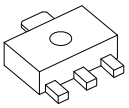
USS304NX **Preliminary** ***NPN EPITAXIAL SILICON TRANSISTOR***

60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR



SOT-89

■ DESCRIPTION

The **USS304NX** is an new low saturation 60V NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.

■ FEATURES

* Low collector-emitter saturation voltage $V_{CE(SAT)}$
* High collector current capability IC and ICM
* High collector current gain (h_{FE}) at high IC
* High efficiency due to less heat generation
* Smaller required Printed-Circuit Board (PCB) area than for conventional transistors

■ ORDERING INFORMATION

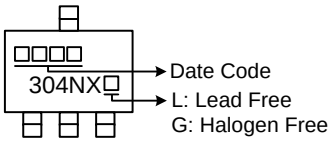
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
USS304NXL-AB3-R	USS304NXG-AB3-R	SOT-89	B	C	E	Tape Reel

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

USS304NXG-AB3-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AB3: SOT-89
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUATE MAXIUM RATINGS (T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	60	V
Emitter to Base Voltage	V_{EBO}	5	V
Collector Current	I_C	4.7	A
Peak Collector Current	I_{CM}	9.4	A
Collector Dissipation	P_C	1.65	W
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°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. Single pulse, P_W=10ms.
3. Device mounted on FR-4 PCB with minimum recommended pad layout.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	76	°C/W
Junction to Case	θ_{JC}	20	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A= 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=100μA				V
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=1μA				V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=100μA				V
Collector Cutoff Current	I_{CBO}	V_{CB}=60V, I_E=0A			100	nA
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=120V				nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0A			100	nA
Base Emitter On Voltage (Note)	$V_{BE(ON)}$	V_{CE}=2V, I_C=2A			0.85	V
Base-Emitter Saturation Voltage (Note)	$V_{BE(SAT)}$	I_C=1A, I_B=100mA			0.9	V
		I_C=4A, I_B=400mA			1.05	V
Collector-Emitter Saturation Voltage (Note)	$V_{CE(SAT)}$	I_C=0.5A, I_B=50mA			35	mV
		I_C=1A, I_B=50mA			70	mV
		I_C=1A, I_B=10mA			120	mV
		I_C=2A, I_B=40mA			150	mV
		I_C=4A, I_B=200mA			210	mV
		I_C=4A, I_B=400mA			200	mV
		I_C=4A, I_B=80mA			290	mV
		I_C=4.7A, I_B=235mA			245	mV
DC Current Transfer Ratio (Note)	h_{FE}	I_C=0.5A, V_{CE}=2V	300			
		I_C=1A, V_{CE}=2V	300			
		I_C=2A, V_{CE}=2V	250			
		I_C=4A, V_{CE}=2V	150			
		I_C=6A, V_{CE}=2V	75			
Delay Time	t_d	I_C=3A, V_{CC}=12.5V, I_{BON}=0.15A, I_{BOFF}=-0.15A		15		ns
Rise Time	t_r			95		ns
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$			110		ns
Storage Time	t_s			360		ns
Fall Time	t_f			195		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			555		ns
Transition Frequency	f_T	I_C=100mA, V_{CE}=10V, f=1MHz		130		MHz
Collector Capacitance	C_{OB}	V_{CB}=10V, I_E=I_e=0A, f=1MHz		48	70	pF

Note : Measured under pulsed conditions. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%.