



## USS305NX

Advance

NPN EPITAXIAL SILICON TRANSISTOR

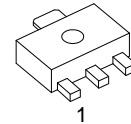
### 60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR

#### DESCRIPTION

The **USS305NX** 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

- \* 5 amps continuous current
- \* Up to 20 amps peak current
- \* Very low saturation voltages
- \* Excellent hFE characteristics up to 10 amps



SOT-89

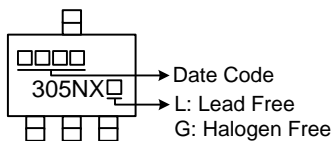
#### ORDERING INFORMATION

| Ordering Number |                 | Package | Pin Assignment |   |   | Packing   |
|-----------------|-----------------|---------|----------------|---|---|-----------|
| Lead Free       | Halogen Free    |         | 1              | 2 | 3 |           |
| USS305NXL-AB3-R | USS305NXG-AB3-R | SOT-89  | B              | C | E | Tape Reel |

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

|                 |                  |   |
|-----------------|------------------|---|
| USS305NXG-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



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

| PARAMETER                    | SYMBOL    | RATINGS    | UNIT             |
|------------------------------|-----------|------------|------------------|
| Collector to Base Voltage    | $V_{CBO}$ | 150        | V                |
| Collector to Emitter Voltage | $V_{CEO}$ | 60         | V                |
| Emitter to Base Voltage      | $V_{EBO}$ | 7          | V                |
| Base Current                 | $I_B$     | 2          | A                |
| Collector Current            | $I_C$     | 5          | A                |
| Peak Collector Current       | $I_{CM}$  | 20         | A                |
| Collector Dissipation        | $P_C$     | 1.5        | W                |
| Junction Temperature         | $T_J$     | +150       | $^\circ\text{C}$ |
| Storage Temperature          | $T_{STG}$ | -55 ~ +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. Single pulse,  $P_W=10\text{ms}$ .

3. Device mounted on FR-4 PCB with minimum recommended pad layout. (25x25x1.6mm)

■ **THERMAL DATA**

| PARAMETER           | SYMBOL        | RATINGS | UNIT               |
|---------------------|---------------|---------|--------------------|
| Junction to Ambient | $\theta_{JA}$ | 83      | $^\circ\text{C/W}$ |
| Junction to Case    | $\theta_{JC}$ | 60      | $^\circ\text{C/W}$ |

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

| PARAMETER                                   | SYMBOL        | TEST CONDITIONS  | MIN | TYP | MAX  | UNIT |
|---|---------------|--|-----|-----|------|------|
| Collector-Base Breakdown Voltage            | $BV_{CBO}$    | $I_C=100\mu\text{A}$   | 150 |     |      | V    |
| Collector-Emitter Breakdown Voltage         | $BV_{CEO}$    | $I_C=1\mu\text{A}$   | 60  |     |      | V    |
| Emitter-Base Breakdown Voltage              | $BV_{EBO}$    | $I_E=100\mu\text{A}$   | 7.0 |     |      | V    |
| Collector Cutoff Current                    | $I_{CBO}$     | $V_{CB}=120\text{V}$   |     |     | 20   | nA   |
| Emitter Cutoff Current                      | $I_{EBO}$     | $V_{EB}=6\text{V}$   |     |     | 10   | nA   |
| Base Emitter On Voltage (Note)              | $V_{BE(ON)}$  | $V_{CE}=1\text{V}, I_C=6\text{A}$                              |     |     | 1050 | mV   |
| Base-Emitter Saturation Voltage (Note)      | $V_{BE(SAT)}$ | $I_C=6\text{A}, I_B=300\text{mA}(\text{Note})$                 |     |     | 1100 | mV   |
| Collector-Emitter Saturation Voltage (Note) | $V_{CE(SAT)}$ | $I_C=100\text{mA}, I_B=5\text{mA}$                             |     |     | 30   | mV   |
|   |               | $I_C=1\text{A}, I_B=100\text{mA}$                              |     |     | 55   | mV   |
|   |               | $I_C=1\text{A}, I_B=50\text{mA}$                               |     |     | 65   | mV   |
|   |               | $I_C=2\text{A}, I_B=50\text{mA}$                               |     |     | 125  | mV   |
|   |               | $I_C=6\text{A}, I_B=300\text{mA}$                              |     |     | 230  | mV   |
| DC Current Transfer Ratio (Note)            | $h_{FE}$      | $I_C=10\text{mA}, V_{CE}=1\text{V}$                            | 100 |     |      |      |
|   |               | $I_C=2\text{A}, V_{CE}=1\text{V}$                              | 100 |     | 300  |      |
|   |               | $I_C=5\text{A}, V_{CE}=1\text{V}$                              | 55  |     |      |      |
|   |               | $I_C=10\text{A}, V_{CE}=1\text{V}$                             | 20  |     |      |      |
| Turn-ON Delay Time (Note 1)                 | $t_{D(ON)}$   | $I_C=1\text{A}, V_{CC}=10\text{V}, I_{B1}=I_{B2}=100\text{mA}$ |     | 42  |      | ns   |
| Turn-OFF Delay Time                         | $t_{D(OFF)}$  |  |     | 760 |      | ns   |
| Transition Frequency (Note)                 | $f_T$         | $I_C=100\text{mA}, V_{CE}=10\text{V}, f=1\text{MHz}$           |     | 130 |      | MHz  |
| Collector Capacitance                       | $C_{OB}$      | $V_{CB}=10\text{V}, f=1\text{MHz}$                             |     | 31  |      | pF   |

Note : Measured under pulsed conditions. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycles  $\leq 2\%$ .

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