

Features

- $BV_{CEO} > 40V$
- $I_C = 600mA$ Collector Current
- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- Complementary PNP Type: MMST2907A
- **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**

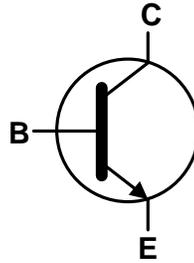
Mechanical Data

- Case: SOT323
- Case Material: Molded Plastic. "Green" Molding Compound; UL Flammability 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: 0.006 grams (Approximate)

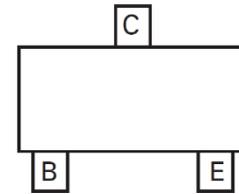
SOT323



Top View



Device Symbol



Pin-Out Top View

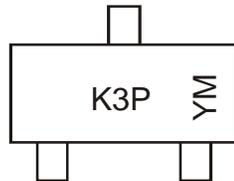
Ordering Information (Note 4)

| Product | Status | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|--------|------------|---------|--------------------|-----------------|-------------------|
| MMST2222A-7-F | Active | AEC-Q101 | K3P | 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

SOT323



K3P = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: D = 2016)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | |
|-------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Code | D | E | F | G | H | I | J | K | L | M | N | |
| 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} | 75 | V |
| Collector-Emitter Voltage | V _{CEO} | 40 | V |
| Emitter-Base Voltage | V _{EBO} | 6 | V |
| Collector Current | I _C | 600 | mA |

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

| Characteristic | Symbol | Value | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 6)

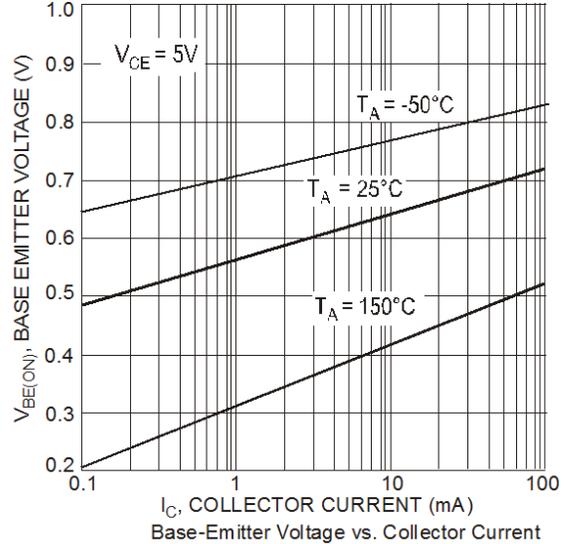
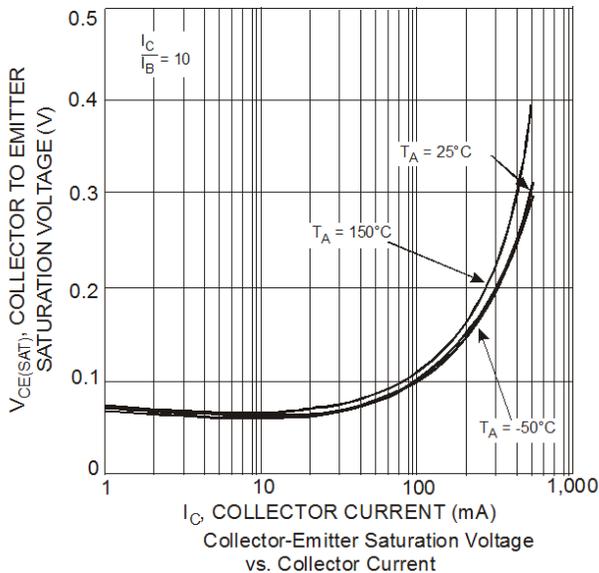
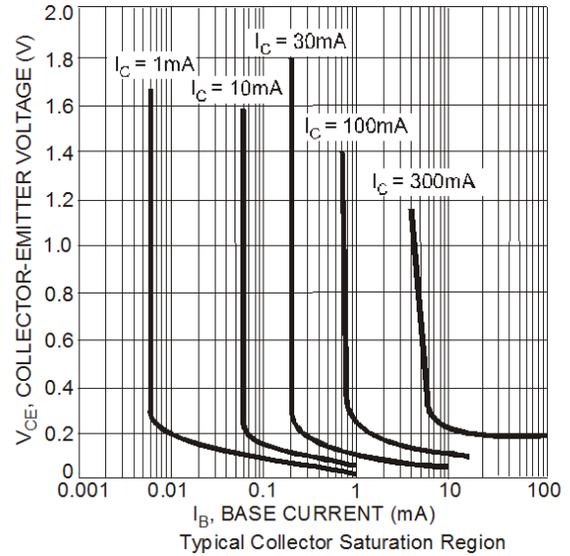
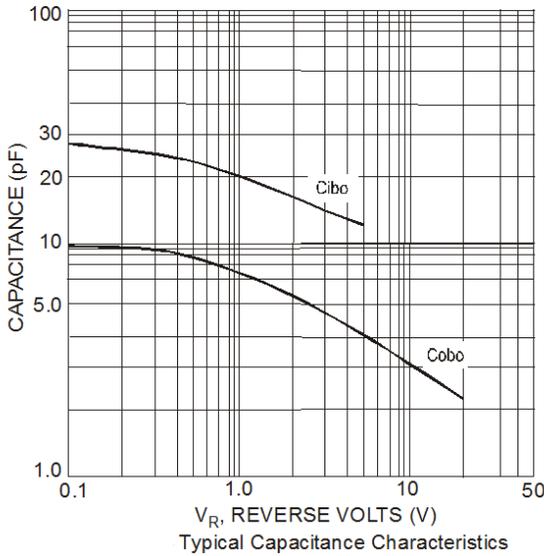
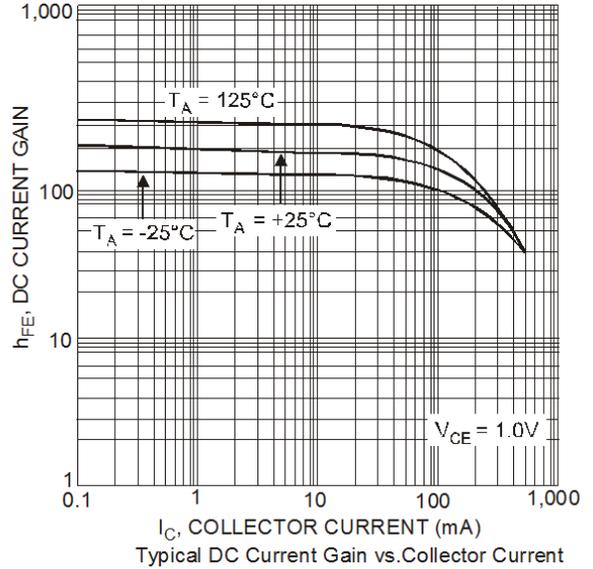
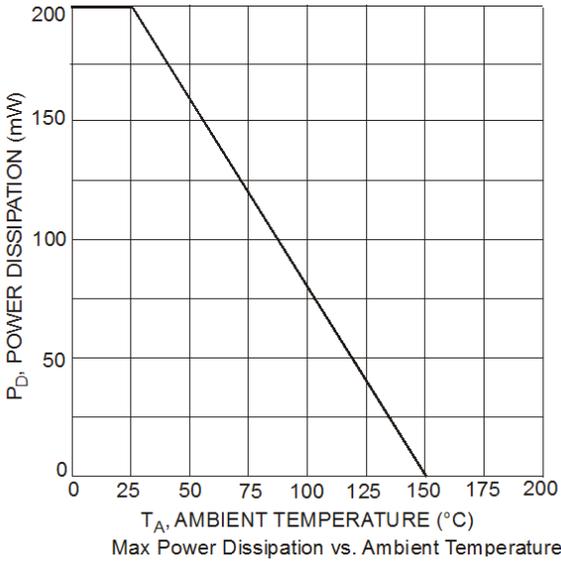
| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

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

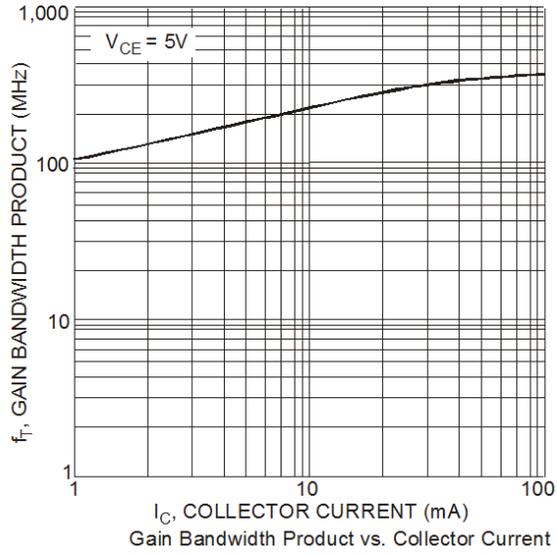
| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|----------------------|-----------------------------------------|-----------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 7) | | | | | |
| Collector-Base Breakdown Voltage | BV _{CBO} | 75 | — | V | I _C = 10μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 40 | — | V | I _C = 10mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 6.0 | — | V | I _E = 10μA, I _C = 0 |
| Collector Cut-Off Current | I _{CBO} | — | 10 | nA μA | V _{CB} = 60V, I _E = 0 V _{CB} = 60V, I _E = 0, T _A = +150°C |
| Collector Cut-Off Current | I _{CEX} | — | 10 | nA | V _{CE} = 60V, V _{EB(OFF)} = 3V |
| Base Cutoff Current | I _{BL} | — | 20 | nA | V _{CE} = 60V, V _{EB(OFF)} = 3V |
| ON CHARACTERISTICS (Note 7) | | | | | |
| DC Current Gain | h _{FE} | 35 50 75 100 40 50 35 | — — — 300 — — — | — | I _C = 100μA, V _{CE} = 10V I _C = 1.0mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V I _C = 150mA, V _{CE} = 10V I _C = 500mA, V _{CE} = 10V I _C = 10mA, V _{CE} = 10V, T _A = -55°C I _C = 150mA, V _{CE} = 1.0V |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | 0.3 1.0 | V | I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA |
| Base-Emitter Saturation Voltage | V _{BE(SAT)} | 0.6 | 1.2 2.0 | V | I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA |
| SMALL SIGNAL CHARACTERISTICS | | | | | |
| Output Capacitance | C _{obo} | — | 8 | pF | V _{CB} = 10V, f = 1.0MHz, I _E = 0 |
| Input Capacitance | C _{ibo} | — | 25 | pF | V _{EB} = 0.5V, f = 1.0MHz, I _C = 0 |
| Current Gain-Bandwidth Product | f _T | 300 | — | MHz | V _{CE} = 20V, I _C = 20mA, f = 1.0MHz |
| Noise Figure | NF | — | 4.0 | dB | V _{CE} = 10V, I _C = 100μA, R _S = 1kΩ, f = 1.0kHz |
| SWITCHING CHARACTERISTICS | | | | | |
| Delay Time | t _d | — | 10 | ns | V _{CC} = 30V, I _C = 150mA, V _{BE(OFF)} = -0.5V, I _{B1} = 15mA |
| Rise Time | t _r | — | 25 | ns | V _{CC} = 30V, I _C = 150mA, I _{B1} = I _{B2} = 15mA |
| Storage Time | t _s | — | 225 | ns | |
| Fall Time | t _f | — | 60 | ns | |

- Notes: 5. For a device mounted with the collector lead on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.
7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



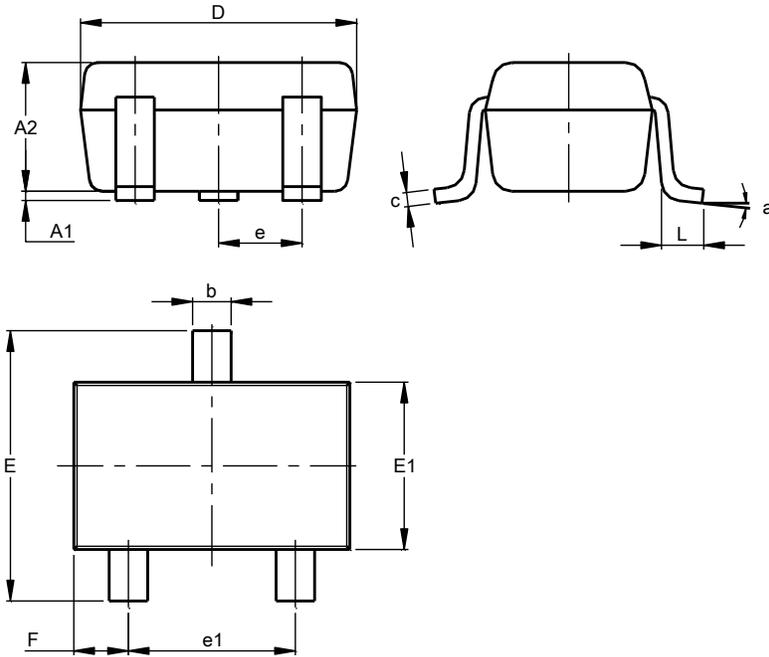
Typical Electrical Characteristics (Cont. @T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323

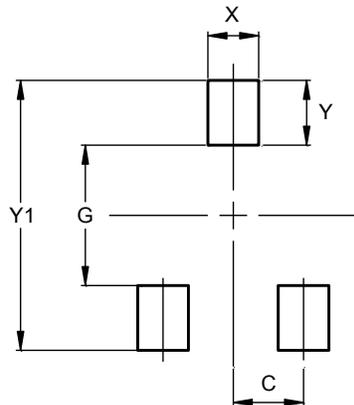


| SOT323 | | | |
|----------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 0.95 |
| b | 0.25 | 0.40 | 0.30 |
| c | 0.10 | 0.18 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| e1 | 1.20 | 1.40 | 1.30 |
| F | 0.375 | 0.475 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT323



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.470 |
| Y | 0.600 |
| Y1 | 2.500 |

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