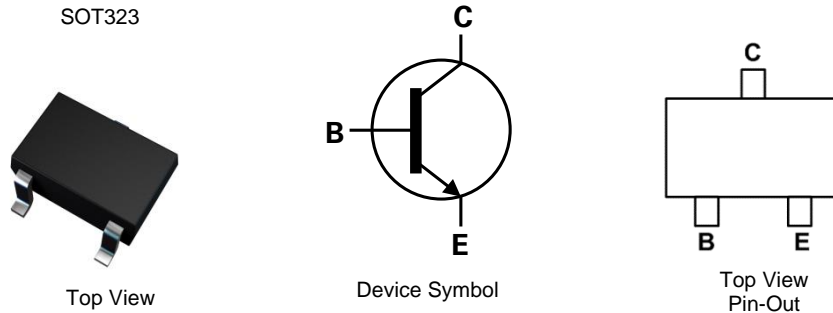


Features

- Ultra-Small Surface-Mount Package
- Epitaxial Planar Die Construction
- Ideal for Low-Power Amplification and Switching
- Complementary PNP Type: MMST4403
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: SOT323
- Package 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 Lead, Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (Approximate)

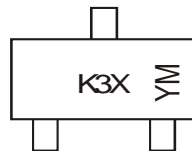


Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMST4401-7-F	SOT323	K3X	7	8	3,000	Reel
MMST4401-13-F	SOT323	K3X	13	8	10,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K3X = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: L = 2024)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2010	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	X	-	K	L	M	N	P	R	S	T	U	V
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 _{CB0}	60	V
Collector-Emitter Voltage	V _{CE0}	40	V
Emitter-Base Voltage	V _{EB0}	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 Air (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 - Charged Device Model	ESD CDM	1,000	V	C3

Notes: 5. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.
 6. Refer to JEDEC specification JS-001-2017 and JS-002-2022.

Thermal Characteristics and Derating Information

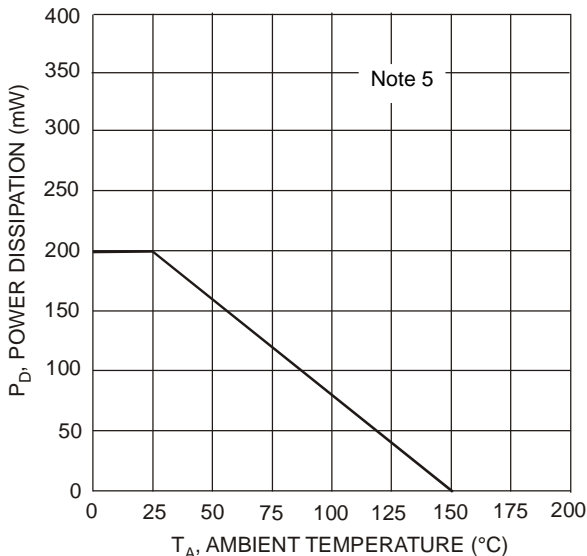


Fig. 1, Max Power Dissipation vs Ambient Temperature

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CB0}	60	—	—	V	I _C = 100μA, I _B = 0
Collector-Emitter Breakdown Voltage (Note 7)	BV _{CEO}	40	—	—	V	I _C = 1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{EBO}	6	—	—	V	I _E = 100μA, I _C = 0
Collector Cutoff Current	I _{CEX}	—	—	100	nA	V _{CE} = 35V, V _{EB(off)} = 0.4V
Base Cutoff Current	I _{BL}	—	—	100	nA	V _{CE} = 35V, V _{EB(off)} = 0.4V
ON CHARACTERISTICS (Note 7)						
DC Current Gain	h _{FE}	20	—	—	—	I _C = 100μA, V _{CE} = 1.0V
		40	—	—		I _C = 1.0mA, V _{CE} = 1.0V
		80	—	—		I _C = 10mA, V _{CE} = 1.0V
		100	—	300		I _C = 150mA, V _{CE} = 1.0V
		40	—	—		I _C = 500mA, V _{CE} = 2.0V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	—	0.4 0.75	V	I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	0.75 —	—	0.95 1.2	V	I _C = 150mA, I _B = 15mA I _C = 500mA, I _B = 50mA
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C _{obo}	—	—	8.5	pF	V _{CB} = 5V, f = 1MHz, I _E = 0
Input Capacitance	C _{ibo}	—	—	30	pF	V _{EB} = 0.5V, f = 1MHz, I _C = 0
Input Impedance	h _{ie}	1.0	—	15	kΩ	V _{CE} = 10V, I _C = 1.0mA f = 1kHz
Voltage Feedback Ratio	h _{re}	0.1	—	8.0	x 10 ⁻⁴	
Small Signal Current Gain	h _{fe}	40	—	500	—	
Output Admittance	h _{oe}	1.0	—	30	μS	
Current Gain Bandwidth Product	f _T	250	—	—	MHz	
SMALL SIGNAL CHARACTERISTICS						
Delay Time	t _d	—	—	15	ns	V _{CC} = 30V, I _C = 150mA
Rise Time	t _r	—	—	20	ns	V _{BE(off)} = 2.0V, I _{B1} = 15mA
Storage Time	t _s	—	—	225	ns	V _{CC} = 30V, I _C = 150mA
Fall Time	t _f	—	—	30	ns	I _{B1} = -I _{B2} = 15mA

Note: 7. Short duration pulse test used to minimize self-heating effect.

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

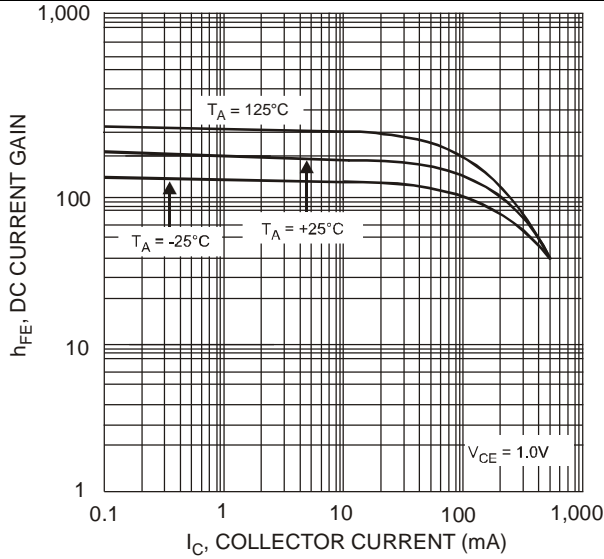


Fig. 2 Typical DC Current Gain vs Collector Current

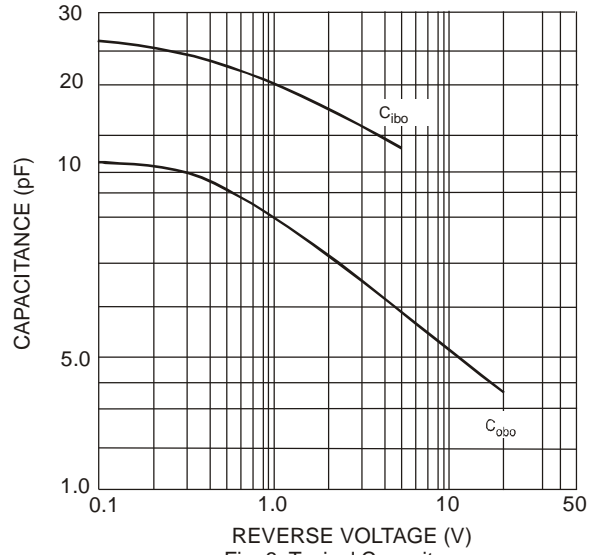


Fig. 3 Typical Capacitance

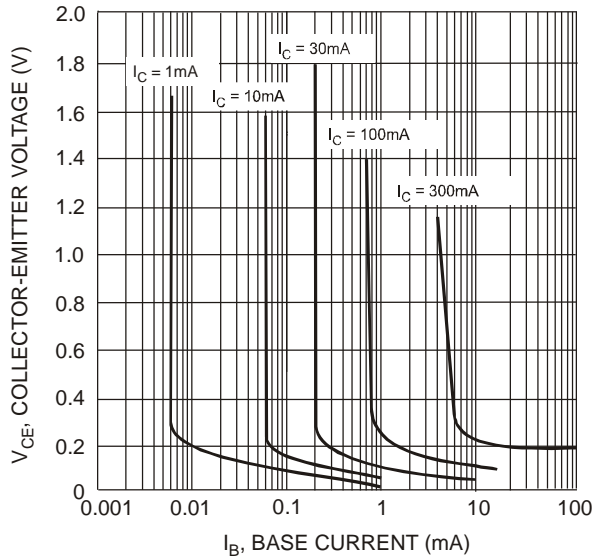


Fig. 4 Typical Collector Saturation Region

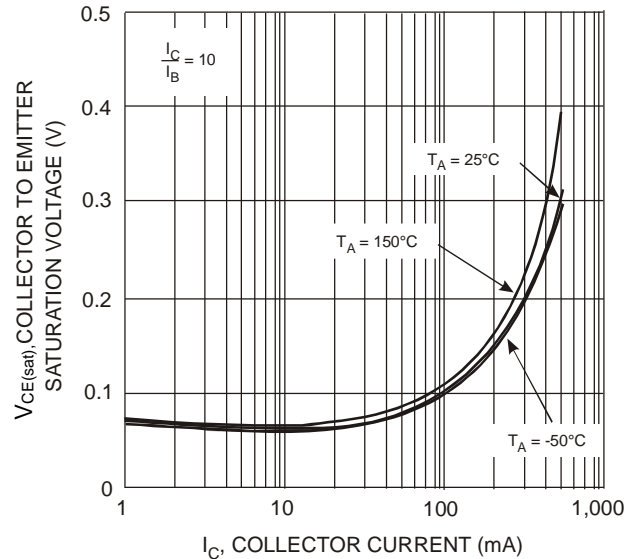


Fig. 5 Collector Emitter Saturation Voltage vs. Collector Current

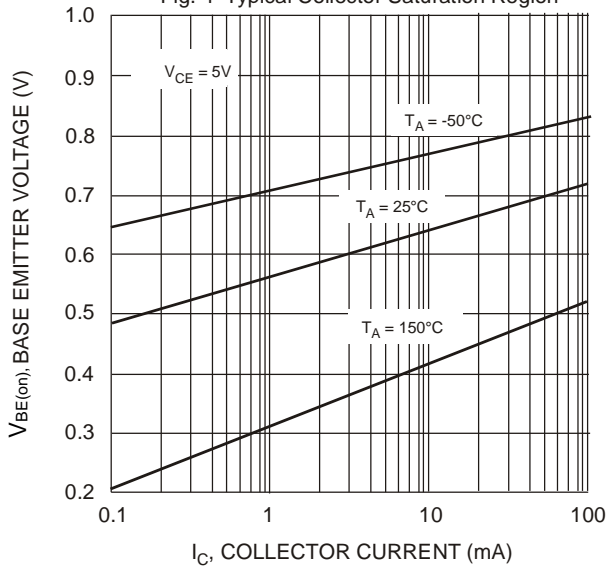


Fig. 6 Base Emitter Voltage vs. Collector Current

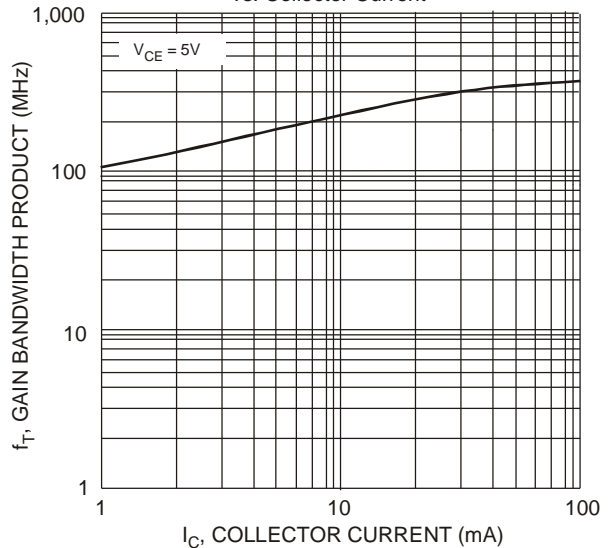
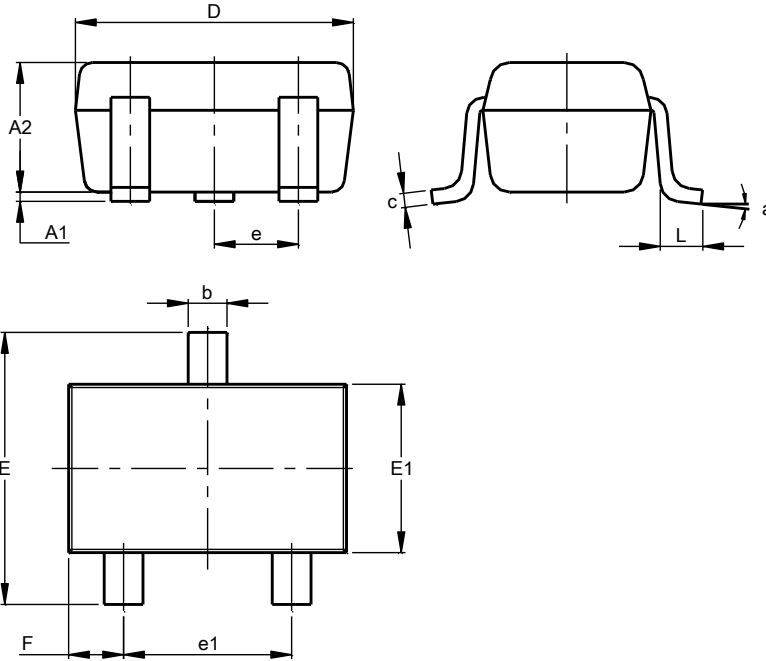


Fig. 7 Gain Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT323

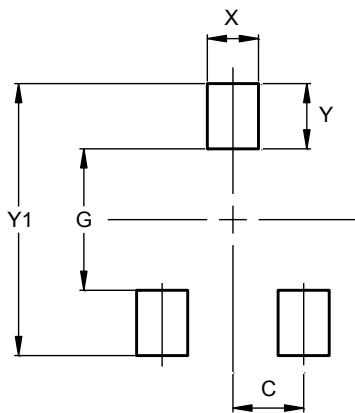


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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