

**Features**

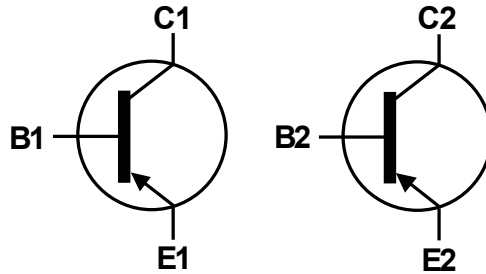
- Ultra-Small Surface Mount Package
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

**Mechanical Data**

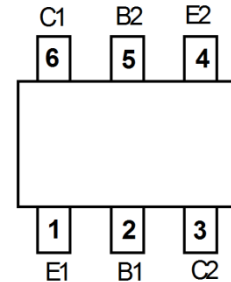
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 <sup>e3</sup>
- Weight: 0.006 grams (approximate)



Top View



Device Symbol



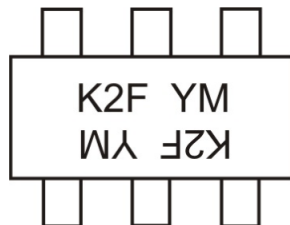
Top View  
Pin-Out

**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MMDT2907A-7-F	AEC-Q101	K2F	7	8	3,000
MMDT2907AQ-7-F	Automotive	K2F	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](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.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



K2F = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017
Code	X	Y	Z	A	B	C	D	E

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<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5.0	V
Collector Current	I <sub>C</sub>	-600	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-60	—	—	V	I <sub>C</sub> = -10μA, I <sub>B</sub> = 0
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	-60	—	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -10μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CB0</sub>	—	—	-10	nA	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0
Collector Cutoff Current	I <sub>C0</sub>	—	—	-10	μA	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0, T <sub>A</sub> = +125°C
Collector Cutoff Current	I <sub>C0EX</sub>	—	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
Base Cutoff Current	I <sub>BL</sub>	—	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(OFF)</sub> = -0.5V
<b>ON CHARACTERISTICS (Note 7)</b>						
DC Current Gain	h <sub>FE</sub>	75	—	—	—	I <sub>C</sub> = -100μA, V <sub>CE</sub> = -10V
		100	—	—		I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -10V
		100	—	—		I <sub>C</sub> = -10mA, V <sub>CE</sub> = -10V
		100	—	300		I <sub>C</sub> = -150mA, V <sub>CE</sub> = -10V
		50	—	—		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -10V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	-0.4 -1.6	V	I <sub>C</sub> = -150mA, I <sub>B</sub> = -15mA I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	-1.3 -2.6	V	I <sub>C</sub> = 150mA, I <sub>B</sub> = 15mA 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 = 1.0MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>I0</sub>	—	—	30	pF	V <sub>EB</sub> = -2.0V, f = 1.0MHz, I <sub>C</sub> = 0
Current Gain Bandwidth Product	f <sub>T</sub>	200	—	—	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -50mA, f = 100MHz
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Time	t <sub>off</sub>	—	—	45	ns	V <sub>CC</sub> = -30V, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = -15mA
Delay Time	t <sub>d</sub>	—	—	10	ns	
Rise Time	t <sub>r</sub>	—	—	40	ns	
Turn-Off Time	t <sub>off</sub>	—	—	100	ns	V <sub>CC</sub> = -6V, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = -I <sub>B2</sub> = -15mA
Storage Time	t <sub>s</sub>	—	—	80	ns	
Fall Time	t <sub>f</sub>	—	—	30	ns	

- Notes: 6. 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.  
7. Short duration pulse test used to minimize self-heating effect.

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

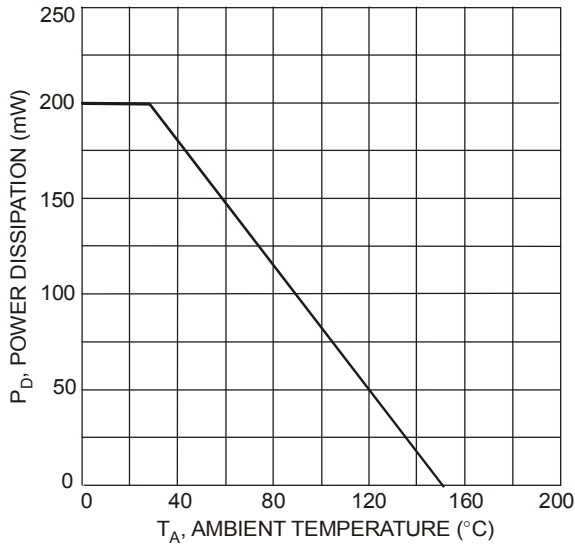


Figure 1 Power Derating Curve

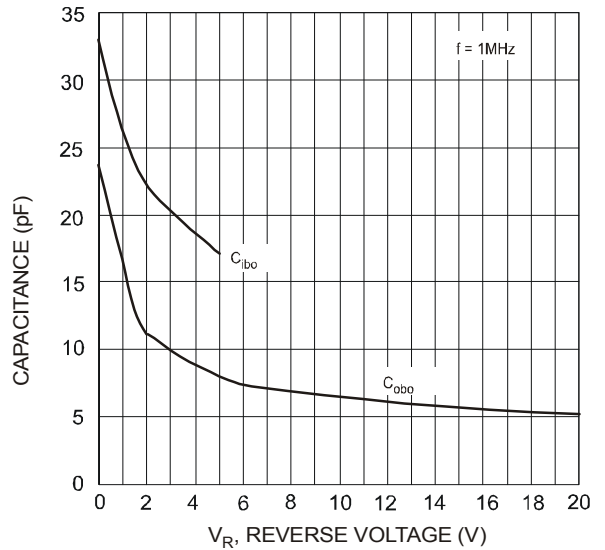


Figure 2, Typical Capacitance Characteristics

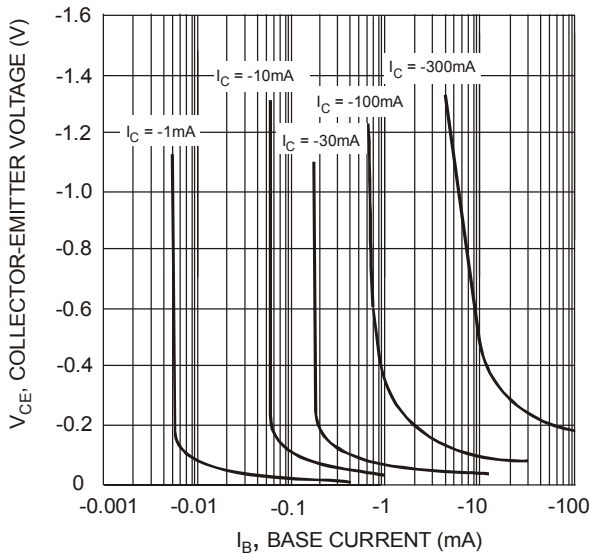


Figure 3, Typical Collector Saturation Region

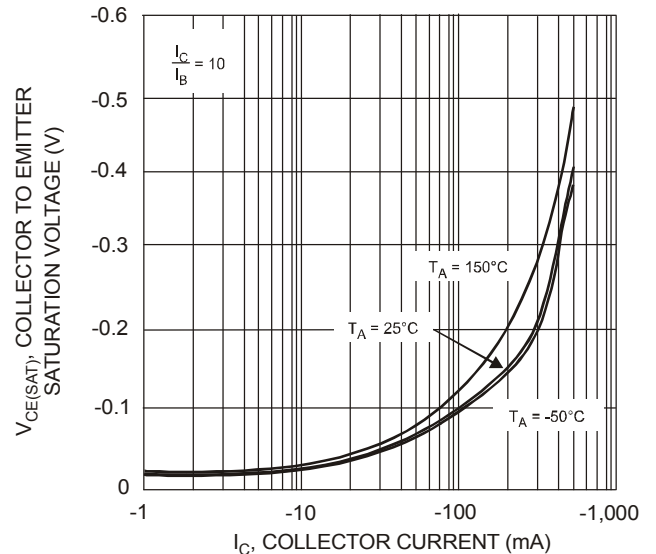


Figure 4, Collector Emitter Saturation Voltage vs. Collector Current

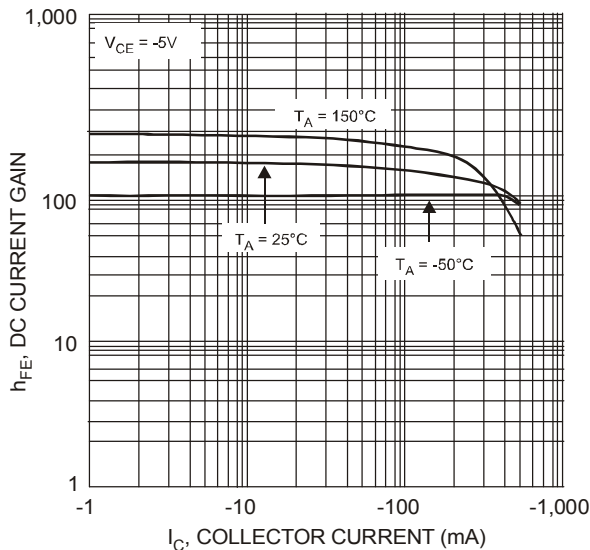


Figure 5, DC Current Gain vs. Collector Current

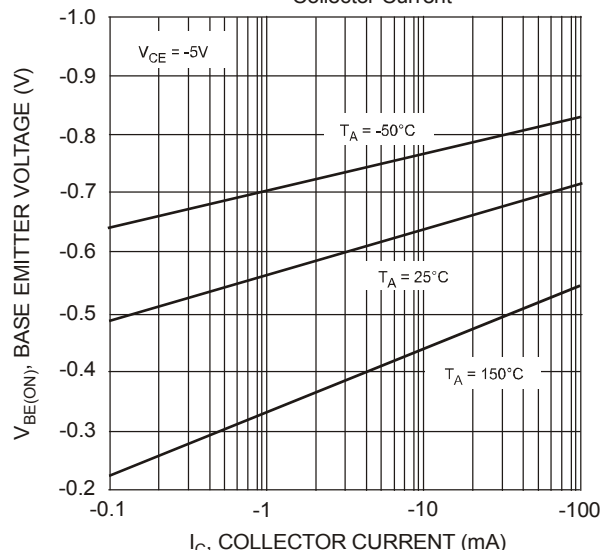
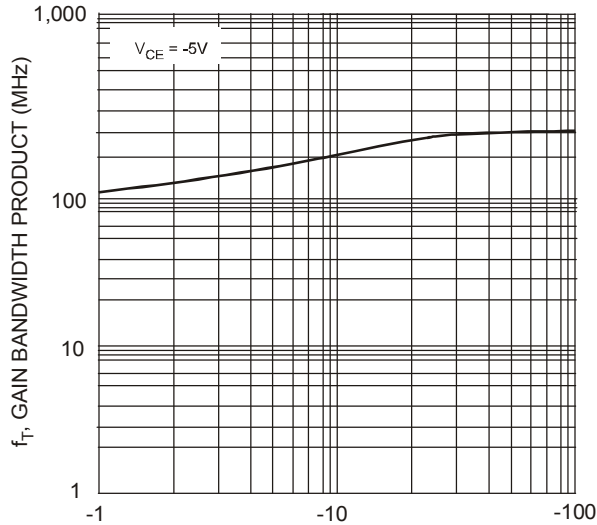


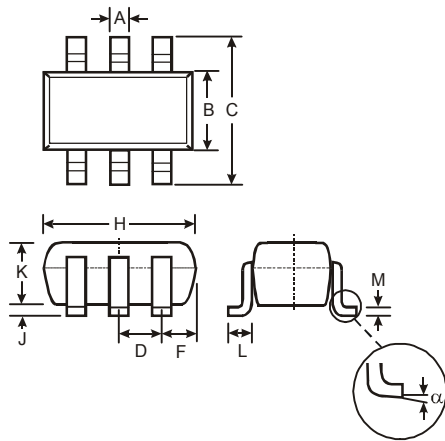
Figure 6, Base Emitter Voltage vs. Collector Current



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 7, Gain Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

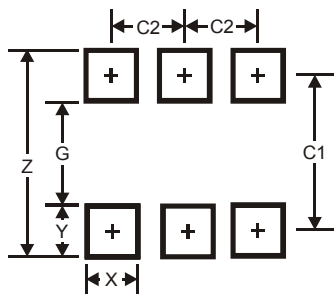
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT363			
Dim	Min	Max	Typ
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.65 Typ		
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
$\alpha$	0°	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	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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