

300V High Performance NPN Transistor

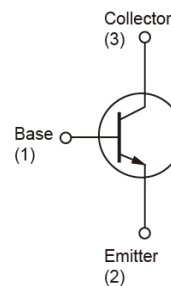
FEATURES

- Epitaxial Planar Type
- NPN Silicon Transistor
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

APPLICATION

- Consumer electronics
- High voltage switching
- High voltage driver

| KEY PERFORMANCE PARAMETERS | | | |
|----------------------------|---|-------|------|
| PARAMETER | | VALUE | UNIT |
| BV _{CBO} | | 300 | V |
| BV _{CEO} | | 300 | V |
| I _C | | 500 | mA |
| V _{CE(SAT)} | I _C =100mA, I _B =10mA | 0.2 | V |



Notes: MSL 1 (Moisture Sensitivity Level) per J-STD-020

| ABSOLUTE MAXIMUM RATINGS (T _A = 25°C unless otherwise noted) | | | |
|---|------------------|-------------|------|
| PARAMETER | SYMBOL | LIMIT | UNIT |
| Collector-Base Voltage | V _{CBO} | 300 | V |
| Collector-Emitter Voltage | V _{CEO} | 300 | V |
| Emitter-Base Voltage | V _{EBO} | 5 | V |
| Collector Current (DC) | I _C | 500 | mA |
| Collector Peak Current (Pulse) ^{Note} | I _{CM} | 1 | A |
| Base Current | I _B | 200 | mA |
| Power Total Dissipation @ T _A =25°C | P _D | 0.5 | W |
| Maximum Operating Junction Temperature | T _J | +150 | °C |
| Storage Temperature Range | T _{STG} | -55 to +150 | °C |

Note: Single pulse, P_w ≤ 380μs, Duty ≤ 2%

| THERMAL PERFORMANCE | | | |
|--|------------------|-----|------|
| PARAMETER | SYMBOL | TYP | UNIT |
| Junction to Ambient Thermal Resistance | R _{θJA} | 420 | °C/W |
| Junction to Case Thermal Resistance | R _{θJC} | 155 | °C/W |

| ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|--|-----------------|-----|------|-----|------|
| PARAMETER | CONDITIONS | SYMBOL | MIN | TYP | MAX | UNIT |
| Static (Note 1) | | | | | | |
| Collector-Base Breakdown Voltage | $I_C = 100\mu\text{A}$ | BV_{CBO} | 300 | -- | -- | V |
| Collector-Emitter Breakdown Voltage | $I_C = 10\text{mA}$ | BV_{CEO} | 300 | -- | -- | V |
| Emitter-Base Breakdown Voltage | $I_E = 100\mu\text{A}$ | BV_{EBO} | 5 | -- | -- | V |
| Collector Cutoff Current | $V_{CB} = 250\text{V}$ | I_{CBO} | -- | -- | 100 | nA |
| Collector Cutoff Current | $V_{CES} = 250\text{V}$ | I_{CES} | -- | -- | 100 | nA |
| Emitter Cutoff Current | $V_{EB} = 4\text{V}$ | I_{EBO} | -- | -- | 100 | nA |
| Collector-Emitter Saturation Voltage | $I_C = 100\text{mA}, I_B = 10\text{mA}$ | $V_{CE(SAT)}^1$ | -- | -- | 0.2 | V |
| | $I_C = 250\text{mA}, I_B = 25\text{mA}$ | $V_{CE(SAT)}^2$ | -- | -- | 0.3 | V |
| Base-Emitter Saturation Voltage | $I_C = 250\text{mA}, I_B = 25\text{mA}$ | $V_{BE(SAT)}$ | -- | -- | 1 | V |
| Base-Emitter Turn-on Voltage | $I_C = 250\text{mA}, V_{CE} = 10\text{V}$ | $V_{BE(ON)}$ | -- | -- | 1 | V |
| DC Current Transfer Ratio | $V_{CE} = 10\text{V}, I_C = 1\text{mA}$, | h_{FE}^1 | 100 | -- | -- | |
| | $V_{CE} = 10\text{V}, I_C = 100\text{mA}$, | h_{FE}^2 | 80 | -- | 300 | |
| | $V_{CE} = 10\text{V}, I_C = 250\text{mA}$, | h_{FE}^3 | 20 | -- | -- | |
| Dynamic (Note 2) | | | | | | |
| Transition Frequency | $V_{CE} = -10\text{V}, I_C = -30\text{mA}$, $f = 100\text{MHz}$ | f_T | 75 | -- | -- | MHz |
| Collector Output Capacitance | $V_{CB} = -10\text{V}, I_E = 0\text{A}$, $f = 100\text{MHz}$ | C_{ob} | -- | -- | 5 | pF |
| Delay Time | $V_{CC} = 100\text{V}, I_C = 100\text{mA}$, $I_{B1} = -I_{B2} = 10\text{mA}$ | t_d | -- | 53 | -- | ns |
| Rise Time | | t_r | -- | 126 | -- | ns |
| Storage Time | | t_s | -- | 2580 | -- | ns |
| Fall Time | | t_f | -- | 228 | -- | ns |

Note:

1. Pulse test: $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$
2. For DESIGN AID ONLY, not subject to production testing

ORDERING INFORMATION

| ORDERING CODE | PACKAGE | PACKING |
|---------------|---------|--------------------|
| TSC497CX RFG | SOT-23 | 3,000pcs / 7" Reel |

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

Figure 1. $V_{CE(sat)}$ vs. Collector Current

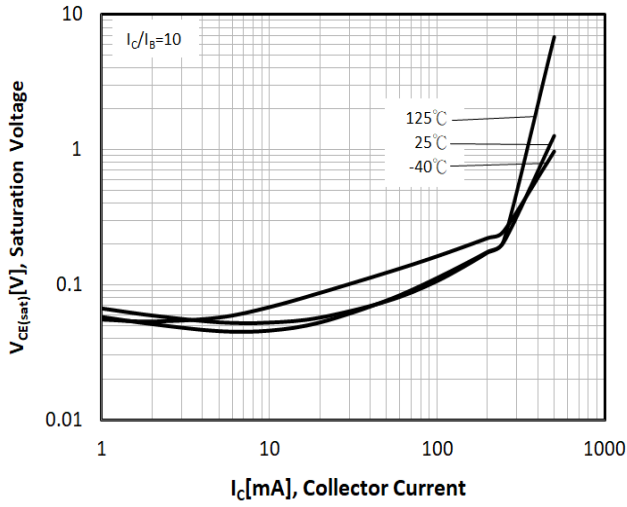


Figure 2. DC Current Gain

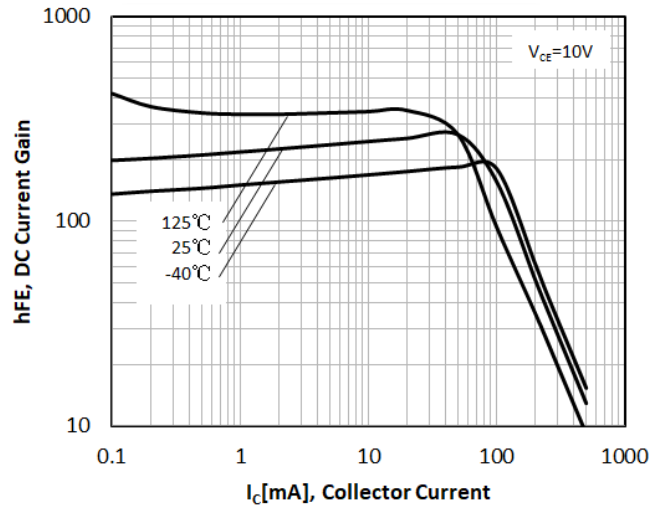


Figure 3. $V_{BE(sat)}$ vs. Collector Current

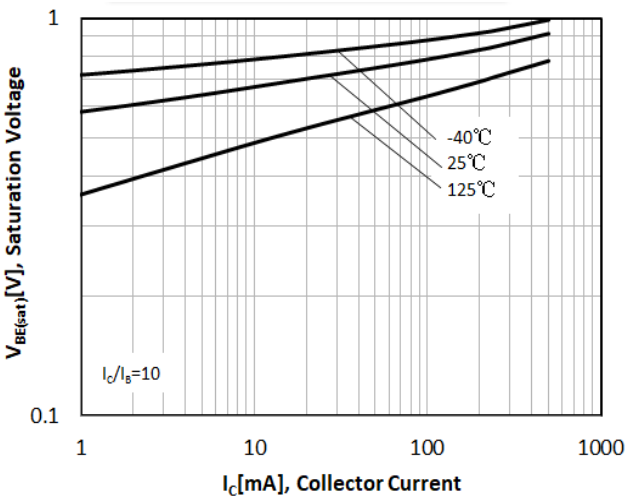


Figure 4. $V_{BE(on)}$ vs. Collector Current

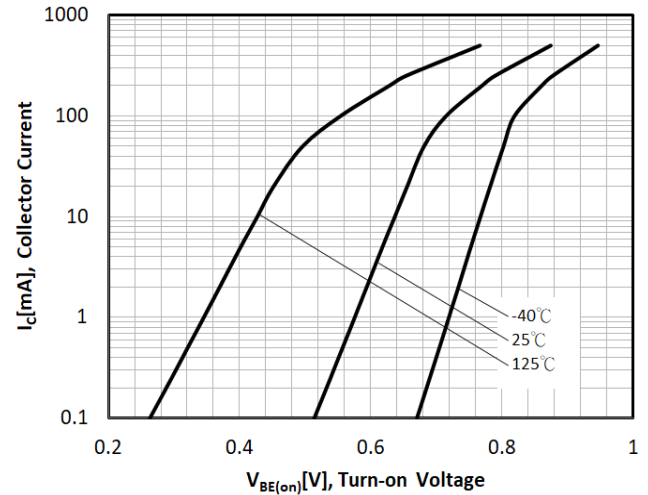
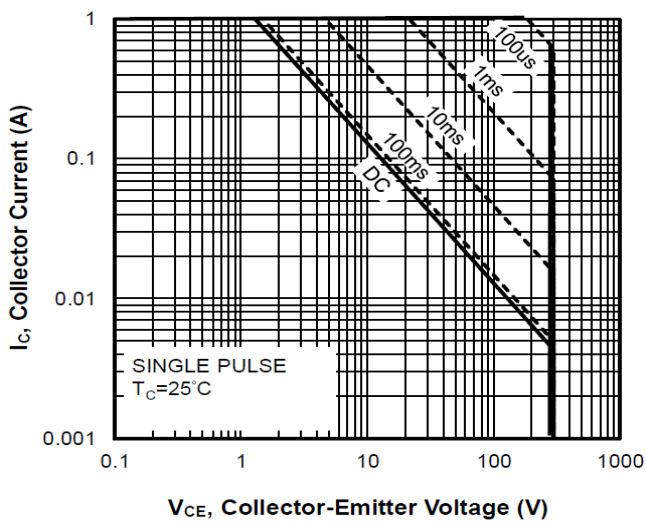
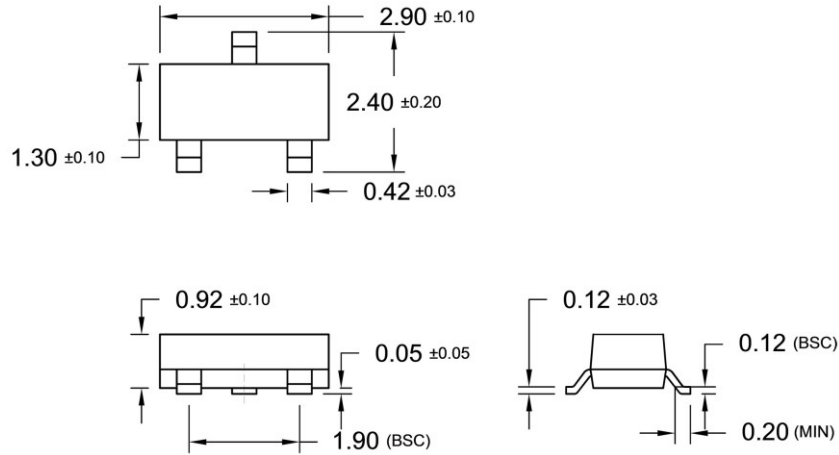


Figure 5. Safe Operating Area

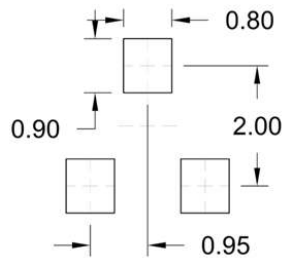


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

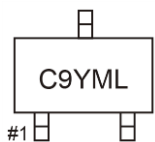
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



- C9** = Device Code
- Y** = Year Code
- M** = Month Code for Halogen Free Product
 - O** =Jan **P** =Feb **Q** =Mar **R** =Apr
 - S** =May **T** =Jun **U** =Jul **V** =Aug
 - W** =Sep **X** =Oct **Y** =Nov **Z** =Dec
- L** = Lot Code (1~9, A~Z)

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