



40V DUAL NPN SMALL SIGNAL TRANSISTOR IN SOT363

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)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

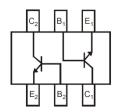
Mechanical Data

- 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 (3)
- Weight: 0.006 grams (Approximate)

SOT363



Top View



Device Schematic Top View

Ordering Information (Note 5)

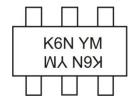
Product	Status	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
MMDT3904Q-7-F	Active	Automotive	K6N	7	8	3,000

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See 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. Refer to http://www.diodes.com/product_compliance_definitions.html.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

SOT363



K6N = Product Type Marking Code YM = Date Code Marking Y or \overline{Y} = Year (ex: D = 2016) M or \overline{M} = Month (ex: 9 = September)

Date Code Key

Code

Year	2016		2017	2018		2019	2020		2021	2022		2023
Code	D		E	F		G	Н		1	J		K
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



Absolute Maximum Ratings (@ $T_A = +25^{\circ}C$, 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_{EBO}	6.0	V
Collector Current	Ic	200	mA

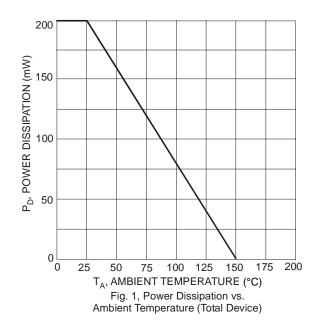
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	200	mW
Thermal Resistance, Junction to Ambient (Note 6)	R _{0JA}	625	°C/W
Operating and Storage 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	С

Thermal Characteristic and Derating Information



^{6.} For the device mounted on minimum recommended pad layout FR-4 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. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



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

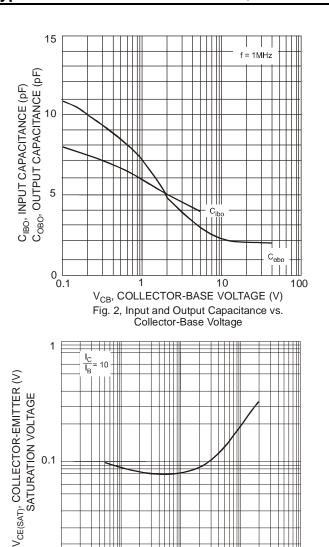
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS					
Collector-Base Breakdown Voltage	BV _{CBO}	60	_	V	$I_C = 100\mu A, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 8)	BV _{CEO}	40	_	V	$I_C = 10.0 \text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	BV _{EBO}	6.0	_	V	$I_E = 100 \mu A, I_C = 0$
Collector-Base Cut-Off Current	I _{CBO}	_	50	nA	V _{CB} = 50V
Collector-Emitter Cut-Off Current		_	50	nA	$V_{CE} = 40V$, $V_{BE(OFF)} = 3.0V$
Collector-Emilier Cut-On Current	I _{CEV}		50	IIA	$V_{CE} = 40V, V_{BE(ON)} = 0.25V$
Emitter-Base Cut-Off Current	I _{EBO}	_	50	nA	V _{EB} = 5V
ON CHARACTERISTICS (Note 8)					
		40			$I_C = 100\mu A, V_{CE} = 1.0V$
		70	_		$I_C = 1.0 \text{mA}, V_{CE} = 1.0 \text{V}$
DC Current Gain	h _{FE}	100	300		$I_C = 10 \text{mA}, V_{CE} = 1.0 \text{V}$
		60	_		$I_C = 50 \text{mA}, V_{CE} = 1.0 \text{V}$
		30	_		$I_C = 100 \text{mA}, V_{CE} = 1.0 \text{V}$
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	_	0.20	V	$I_C = 10mA, I_B = 1.0mA$
Oblicator Emiliar Saturation Voltage	V CE(SAT)		0.30		$I_C = 50 \text{mA}, I_B = 5.0 \text{mA}$
Base-Emitter Saturation Voltage	V _{BE(SAT)}	0.65	0.85	V	$I_C = 10 \text{mA}, I_B = 1.0 \text{mA}$
G C C C C C C C C C C C C C C C C C C C	V BE(SAT)		0.95	· ·	$I_C = 50 \text{mA}, I_B = 5.0 \text{mA}$
SMALL SIGNAL CHARACTERISTICS			ı	ı	
Output Capacitance	C _{obo}		4.0	pF	$V_{CB} = 5.0V$, $f = 1.0MHz$, $I_E = 0$
Input Capacitance	C _{ibo}	_	8.0	pF	$V_{EB} = 0.5V, f = 1.0MHz, I_{C} = 0$
Input Impedance	h _{ie}	1.0	10	kΩ	
Voltage Feedback Ratio	h _{re}	0.5	8.0	x 10 ⁻⁴	$V_{CE} = 10V, I_{C} = 1.0mA,$
Small Signal Current Gain	h _{fe}	100	400	_	f = 1.0kHz
Output Admittance	h _{oe}	1.0	40	μs	
Current Gain-Bandwidth Product	f⊤	300	_	MHz	$V_{CE} = 20V, I_{C} = 10mA,$ f = 100MHz
Noise Figure	NF	_	5.0	dB	$V_{CE} = 5.0V$, $I_{C} = 100\mu A$,
SWITCHING CHARACTERISTICS					$R_S = 1.0k\Omega$, $f = 1.0kHz$
Delay Time	t _D		35	ns	V _{CC} = 3.0V, I _C = 10mA,
Rise Time	t _R		35	ns	$V_{BE(OFF)} = -0.5V, I_{B1} = 1.0mA$
Storage Time	ts		200	ns	$V_{CC} = 3.0V$, $I_{C} = 10$ mA,
Fall Time	t _F		50	ns	$I_{B1} = -I_{B2} = 1.0 \text{mA}$
1 411 11110	l ι⊦			110	ID = IDZ = 1.0111/1

Note:

8. Measured under pulsed conditions. Pulse width \leq 300 μ s. Duty cycle \leq 2%.



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



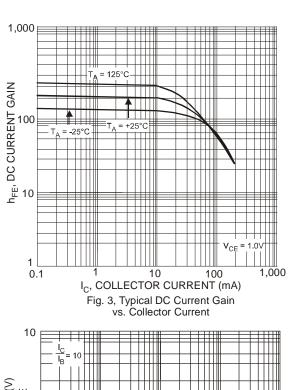
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 I_C , COLLECTOR CURRENT (mA)

Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

100

1,000



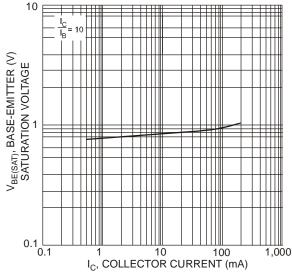


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

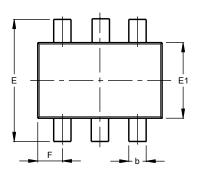
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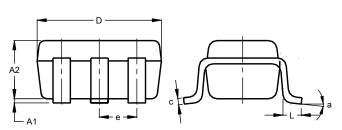


Package Outline Dimensions

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

SOT363



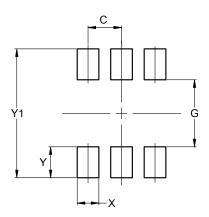


SOT363						
Dim	Min	Max	Тур			
A1	0.00	0.10	0.05			
A2	0.90	1.00	1.00			
b	0.10	0.30	0.25			
C	0.10	0.22	0.11			
D	1.80	2.20	2.15			
Е	2.00	2.20	2.10			
E1	1.15	1.35	1.30			
е	().650 B	SC			
F	0.40	0.45	0.425			
٦	0.25	0.40	0.30			
a 0° 8°		8°				
All Dimensions in mm						

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)		
С	0.650		
G	1.300		
X	0.420		
Y	0.600		
Y1	2 500		



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