	$V_{(BR)CEO}$	30	30	V
Collector-base breakdown voltage ($I_C = 10\text{ }\mu\text{A}$; $I_E = 0$)	$V_{(BR)CBO}$	60	60	V
Emitter-base breakdown voltage ($I_E = 10\text{ }\mu\text{A}$; $I_C = 0$)	$V_{(BR)EBO}$	5	5	V
DC current gain ($V_{CE} = 10\text{ V}$; $I_C = 0.1\text{ mA}$)	h_{FE}	> 20	> 35	-
($V_{CE} = 10\text{ V}$; $I_C = 1\text{ mA}$)	h_{FE}	> 25	> 50	-
($V_{CE} = 10\text{ V}$; $I_C = 10\text{ mA}$)	h_{FE}	> 35	> 75	-
($V_{CE} = 10\text{ V}$; $I_C = 150\text{ mA}$)	h_{FE}	40 to 120	100 to 300	-
($V_{CE} = 10\text{ V}$; $I_C = 500\text{ mA}$)	h_{FE}	> 20	> 30	-

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Static characteristics ($T_{amb} = 25^\circ\text{C}$)		2 N 2218 A	2 N 2219 A	
Collector-emitter saturation voltage ($I_C = 150\text{ mA}; I_B = 15\text{ mA}$)		$V_{CEsat} \leq 0.3$	≤ 0.3	V
($I_C = 500\text{ mA}; I_B = 50\text{ mA}$)		$V_{CEsat} \leq 1$	≤ 1	V
Base-emitter saturation voltage ($I_C = 150\text{ mA}; I_B = 15\text{ mA}$)		$V_{BEsat} 0.6\text{ to }1.2$	$0.6\text{ to }1.2$	V
($I_C = 500\text{ mA}; I_B = 50\text{ mA}$)		$V_{BEsat} \leq 2$	≤ 2	V
Emitter cutoff current ($V_{EBO} = 3\text{ V}$)		$I_{EBO} \leq 10$	≤ 10	nA
Collector cutoff current ($V_{CBO} = 60\text{ V}$)		$I_{CBO} \leq 0.01$	≤ 0.01	μA
Collector cutoff current ($V_{CBO} = 60\text{ V}; T_{amb} = 150^\circ\text{C}$)		$I_{CBO} \leq 10$	≤ 10	μA
Collector-emitter breakdown voltage ($I_C = 10\text{ mA}; I_B = 0$)		$V_{(BR)CEO} > 40$	> 40	V
Collector-base breakdown voltage ($I_C = 10\text{ }\mu\text{A}; I_E = 0$)		$V_{(BR)CBO} > 75$	> 75	V
Emitter-base breakdown voltage ($I_E = 10\text{ }\mu\text{A}; I_C = 0$)		$V_{(BR)EBO} > 6$	> 6	V
DC current gain ($V_{CE} = 10\text{ V}; I_C = 0.1\text{ mA}$)		$h_{FE} > 20$	> 35	-
($V_{CE} = 10\text{ V}; I_C = 1\text{ mA}$)		$h_{FE} > 25$	> 50	-
($V_{CE} = 10\text{ V}; I_C = 10\text{ mA}$)		$h_{FE} > 35$	> 75	-
($V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; T_{amb} = -55^\circ\text{C}$)		$h_{FE} > 15$	> 35	-
($V_{CE} = 10\text{ V}; I_C = 150\text{ mA}$)		$h_{FE} 40\text{ to }120$	$100\text{ to }300$	-
($V_{CE} = 1\text{ V}; I_C = 150\text{ mA}$)		$h_{FE} > 20$	> 50	-
($V_{CE} = 10\text{ V}; I_C = 500\text{ mA}$)		$h_{FE} > 20$	> 40	-

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Dynamic characteristics ($T_{amb} = 25^\circ\text{C}$)

		2 N 2218	2 N 2219	
Transition frequency ($V_{CE} = 20\text{ V}; I_C = 20\text{ mA}; f = 100\text{ MHz}$)	f_T	> 250	> 250	MHz
Collector-base capacitance ($V_{CBO} = 10\text{ V}; f = 100\text{ kHz}$)	C_{CBO}	≤ 8	≤ 8	pF
Emitter base capacitance ($V_{EBO} = 0.5\text{ V}; f = 100\text{ kHz}$)	C_{EBO}	< 30	< 30	pF

Dynamic characteristics ($T_{amb} = 25^\circ\text{C}$)

		2 N 2218 A	2 N 2219 A	
Transition frequency ($V_{CE} = 20\text{ V}; I_C = 20\text{ mA}; f = 100\text{ MHz}$)	f_T	> 250	> 300	MHz
Collector base capacitance ($V_{CBO} = 10\text{ V}; f = 100\text{ kHz}$)	C_{CBO}	< 8	< 8	pF
Emitter base capacitance ($V_{EBO} = 0.5\text{ V}; f = 100\text{ kHz}$)	C_{EBO}	< 25	< 25	pF
Feedback time constant ($V_{CB} = 20\text{ V}; I_C = 20\text{ mA};$ $f = 31.8\text{ MHz}$)	$r_{bb}; C_{b'c}$	< 150	< 150	ps
Noise figure ($V_{CE} = 10\text{ V}; I_C = 100\text{ }\mu\text{A}$ $f = 1\text{ kHz}; R_g = 1\text{ k}\Omega$)	NF	-	< 4	dB

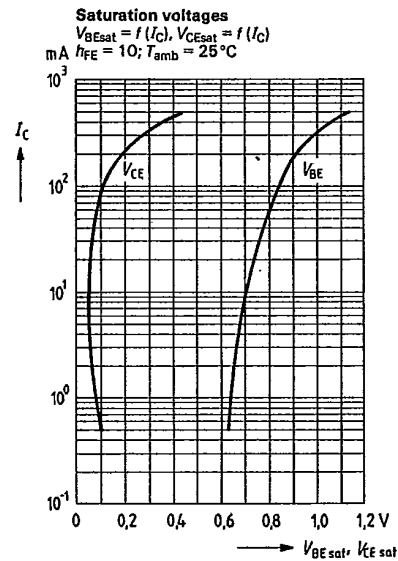
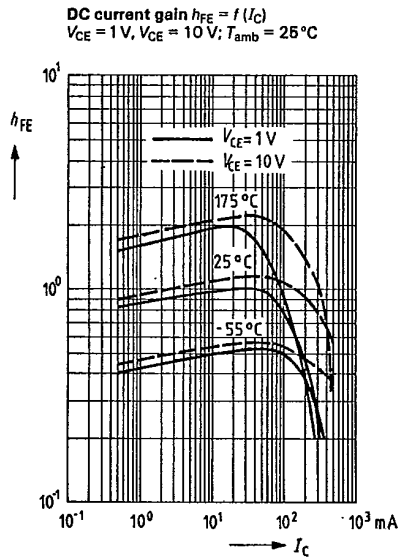
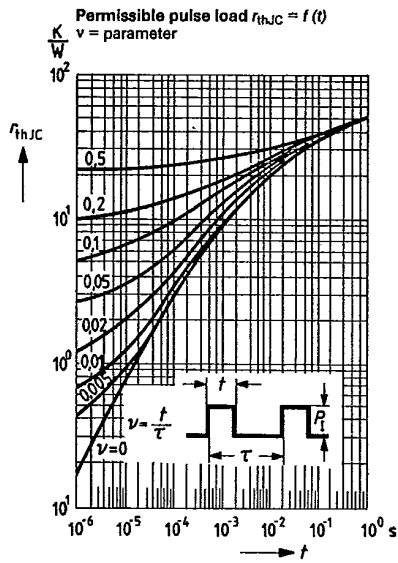
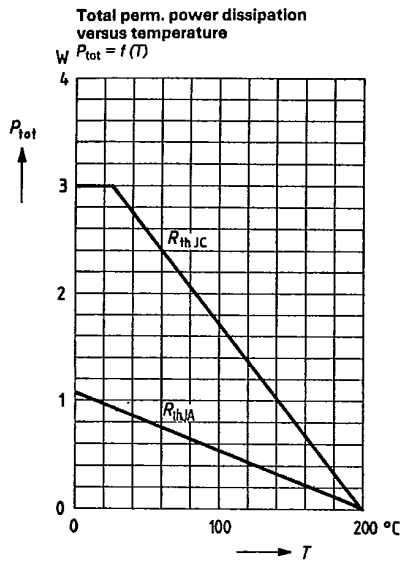
Switching times:

($I_C = 150\text{ mA}; I_{B1} = -I_{B2} = 15\text{ mA}, V_{CC} = 30\text{ V}$)

		≤ 10	≤ 10	ns
Delay time	t_d	≤ 10	≤ 10	ns
Rise time	t_r	≤ 25	≤ 25	ns
Storage time	t_s	≤ 225	≤ 225	ns
Fall time	t_f	≤ 60	≤ 60	ns

Four-pole characteristics

($V_{CE} = 10\text{ V}; I_C = 1\text{ mA}; f = 1\text{ kHz}$)	h_{11e}	1 to 3.5	2 to 8	k Ω
	h_{12e}	$< 5 \cdot 10^{-4}$	$< 8 \cdot 10^{-4}$	-
	h_{21e}	30 to 150	50 to 300	-
	h_{22e}	3 to 15	5 to 35	μS
($V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 1\text{ kHz}$)	h_{11e}	0.2 to 1	0.25 to 1.25	k Ω
	h_{12e}	$2.5 \cdot 10^{-4}$	$4 \cdot 10^{-4}$	-
	h_{21e}	50 to 300	75 to 375	-
	h_{22e}	10 to 100	25 to 200	μS



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