

Type 2N5238
Geometry 3111
Polarity NPN
Qual Level: JAN - JANTXV

Generic Part Number:
2N5238

REF: MIL-PRF-19500/394

Features:

- Silicon power transistor for use in high speed switching applications.
- Housed in a [TO-5](#) case.
- Also available in chip form using the 3111 chip geometry.
- The Min and Max limits shown are per [MIL-PRF-19500/394](#) which Semicoa meets in all cases.

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TO-5

Maximum Ratings

$T_C = 25^{\circ}\text{C}$ unless otherwise specified

Rating	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CEO}	170	V
Collector-Base Voltage	V_{CBO}	200	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current, Continuous	I_C	10	A
Power Disipation $T_A = 25^{\circ}\text{C}$ ambient Derate above 25°C	P_T	1.0 5.7	mW $\text{mW}/^{\circ}\text{C}$
Power Disipation $T_A = 25^{\circ}\text{C}$ ambient Derate above 25°C	P_T	5.0 50	Watt $\text{mW}/^{\circ}\text{C}$
Thermal Impedance	R_{JC}	0.020	$^{\circ}\text{C}/\text{mW}$
	R_{JA}	0.175	$^{\circ}\text{C}/\text{mW}$
Operating Junction Temperature	T_J	-65 to +200	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-65 to +200	$^{\circ}\text{C}$

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise specified

OFF Characteristics	Symbol	Min	Max	Unit
Collector-Base Breakdown Voltage $I_C = 10 \mu\text{A}$	$V_{(BR)CBO}$	200	---	V
Collector-Emitter Breakdown Voltage $I_C = 0.1 \text{ A}$, pulsed	$V_{(BR)CEO}$	170		V
Emitter-Base Breakdown Voltage $I_E = 10 \mu\text{A}$	$V_{(BR)EBO}$	7.0	---	V
Collector-Emitter Cutoff Current $V_{CE} = 160 \text{ V}$ $V_{BE} = 0.5 \text{ V}$, $V_{CE} = 200 \text{ V}$ $V_{BE} = -0.5 \text{ V}$, $V_{CE} = 200 \text{ V}$, $T_C = +150^\circ\text{C}$	I_{CEO1} I_{CEX} I_{CEX2}	---	10 10 100	μA μA μA
Base-Emitter Cutoff Current $V_{EB} = 5 \text{ V}$	I_{EBO}	---	0.1	μA
Collector-Base Cutoff Current $V_{CB} = 80 \text{ V}$	I_{CBO}	---	0.1	μA
ON Characteristics	Symbol	Min	Max	Unit
Forward Current Transfer Ratio $I_C = 1 \text{ A}$, $V_{CE} = 5 \text{ V}$, pulsed $I_C = 5 \text{ A}$, $V_{CE} = 5 \text{ V}$, pulsed $I_C = 10 \text{ A}$, $V_{CE} = 5 \text{ V}$ $I_C = 5 \text{ A}$, $V_{CE} = 5 \text{ V}$, $T_C = -55^\circ\text{C}$	h_{FE1} h_{FE2} h_{FE3} h_{FE4}	50 40 10 20	225 120 ---	---
Base-Emitter Saturation Voltage $I_C = 5 \text{ A}$, $I_B = 0.5 \text{ A}$, pulsed $I_C = 10 \text{ A}$, $I_B = 1 \text{ A}$, pulsed	$V_{BE(sat)1}$ $V_{BE(sat)2}$	---	1.5 2.5	V dc V dc
Collector-Emitter Saturation Voltage $I_C = 5 \text{ A}$, $I_B = 0.5 \text{ A}$, pulsed $I_C = 10 \text{ A}$, $I_B = 1 \text{ A}$, pulsed	$V_{CE(sat)1}$ $V_{CE(sat)2}$	---	0.6 2.5	V dc V dc
Safe Operating Area, Continuous DC $T_C = 25^\circ\text{C}$, $t = 1.0 \text{ s}$			$V_{CE} = 40 \text{ V}$, $I_C = 0.22 \text{ A}$ $V_{CE} = 70 \text{ V}$, $I_C = 90 \text{ mA}$	
Small Signal Characteristics	Symbol	Min	Max	Unit
Magnitude of Common Emitter Small Signal Short Circuit Forward Current Transfer Ratio $V_{CE} = 10 \text{ V}$, $I_C = 0.2 \text{ A}$, $f = 10 \text{ MHz}$	$ h_{fe} $	1.5	7.5	---
Small Signal, Short Circuit Forward Current Transfer Ratio $V_{CE} = 10 \text{ V}$, $I_C = 50 \text{ mA}$, $f = 1 \text{ kHz}$	h_{fe}	40	250	---
Open Circuit Output Capacitance $V_{CB} = 10 \text{ V}$, $I_E = 0$, $100 \text{ kHz} < f < 1 \text{ MHz}$	C_{OBO}	---	350	pF
Switching Time	Symbol	Min	Max	Unit
Delay Time Per figure 4, MIL-PRF-19500/394C	t_d	---	50	ns
Rise Time Per figure 4, MIL-PRF-19500/394C	t_r	---	500	ns
Storage Time Per figure 4, MIL-PRF-19500/394C	t_s	---	1.5	ns
Fall Time Per figure 4, MIL-PRF-19500/394C	t_f	---	50	ns