# 40V PNP LOW SATURATION TRANSISTOR IN SOT23

## Features

- $BV_{CEO}$ > -40V
- $I_C$ = -2A high Continuous Collector Current
- $I_{CM}$ = -3A Peak Pulse Current
- Low Saturation Voltage -225mV Max @ $I_C$ = -1A.
- $R_{CE(SAT)}$ = 90mΩ at 0.5A for a Low Equivalent On-Resistance
- 730mW Power Dissipation
- Complimentary NPN Type: DSS4240T
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

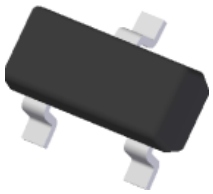
## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight 0.008 grams (Approximate)

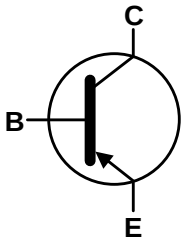
## Application

- Gate Driving MOSFETs and IGBTs
- Load Switch
- DC-DC Converters
- Battery Charging

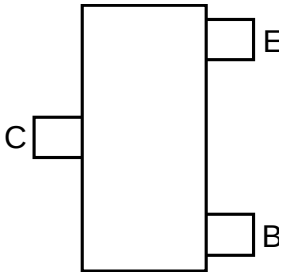
SOT23



Top View




Device Symbol



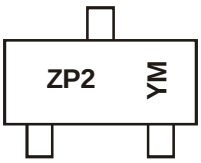

Top View
Pin-Out

## Ordering Information (Note 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|---|
| DSS5240T-7 | AEC-Q101 | ZP2 | 7 | 8 | 3,000 |
| DSS5240T-13 | AEC-Q101 | ZP2 | 13 | 8 | 10,000 |
| DSS5240TQ-7 | Automotive | ZP2 | 7 | 8 | 3,000 |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen and Antimony free, "Green" and Lead-Free.
3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

## Marking Information




ZP2 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: C = 2015)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | A | B | C | D | E | F | G | H | I | J | K |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

## Absolute Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -40 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -40 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -5 | V |
| Peak Pulse Collector Current | $I_{CM}$ | -3 | A |
| Continuous Collector Current | $I_C$ | -2 | A |
| Base Current | $I_B$ | -300 | mA |

## Thermal Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

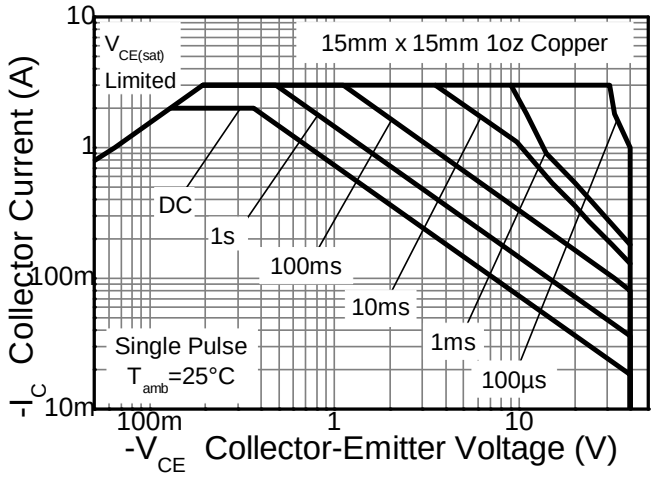
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 6) | $P_D$ | 730 | mW |
| Power Dissipation (Note 7) | $P_D$ | 600 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 171 | °C/W |
| Thermal Resistance, Junction to Ambient Air (Note 7) | $R_{\theta JA}$ | 209 | °C/W |
| Thermal Resistance, Junction to Lead (Note 8) | $R_{\theta JL}$ | 75 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## ESD Ratings (Note 9)

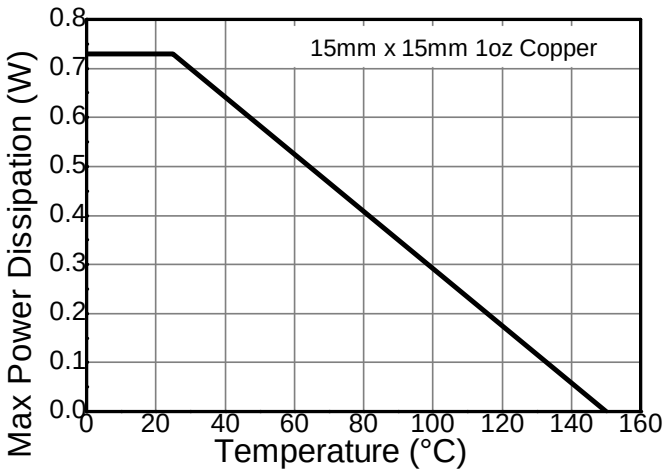
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|---|---|---|---|---|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

Notes:
6. For a device mounted with the collector lead on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
7. Same as note (6), except the device is mounted on minimum recommended pad layout.
8. Thermal resistance from junction to solder-point (at the end of the collector lead).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

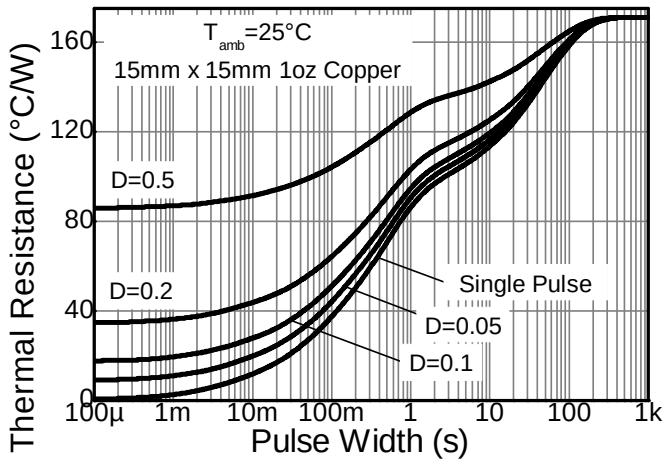
## Thermal Characteristics and Derating Information



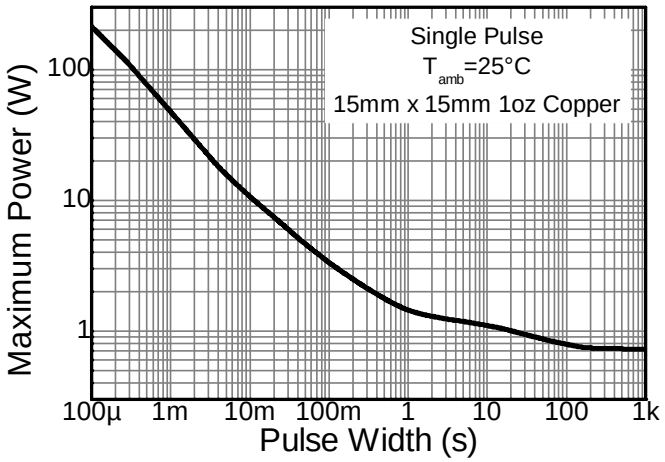

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**




**Pulse Power Dissipation**

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -40 | — | — | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage (Note 9) | $BV_{CEO}$ | -40 | — | — | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -5 | — | — | V | $I_E$ = -100µA |
| Collector-Base Cutoff Current | $I_{CBO}$ | — | — | -100 | nA | $V_{CB}$ = -30V, $I_E$ = 0 |
| | | — | — | -50 | µA | $V_{CB}$ = -30V, $I_E$ = 0, $T_A$ = +150°C |
| Emitter-Base Cutoff Current | $I_{EBO}$ | — | — | -100 | nA | $V_{EB}$ = -4V, $I_C$ = 0 |
| **ON CHARACTERISTICS (Note 9)** | | | | | | |
| DC Current Gain | $h_{FE}$ | 300 | — | — | — | $V_{CE}$ = -2V, $I_C$ = -0.1A |
| | | 260 | — | — | | $V_{CE}$ = -2V, $I_C$ = -0.5A |
| | | 210 | — | — | | $V_{CE}$ = -2V, $I_C$ = -1A |
| | | 100 | — | — | | $V_{CE}$ = -2V, $I_C$ = -2A |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | — | -100 | mV | $I_C$ = -100mA, $I_B$ = -1mA |
| | | — | 45 | -110 | | $I_C$ = -500mA, $I_B$ = -50mA |
| | | — | — | -225 | | $I_C$ = -750mA, $I_B$ = -15mA |
| | | — | — | -225 | | $I_C$ = -1A, $I_B$ = -50mA |
| | | — | — | -350 | | $I_C$ = -2A, $I_B$ = -200mA |
| Equivalent On-Resistance | $R_{CE(SAT)}$ | — | 90 | 220 | mΩ | $I_C$ = -500mA, $I_B$ = -50mA |
| Base-Emitter Saturation Voltage | $V_{BE(SAT)}$ | — | — | -1.1 | V | $I_C$ = -2A, $I_B$ = -200mA |
| Base-Emitter Turn-on Voltage | $V_{BE(ON)}$ | — | — | -0.75 | V | $V_{CE}$ = -2V, $I_C$ = -100mA |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | | |
| Transition Frequency | $f_T$ | 100 | — | — | MHz | $V_{CE}$ = -10V, $I_C$ = -100mA, f = 100MHz |
| Output Capacitance | $C_{ob}$ | — | — | 28 | pF | $V_{CB}$ = -10V, f = 1MHz |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

## Typical Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

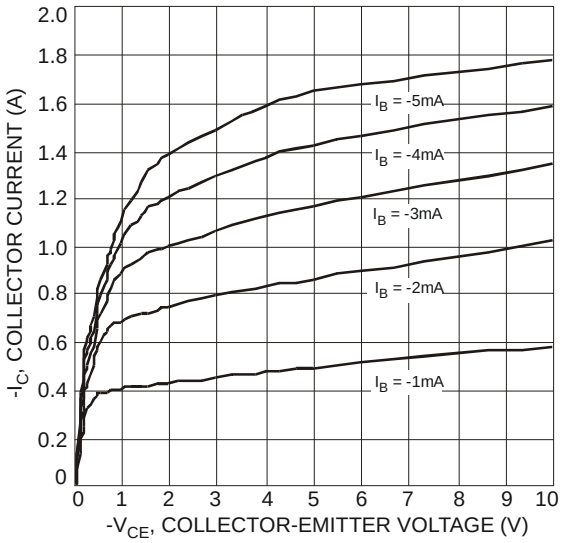



Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

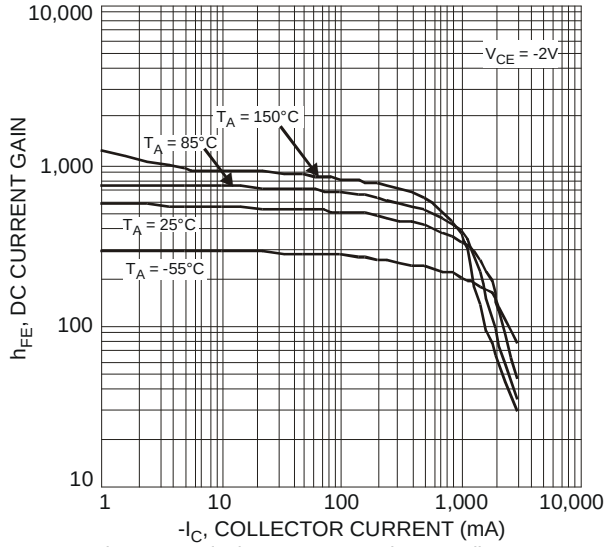



Figure 2 Typical DC Current Gain vs. Collector Current

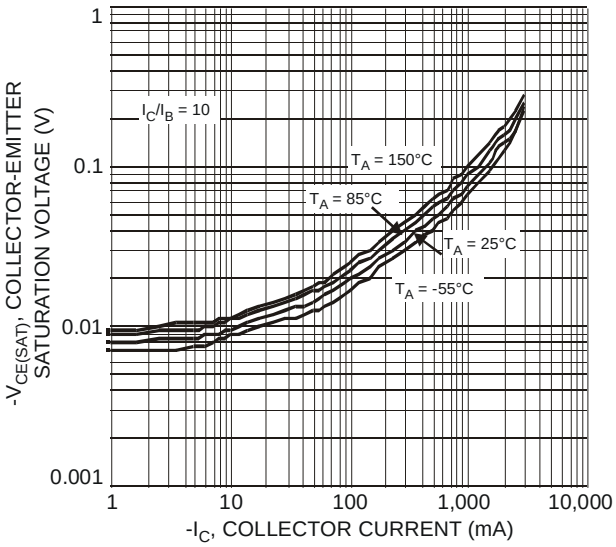



Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

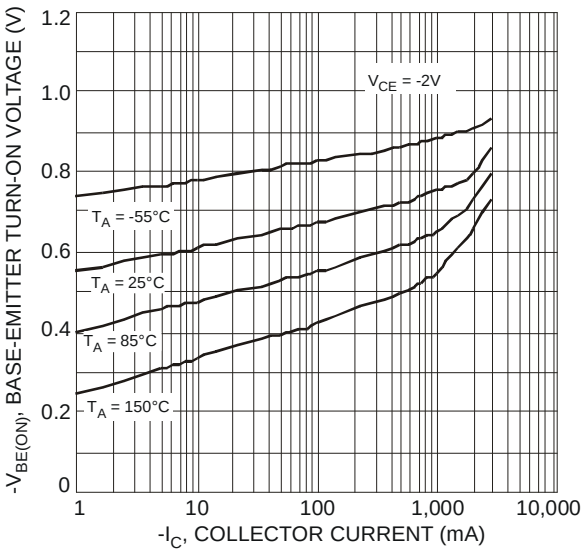



Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

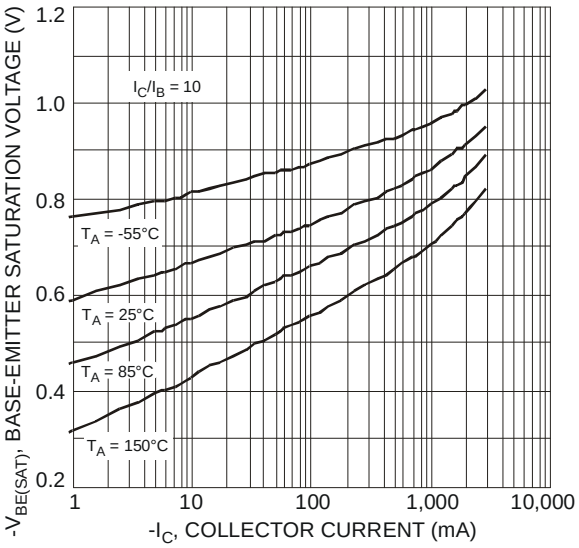



Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

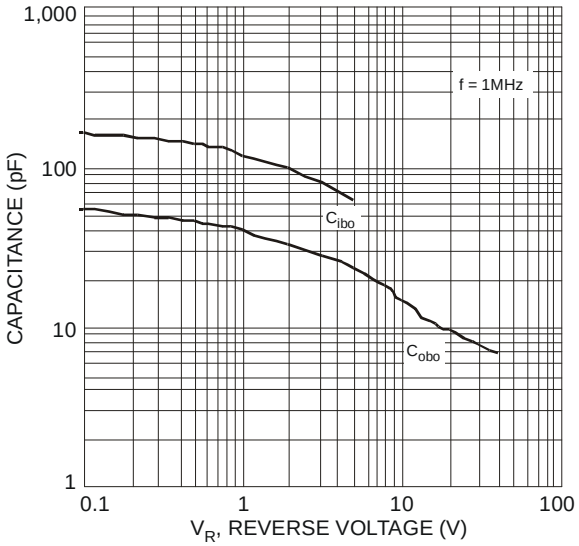



Figure 6 Typical Capacitance Characteristics

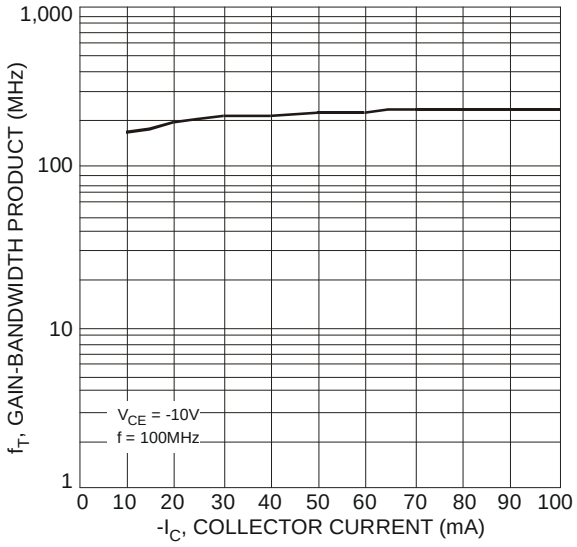
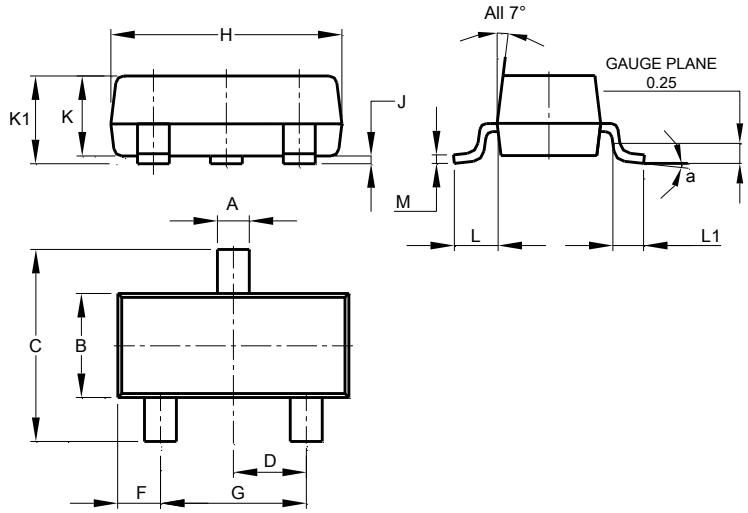



Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

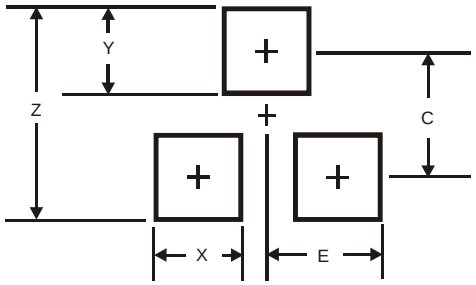
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| SOT23 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.37 | 0.51 | 0.40 |
| **B** | 1.20 | 1.40 | 1.30 |
| **C** | 2.30 | 2.50 | 2.40 |
| **D** | 0.89 | 1.03 | 0.915 |
| **F** | 0.45 | 0.60 | 0.535 |
| **G** | 1.78 | 2.05 | 1.83 |
| **H** | 2.80 | 3.00 | 2.90 |
| **J** | 0.013 | 0.10 | 0.05 |
| **K** | 0.890 | 1.00 | 0.975 |
| **K1** | 0.903 | 1.10 | 1.025 |
| **L** | 0.45 | 0.61 | 0.55 |
| **L1** | 0.25 | 0.55 | 0.40 |
| **M** | 0.085 | 0.150 | 0.110 |
| **a** | 8° | | |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 2.9 |
| **X** | 0.8 |
| **Y** | 0.9 |
| **C** | 2.0 |
| **E** | 1.35 |

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