



USSN0220

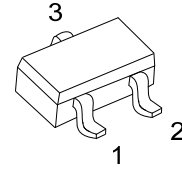
Preliminary

NPN EPITAXIAL SILICON TRANSISTOR

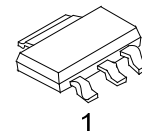
-20V, -2.0A NPN LOW $V_{CE(SAT)}$
TRANSISTOR

FEATURES

- * Low collector-emitter saturation voltage $V_{CE(SAT)}$
- * High collector current capability: I_C and I_{CM}
- * Higher efficiency leading to less heat generation
- * Reduced printed-circuit board requirements
- * Complement: USSP0220



SOT-23
(EIAJ SC-59)



SOT-223

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
USSN0220L-AA3-R	USSN0220G-AA3-R	SOT-223	B	C	E	Tape Reel
USSN0220L-AE3-R	USSN0220G-AE3-R	SOT-23	B	E	C	Tape Reel

Note: Pin Assignment: B: Base C: Collector E: Emitter

USSN0220G-AA3-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AA3: SOT-223, AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223	SOT-23
USSN0220□ □□□□ □□□□ 1 2 3 L: Lead Free G: Halogen Free Date Code	N0220

■ ABSOLUTE MAXIMUM RATING ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Base Voltage		V_{CBO}	20	V
Collector-Emitter Voltage		V_{CEO}	20	V
Emitter-Base Voltage		V_{EBO}	5	V
Collector Current	DC	I_C	2	A
	Peak	I_{CM}	4	A
Power Dissipation ($T_A \leq 25^\circ\text{C}$)	SOT-223	P_D	1	W
	SOT-23		0.35	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-65 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Device mounted on a FR4 printed-circuit board, single-sided copper; tin-plated, mounting pad for collector 1 cm^2 .

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	125	$^\circ\text{C/W}$
	SOT-23		357	$^\circ\text{C/W}$
Junction to Case	SOT-223	θ_{JC}	20	$^\circ\text{C/W}$
	SOT-23		100	$^\circ\text{C/W}$

Note: Device mounted on a FR4 printed-circuit board, single-sided copper; tin-plated, mounting pad for collector 1 cm^2 .

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	BV_{CBO}	$I_C=100\mu\text{A}$, $I_E=0$	20			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=1\text{mA}$, $I_B=0$	20			V
Emitter-Base Breakdown Voltage	BV_{EBO}	$I_E=100\mu\text{A}$, $I_C=0$	5			V
Collector-Base Cut-Off Current	I_{CBO}	$V_{CB}=20\text{V}$, $I_E=0$			100	nA
		$V_{CB}=20\text{V}$, $I_E=0$, $T_J=150^\circ\text{C}$			50	μA
Collector-Emitter Cut-Off Current	I_{CES}	$V_{CE}=30\text{V}$, $V_{BE}=0$			100	nA
Emitter-Base Cut-Off Current	I_{EBO}	$V_{EB}=5\text{V}$, $I_C=0$			100	nA
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	$I_C=100\text{mA}$, $I_B=1\text{mA}$			120	mV
		$I_C=500\text{mA}$, $I_B=50\text{mA}$			150	mV
		$I_C=1\text{A}$, $I_B=100\text{mA}$			180	mV
		$I_C=2\text{A}$, $I_B=100\text{mA}$			360	mV
		$I_C=2\text{A}$, $I_B=200\text{mA}$			350	mV
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	$I_C=1\text{A}$, $I_B=50\text{mA}$			1.1	V
Base-Emitter Turn-On Voltage(Note)	$V_{BE(ON)}$	$V_{CE}=5\text{V}$, $I_C=1\text{A}$			1	V
DC Current Gain (Note)	h_{FE}	$V_{CE}=5\text{V}$, $I_C=1\text{mA}$	300			
		$V_{CE}=5\text{V}$, $I_C=100\text{mA}$	300			
		$V_{CE}=5\text{V}$, $I_C=500\text{mA}$	300			
		$V_{CE}=2\text{V}$, $I_C=1\text{A}$	180			
		$V_{CE}=2\text{V}$, $I_C=2\text{A}$	100			
Transition Frequency	f_T	$V_{CE}=10\text{V}$, $I_C=50\text{mA}$, $f=100\text{MHz}$	150			MHz

Note: Pulse test: $t_P \leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

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