

MMST5401Q-7-F Datasheet



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DiGi Electronics Part Number	MMST5401Q-7-F-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	MMST5401Q-7-F
Description	TRANS PNP 150V 0.2A SOT323
Detailed Description	Bipolar (BJT) Transistor PNP 150 V 200 mA 300MHz 200 mW Surface Mount SOT-323



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Purchase and inquiry

Manufacturer Product Number:

MMST5401Q-7-F

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

150 V

Current - Collector Cutoff (Max):

50nA (ICBO)

Power - Max:

200 mW

Operating Temperature:

-55°C ~ 150°C (TJ)

Qualification:

AEC-Q101

Package / Case:

SC-70, SOT-323

Base Product Number:

MMST5401

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

200 mA

Vce Saturation (Max) @ Ib, Ic:

500mV @ 5mA, 50mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

60 @ 10mA, 5V

Frequency - Transition:

300MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-323

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

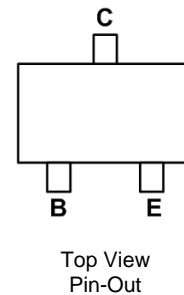
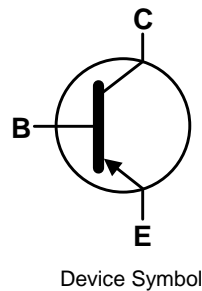
EAR99

Features

- Epitaxial Planar Die Construction
- Ultra-Small Surface Mount Package
- Complementary PNP Type: MMST5551
- Ideal for Low Power Amplification and Switching
- **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: 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
- Weight: 0.006 grams (Approximate)

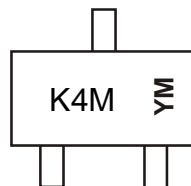


Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
MMST5401-7-F	AEC-Q101	K4M	7	8	3,000
MMST5401-13-F	AEC-Q101	K4M	13	8	10,000
MMST5401Q-7-F	Automotive	K4M	7	8	3,000

- 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. 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 <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K4M = Product Type Marking Code
 YM = Date Code Marking
 Y or Y = Year (ex: F = 2018)
 M or M = Month (ex: 3 = March)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027		
Code	F	G	H	I	J	K	L	M	N	O		
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



MMST5401

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-160	V
Collector-Emitter Voltage	V_{CEO}	-150	V
Emitter-Base Voltage	V_{EBO}	-5	V
Continuous Collector Current	I_C	-200	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	200	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

ESD Ratings (Note 7)

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)					
Collector-Base Breakdown Voltage	V_{CBO}	-160	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	V_{CEO}	-150	—	V	$I_C = -1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	V_{EBO}	-5	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cutoff Current	I_{CBO}	—	-50	nA μA	$V_{CB} = -120\text{V}, I_E = 0$ $V_{CB} = -120\text{V}, I_E = 0, T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	-50	nA	$V_{EB} = -3\text{V}, I_C = 0$
ON CHARACTERISTICS (Note 8)					
DC Current Gain	h_{FE}	50 60 50	— 240 —	—	$I_C = -1\text{mA}, V_{CE} = -5\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5\text{V}$ $I_C = -50\text{mA}, V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	-0.2 -0.5	V	$I_C = -10\text{mA}, I_B = -1\text{mA}$ $I_C = -50\text{mA}, I_B = -5\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	-1	V	$I_C = -10\text{mA}, I_B = -1\text{mA}$ $I_C = -50\text{mA}, I_B = -5\text{mA}$
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	6.0	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}, I_E = 0$
Small Signal Current Gain	h_{fe}	40	260	—	$V_{CE} = -10\text{V}, I_C = -1\text{mA}, f = 1\text{kHz}$
Current Gain-Bandwidth Product	f_T	100	300	MHz	$V_{CE} = -10\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$
Noise Figure	NF	—	8	dB	$V_{CE} = -5\text{V}, I_C = -200\mu\text{A}, R_S = 10\Omega, f = 1\text{kHz}$

- Notes:
6. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.
 8. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.



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

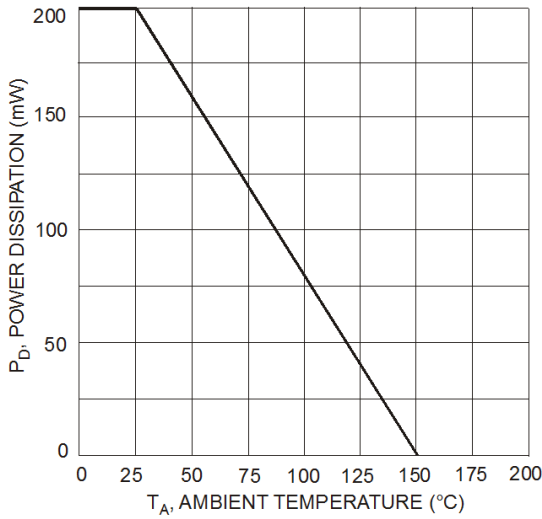


Fig. 1, Max Power Dissipation vs. Ambient Temperature

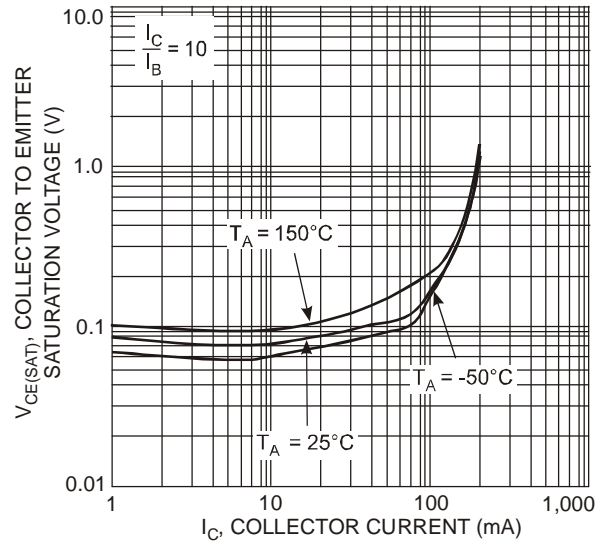


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

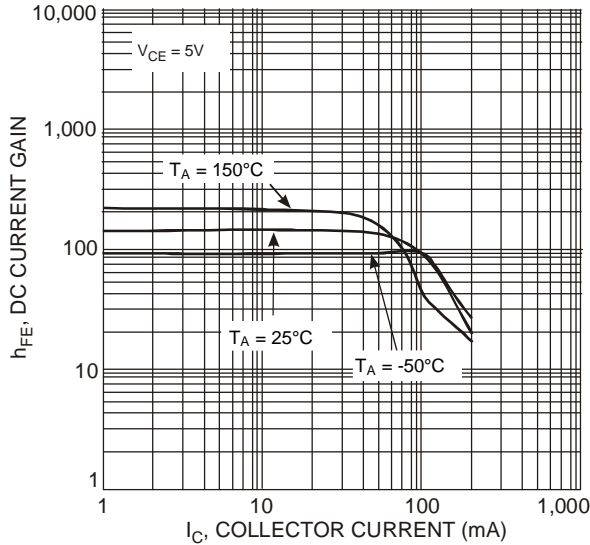


Fig. 3, DC Current Gain vs. Collector Current

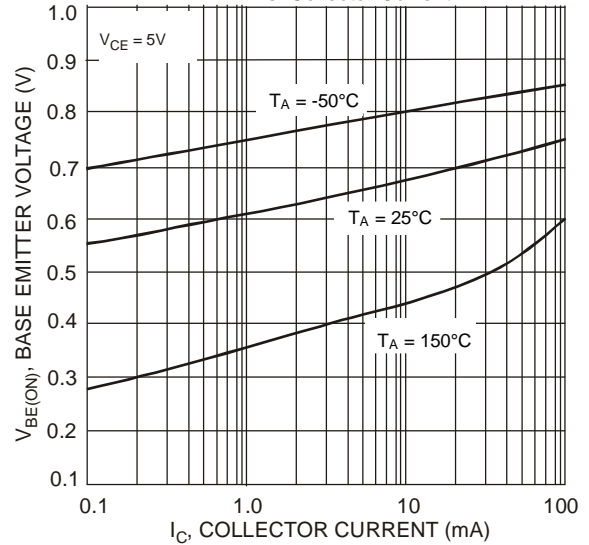


Fig. 4, Base Emitter Voltage vs. Collector Current

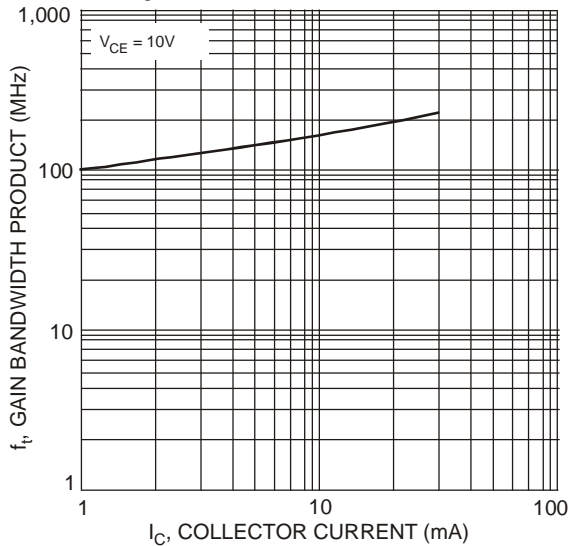
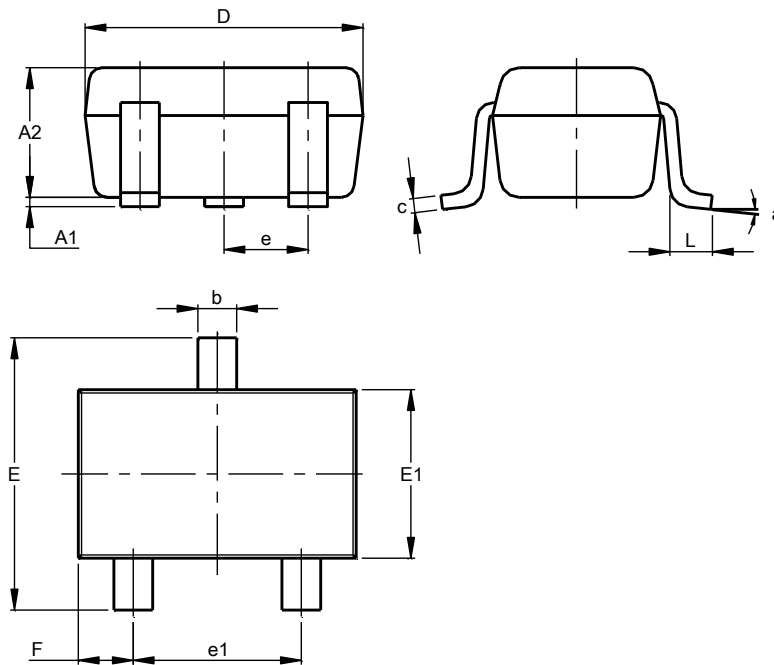


Fig. 5, Gain Bandwidth Product vs. Collector Current

Package Outline Dimensions

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

SOT323

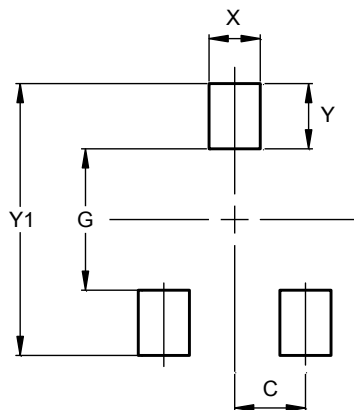


SOT323			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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