

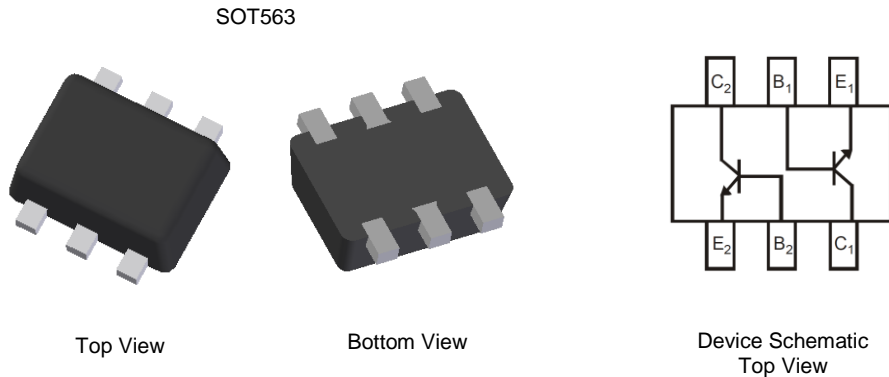
## Features

- $BV_{CEO} > 40V$
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Complementary PNP Type: MMDT2907VQ
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DIODES™ MMDT2222VQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: SOT563
- 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 Finish. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.003 grams (Approximate)

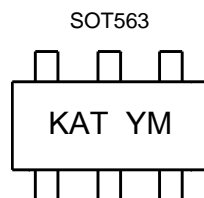


## Ordering Information (Note 4)

Product	Package	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MMDT2222VQ-7	SOT563	KAT	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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>

## Marking Information



KAT = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: J = 2022)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	J	K	L	M	N	O	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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	75	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	600	mA

**Thermal Characteristics**

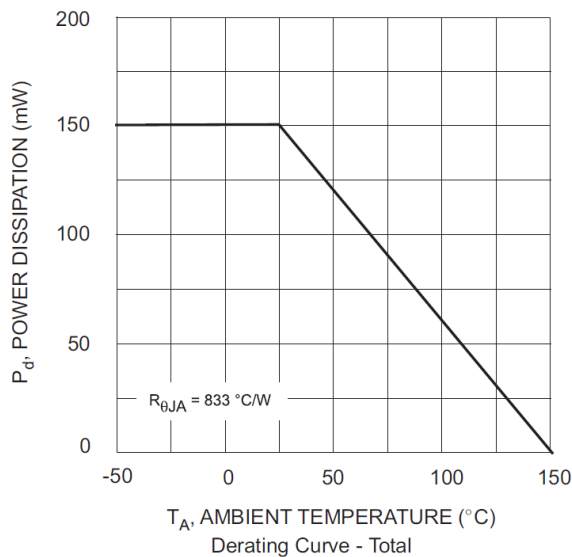
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	150	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage and Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**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

- Notes:
5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristic and Derating Information**

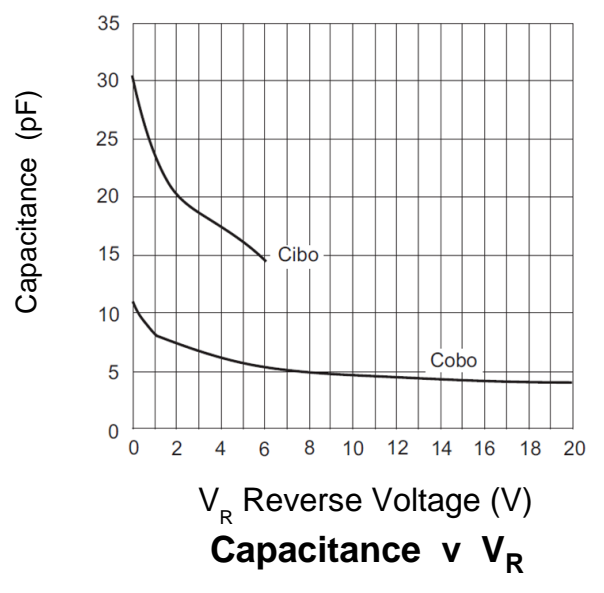
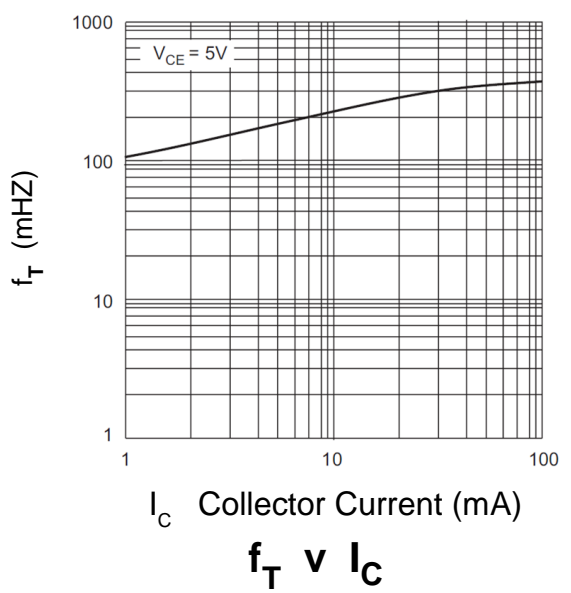
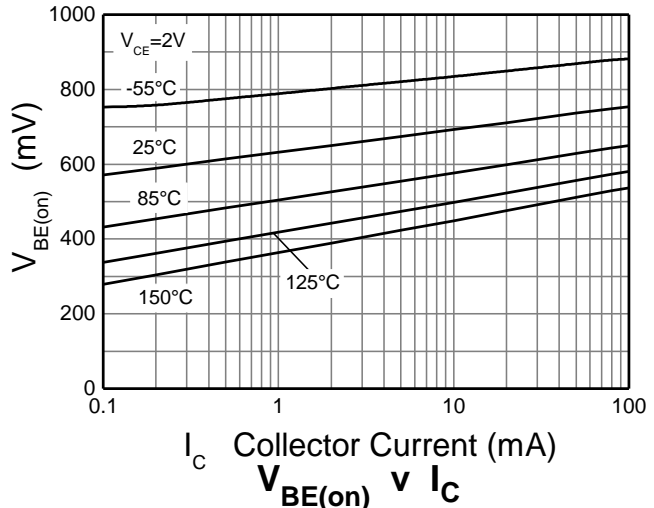
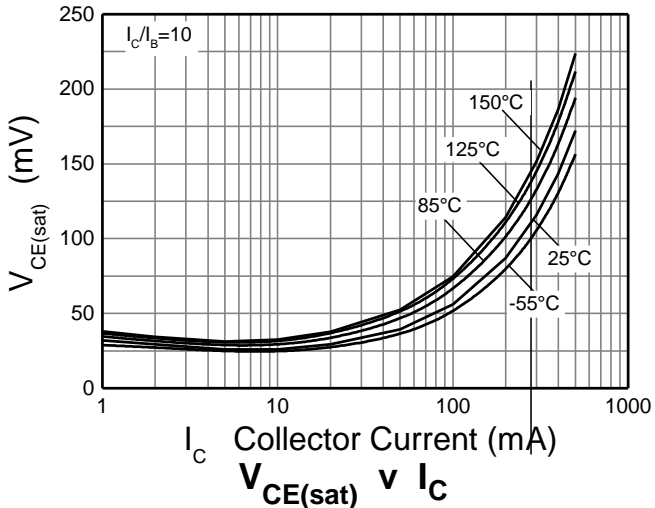
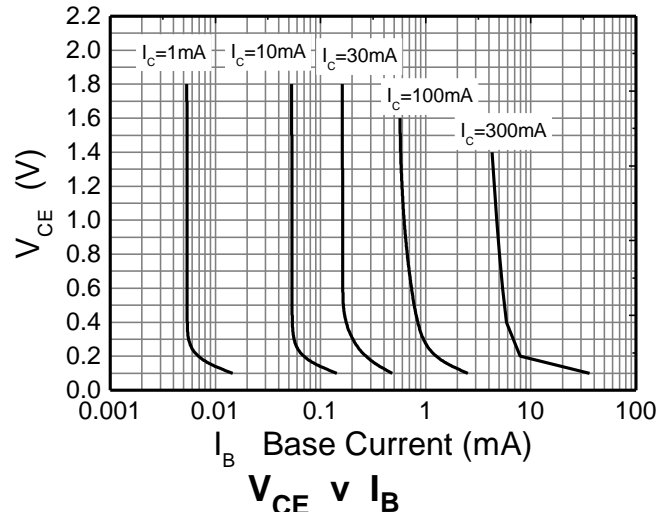
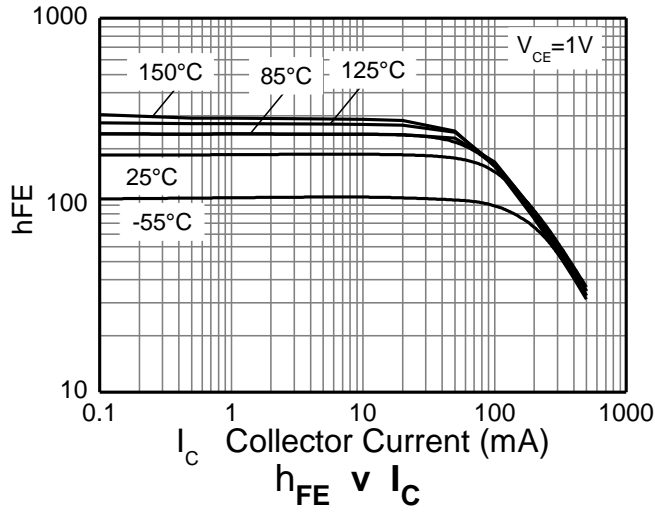


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>					
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	75	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	40	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	V	I <sub>E</sub> = 100μA
Collector-Base Cut-Off Current	I <sub>CBO</sub>	—	10	nA	V <sub>CB</sub> = 60V
			10	μA	V <sub>CB</sub> = 60V, T <sub>A</sub> = +150°C
Collector Cut-Off Current	I <sub>CEX</sub>	—	10	nA	V <sub>CE</sub> = 60V, V <sub>BE(off)</sub> = 3V
Emitter-Base Cut-Off Current	I <sub>EBO</sub>	—	10	nA	V <sub>EB</sub> = 5V
Base Cut-Off Current	I <sub>BL</sub>	—	20	nA	V <sub>CE</sub> = 60V, V <sub>BE(off)</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>					
DC Current Gain	h <sub>FE</sub>	35	—		I <sub>C</sub> = 100μA, V <sub>CE</sub> = 10V
		50	—		I <sub>C</sub> = 1mA, V <sub>CE</sub> = 10V
		75	—		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V
		100	300	—	I <sub>C</sub> = 150mA, V <sub>CE</sub> = 10V
		40	—		I <sub>C</sub> = 500mA, V <sub>CE</sub> = 10V
		50	—		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V, T <sub>A</sub> = -55°C
		35	—		I <sub>C</sub> = 150mA, V <sub>CE</sub> = 1V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	0.3	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA
			1.0		I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	0.6	1.2	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA
		—	2.0		I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>obo</sub>	—	8.0	pF	V <sub>CB</sub> = 10V, f = 1MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>ibo</sub>	—	25	pF	V <sub>EB</sub> = 0.5V, f = 1MHz, I <sub>C</sub> = 0
Current Gain-Bandwidth Product	f <sub>T</sub>	300	—	MHz	V <sub>CE</sub> = 20V, I <sub>C</sub> = 20mA, f = 100MHz
Noise Figure	NF	—	4	dB	V <sub>CE</sub> = 10V, I <sub>C</sub> = 100μA, R <sub>S</sub> = 1kΩ, f = 1.0kHz
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	t <sub>d</sub>	—	10	ns	V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,
Rise Time	t <sub>r</sub>	—	25	ns	V <sub>BE(off)</sub> = -0.5V, I <sub>B1</sub> = 15mA
Storage Time	t <sub>s</sub>	—	225	ns	V <sub>CC</sub> = 30V, I <sub>C</sub> = 150mA,
Fall Time	t <sub>f</sub>	—	60	ns	I <sub>B1</sub> = -I <sub>B2</sub> = 15mA

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

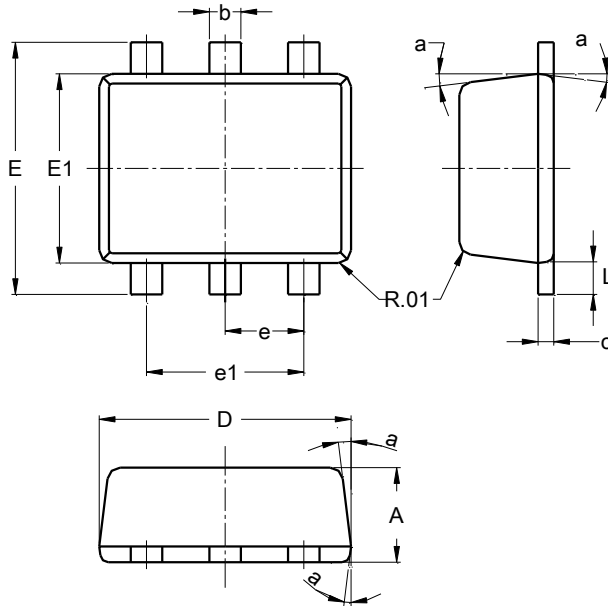
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT563**

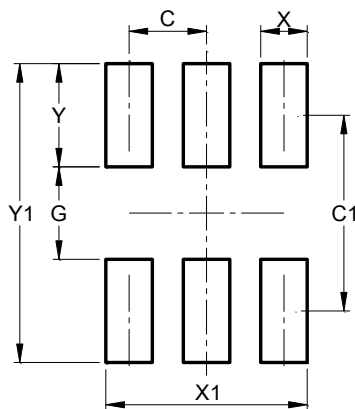


SOT563			
Dim	Min	Max	Typ
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT563**



Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940

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