

Features

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface-Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The MMDT3904Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

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

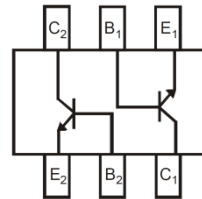
Mechanical Data

- Package: SOT363
- 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 208③
- Weight: 0.006 grams (Approximate)

SOT363



Top View



Device Schematic
Top View

Ordering Information

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMDT3904Q-7-F	SOT363	K6N	7	8	3,000	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

SOT363



K6N = Product Type Marking Code
YM = Date Code Marking
Y or $\bar{Y}$ = Year (ex: N = 2026)
M or $\bar{M}$ = Month (ex: 4 = April)

Date Code Key

Year	2016	-	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Code	D	-	N	P	R	S	T	U	V	W	X	Y

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}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EB0}	6.0	V
Collector Current	I _C	200	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 5 & 6)	P _D	200	mW
Thermal Resistance, Junction to Ambient (Notes 5 & 6)	R _{θJA}	625	°C/W
Thermal Resistance, Junction to Case (Notes 5 & 6)	R _{θJC}	229	°C/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to 150	°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
Electrostatic Discharge – Charged Device Model	ESD CDM	1,000	V	3C

- Notes:
- For the device mounted on minimum recommended pad layout FR4 PCB of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - For a dual device with one active die.
 - Refer to JEDEC specifications JESD22-A114, JESD22-A11 and JS-002.

Thermal Characteristic and Derating Information

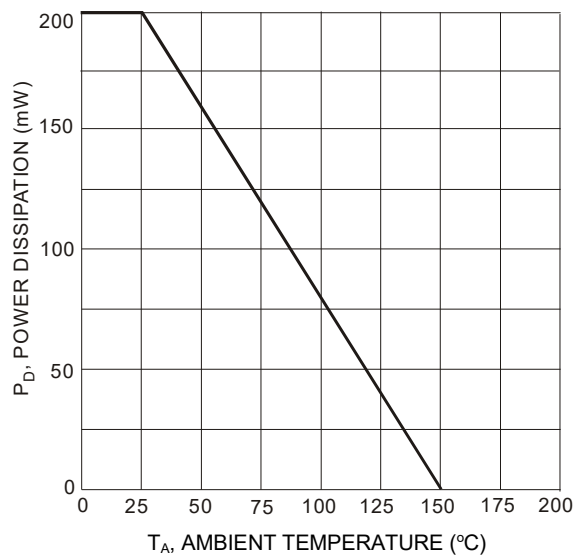


Fig 1. Power Dissipation vs. Ambient Temperature
(Total Device)

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage	BV _{CBO}	60	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	40	—	V	I _C = 10.0mA
Emitter-Base Breakdown Voltage	BV _{EBO}	6.0	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	50	nA	V _{CB} = 50V
Collector-Emitter Cutoff Current	I _{CEV}	—	50	nA	V _{CE} = 40V, V _{BE(on)} = 3.0V
			50		V _{CE} = 40V, V _{BE} = 0.25V
Emitter-Base Cutoff Current	I _{EBO}	—	50	nA	V _{EB} = 5V
ON CHARACTERISTICS (Note 8)					
DC Current Gain	h _{FE}	40	—	—	I _C = 100μA, V _{CE} = 1.0V
		70	—		I _C = 1.0mA, V _{CE} = 1.0V
		100	300		I _C = 10mA, V _{CE} = 1.0V
		60	—		I _C = 50mA, V _{CE} = 1.0V
		30	—		I _C = 100mA, V _{CE} = 1.0V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	—	0.20 0.30	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
Base-Emitter Saturation Voltage	V _{BE(sat)}	0.65 —	0.85 0.95	V	I _C = 10mA, I _B = 1.0mA I _C = 50mA, I _B = 5.0mA
SMALL-SIGNAL CHARACTERISTICS					
Output Capacitance	C _{obo}	—	4.0	pF	V _{CB} = 5.0V, f = 1.0MHz
Input Capacitance	C _{ibo}	—	8.0	pF	V _{EB} = 0.5V, f = 1.0MHz
Input Impedance	h _{ie}	1.0	10	kΩ	V _{CE} = 10V, I _C = 1.0mA, f = 1.0kHz
Voltage Feedback Ratio	h _{re}	0.5	8.0	x 10 ⁻⁴	
Small-Signal Current Gain	h _{fe}	100	400	—	
Output Admittance	h _{oe}	1.0	40	μS	
Current Gain-Bandwidth Product	f _T	300	—	MHz	V _{CE} = 20V, I _C = 10mA, f = 100MHz
Noise Figure	NF	—	5.0	dB	V _{CE} = 5.0V, I _C = 100μA, R _S = 1.0kΩ, f = 1.0kHz
SWITCHING CHARACTERISTICS					
Delay Time	t _d	—	35	ns	V _{CC} = 3.0V, I _C = 10mA, I _{B1} = -I _{B2} = 1.0mA
Rise Time	t _r	—	35	ns	
Storage Time	t _s	—	200	ns	
Fall Time	t _f	—	50	ns	

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

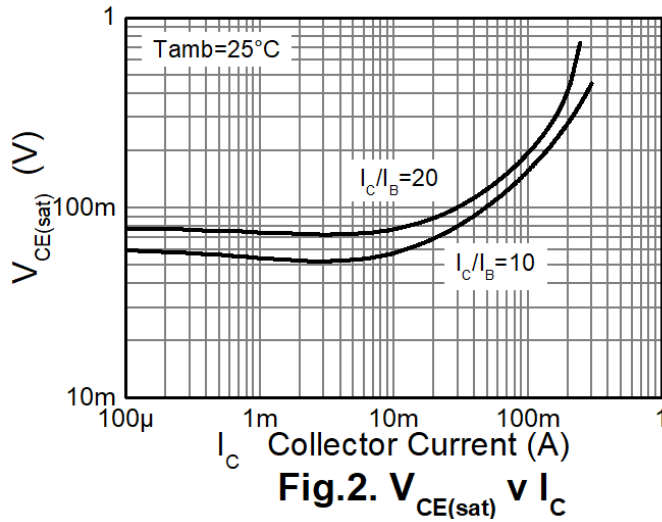


Fig.2. $V_{CE(sat)}$ v I_C

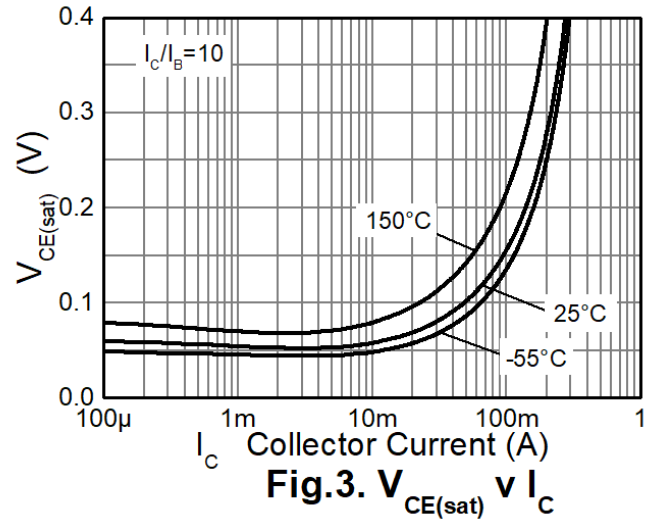


Fig.3. $V_{CE(sat)}$ v I_C

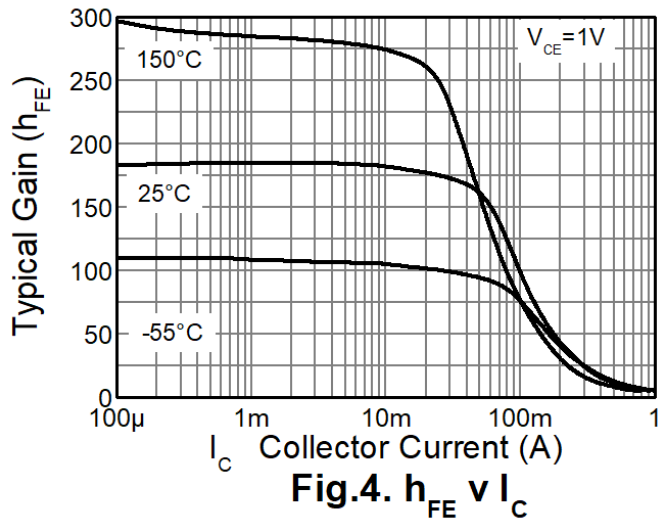


Fig.4. h_{FE} v I_C

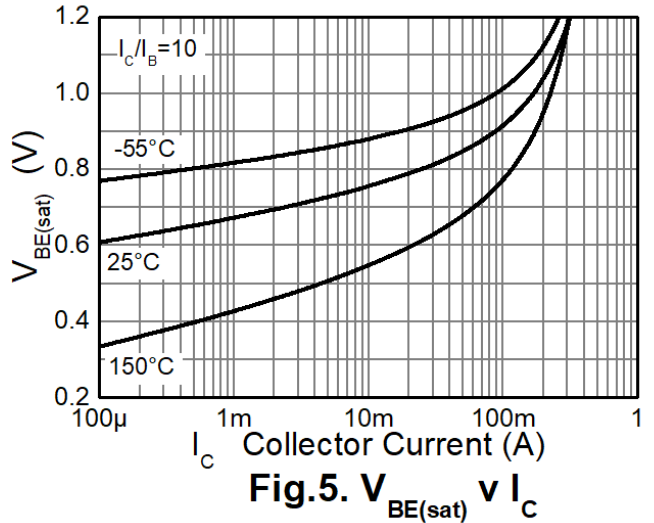


Fig.5. $V_{BE(sat)}$ v I_C

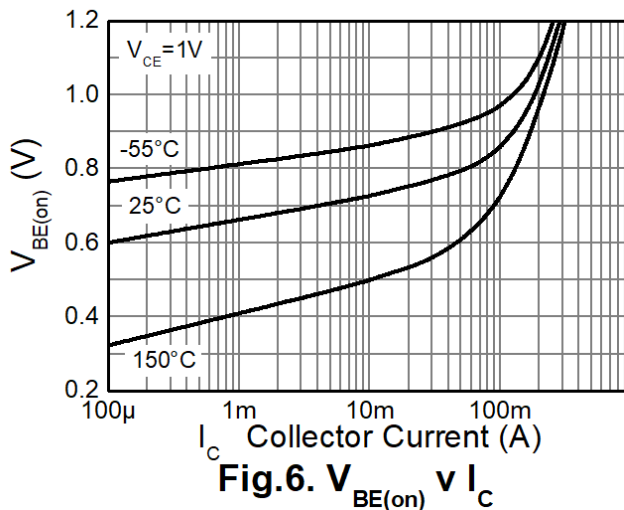


Fig.6. $V_{BE(on)}$ v I_C

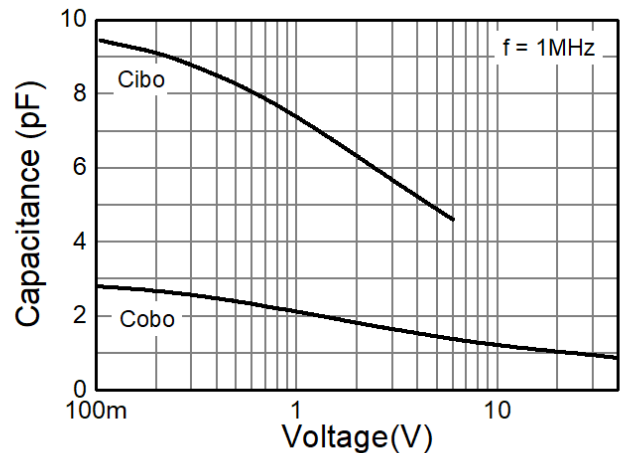
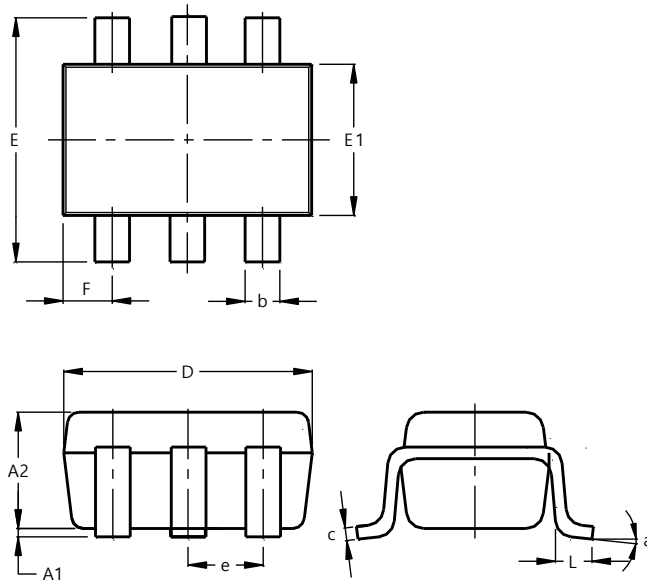


Fig.7. Capacitance v Voltage

Package Outline Dimensions

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

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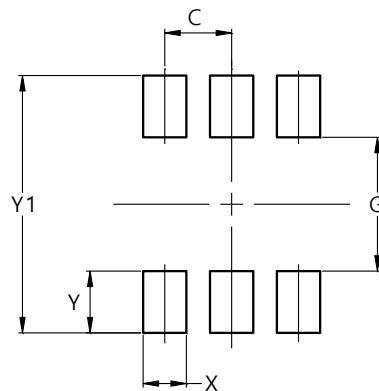


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Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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