160V DUAL NPN HIGH-VOLTAGE TRANSISTOR IN SOT363

Features

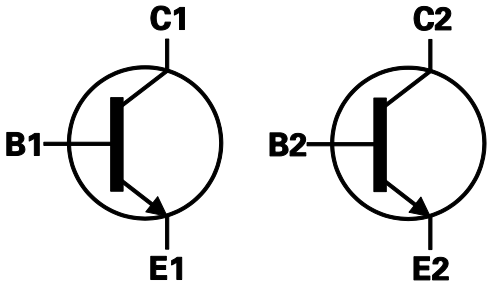
- Epitaxial Planar Die Construction
- Complementary PNP Type – MMDT5401
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface-Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

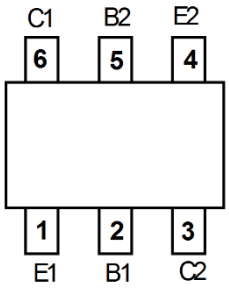
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

SOT363

Top View



Device Symbol



Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMDT5551-7-F	SOT363	K4N	7	8	3000	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

K4N = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: L = 2024)
M = Month (ex: 4 = April)

Date Code Key

Year	2012	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	Z	-	L	M	N	P	R	S	T	U	V	W

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

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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	180	V
Collector-Emitter Voltage	V_{CEO}	160	V
Emitter-Base Voltage	V_{EBO}	6	V
Continuous Collector Current	I_C	200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	200	mW
	(Notes 6 & 7)		320	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	625	°C/W
	(Notes 6 & 7)		390	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JC}$	140	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady state.
6. Same as Note 5, except the device is mounted 25mm × 25mm 2oz copper.
7. Maximum combined dissipation.
8. Thermal resistance from junction to the top of package.

Thermal Characteristics and Derating Information

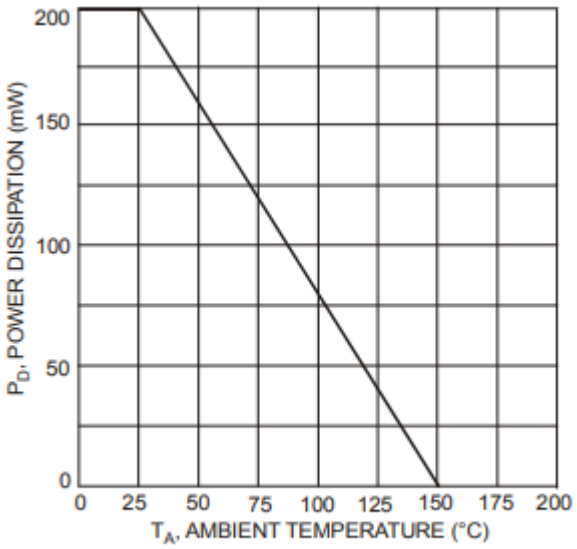

Figure 1. Max Power Dissipation vs. Ambient Temperature

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	180	—	—	V	I_C = 100µA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	160	—	—	V	I_C = 1mA, I_B = 0
Emitter-Base Breakdown Voltage	BV_{EBO}	6	—	—	V	I_E = 10µA, I_C = 0
Collector-Base Cutoff Current	I_{CBO}	—	—	50	nA	V_{CB} = 120V, I_E = 0
		—	—	50	µA	V_{CB} = 120V, I_E = 0, T_A = +100°C
Base-Emitter Cutoff Current	I_{EBO}	—	—	50	nA	V_{EB} = 4V, I_C = 0
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h_{FE}	80	—	—	—	I_C = 1mA, V_{CE} = 5.0V
		80		250		I_C = 10mA, V_{CE} = 5.0V
		30		—		I_C = 50mA, V_{CE} = 5.0V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.15	V	I_C = 10mA, I_B = 1.0mA
				0.20		I_C = 50mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	1.0	V	I_C = 10mA, I_B = 1.0mA
						I_C = 50mA, I_B = 5.0mA
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	—	6.0	pF	V_{CB} = 10V, f = 1.0MHz, I_E = 0
Small Signal Current Gain	h_{fe}	50	—	250	—	I_C = 1mA, V_{CE} = 10V, f = 1.0MHz
Current Gain-Bandwidth Product	f_T	100	—	300	MHz	I_C = 10mA, V_{CE} = 10V, f = 100MHz
Noise Figure	NF	—	—	8.0	dB	V_{CE} = 5.0V, I_C = 200µA, R_S = 1kΩ, f = 1.0kHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

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

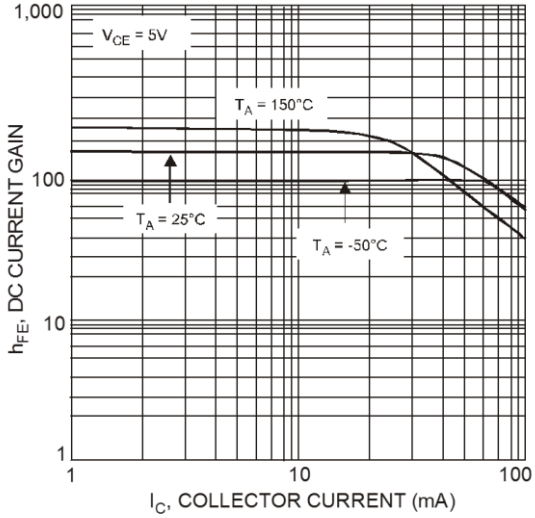

Figure 2. DC Current Gain vs. Collector Current

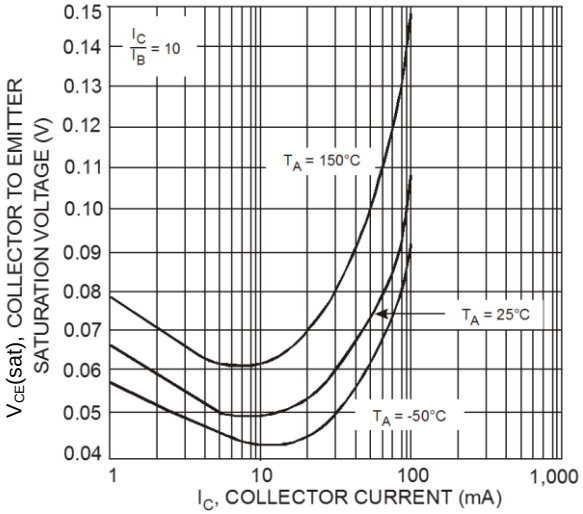

Figure 3. Collector Emitter Saturation Voltage vs. Collector Current

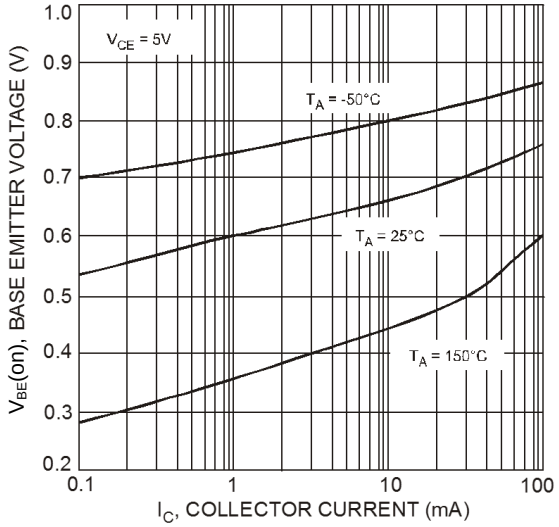

Figure 4. Base Emitter Voltage vs. Collector Current

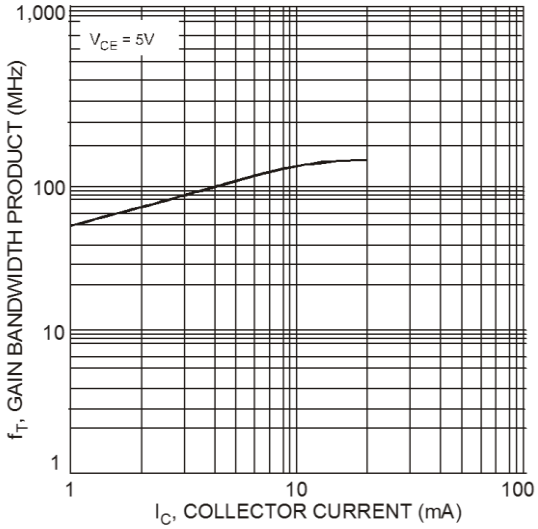

Figure 5. Gain Bandwidth Product vs. Collector Current

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Package Outline Dimensions

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

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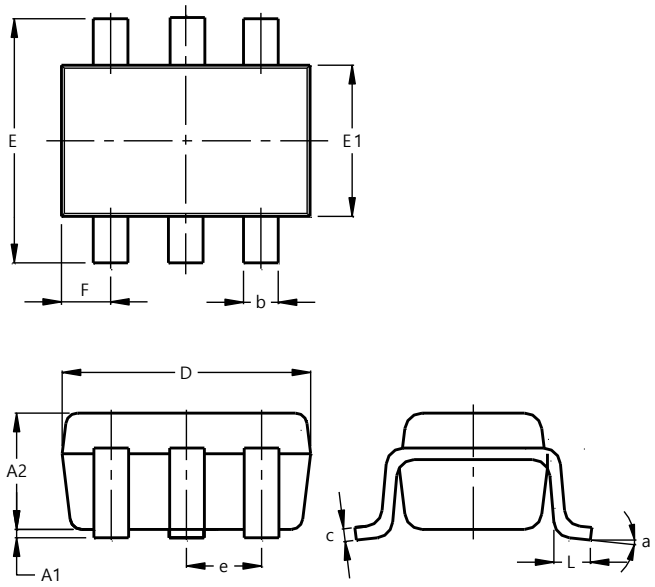
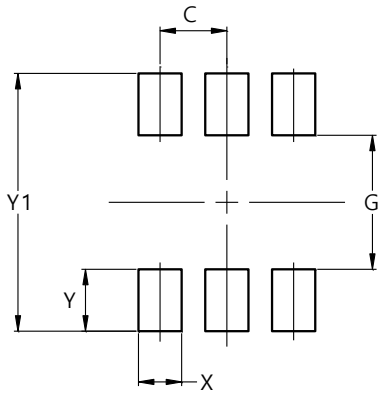


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
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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