

**40V MATCHED PAIR PNP SMALL SIGNAL TRANSISTOR IN SOT363**
**Features**

- $BV_{CEO} > -40V$
- $I_C = -200mA$  High Collector Current
- Pair of PNP Transistors That Are Intrinsically Matched (Note 1)
- 2% Matching on Current Gain ( $h_{FE}$ )
- 2mV Matching on Base-Emitter Voltage ( $V_{BE}$ )
- Fully Internally Isolated in a Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 2 & 3)**
- **Halogen and Antimony Free. "Green" Device (Note 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 5)**

**Mechanical Data**

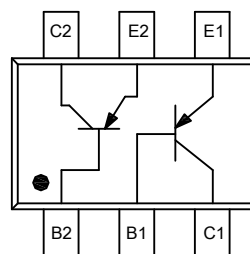
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.006 grams (approximate)

**Applications**

- Current Mirrors
- Differential and Instrumentation Amplifiers
- Comparators



Top View

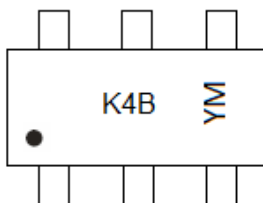


Device Schematic and Pin-Out Top View

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

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DMMT3906W-7-F	AEC-Q101	K4B	7	8	3,000
DMMT3906WQ-7-F	Automotive	K4B	7	8	3,000

- Notes:
1. Intrinsically matched pair as this is built with adjacent die from the same wafer.
  2. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  3. 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.
  4. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  5. 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. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  6. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


K4B = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 2 = February)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-5.0	V
Collector Current	$I_C$	-200	mA

**Thermal Characteristics – Total Device** (@ $T_A = +25^\circ\text{C}$  unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7) Total Device	$P_D$	200	mW
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 8)

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

- Note: 7. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions whilst operating in a steady-state.  
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

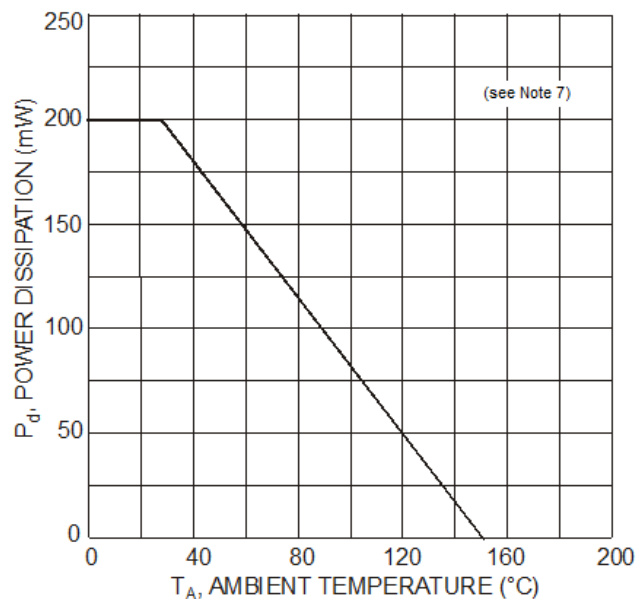
**Thermal Characteristics – Total Device**


Fig. 1, Power Derating Curve (Total Device)

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

Characteristic	Symbol	Min	TYP	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	-40	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	-40	—	—	V	$I_C = -1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-5.0	—	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CEX}$	—	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current	$I_{BL}$	—	—	-50	nA	$V_{CE} = -30\text{V}, V_{EB(OFF)} = 3.0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
DC Current Gain	$h_{FE}$	60 80 100 60 30	—	— — 300 — —	—	$I_C = -100\mu\text{A}, V_{CE} = -1.0\text{V}$ $I_C = -1.0\text{mA}, V_{CE} = -1.0\text{V}$ $I_C = -10\text{mA}, V_{CE} = -1.0\text{V}$ $I_C = -50\text{mA}, V_{CE} = -1.0\text{V}$ $I_C = -100\text{mA}, V_{CE} = -1.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	-250 -400	mV	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.65 —	—	-850 -950	mV	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$ $I_C = -50\text{mA}, I_B = -5.0\text{mA}$
<b>MATCHING CHARACTERISTICS</b>						
DC Current Gain Matching (Note 10)	$h_{FE1} / h_{FE2}$	—	1	2	%	$I_C = -2\text{mA}, V_{CE} = -5\text{V}$
Base-Emitter Voltage Matching (Note 11)	$V_{BE1} - V_{BE2}$	—	1	2	mV	$I_C = -2\text{mA}, V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(SAT)1} / V_{CE(SAT)2}$	—	1	2	%	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(SAT)1} / V_{BE(SAT)2}$	—	1	2	%	$I_C = -10\text{mA}, I_B = -1.0\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	$C_{obo}$	—	—	4.5	pF	$V_{CB} = -5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$
Input Capacitance	$C_{ibo}$	—	—	10.0	pF	$V_{EB} = -0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$
Input Impedance	$h_{ie}$	2.0	—	12	k $\Omega$	$V_{CE} = 10\text{V}, I_C = 1.0\text{mA}, f = 1.0\text{kHz}$
Voltage Feedback Ratio	$h_{re}$	0.1	—	10	$\times 10^{-4}$	
Small Signal Current Gain	$h_{fe}$	100	—	400	—	
Output Admittance	$h_{oe}$	3.0	—	60	$\mu\text{S}$	
Current Gain-Bandwidth Product	$f_T$	250	—	—	MHz	
Noise Figure	NF	—	—	4.0	dB	$V_{CE} = -5.0\text{V}, I_C = -100\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$
<b>SWITCHING CHARACTERISTICS</b>						
Delay Time	$t_d$	—	—	35	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA}, V_{BE(off)} = 0.5\text{V}, I_{B1} = -1.0\text{mA}$
Rise Time	$t_r$	—	—	35	ns	
Storage Time	$t_s$	—	—	225	ns	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA}, I_{B1} = I_{B2} = -1.0\text{mA}$
Fall Time	$t_f$	—	—	75	ns	

Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .  
 10. Is the ratio of one transistor compared to the other transistor.  
 11.  $V_{BE1} - V_{BE2}$  is the absolute difference of one transistor compared to the other transistor.

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

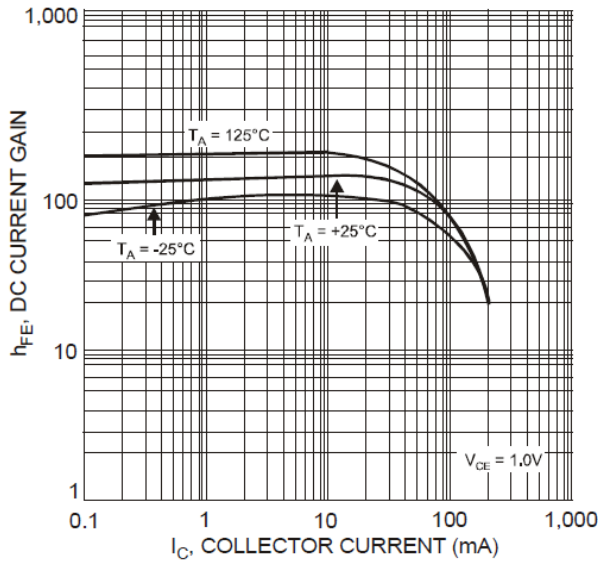


Fig. 3, Typical DC Current Gain vs. Collector Current

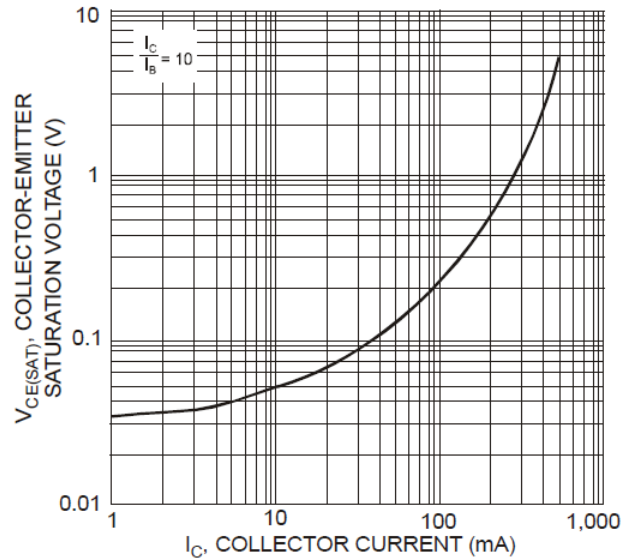


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

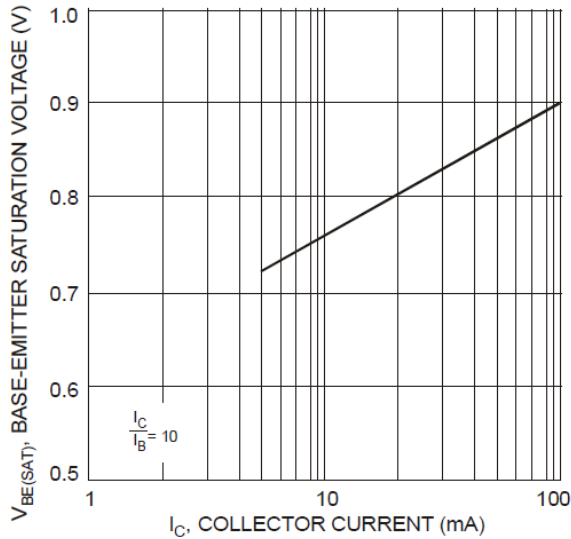


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

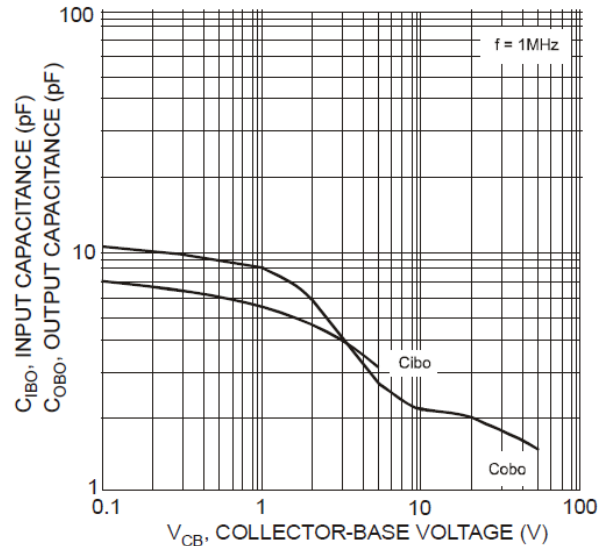
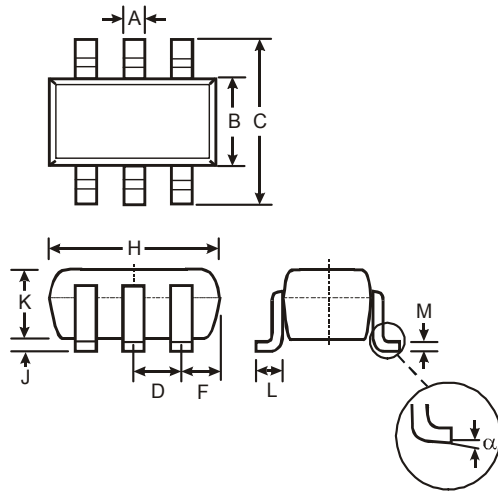


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

**Package Outline Dimensions**

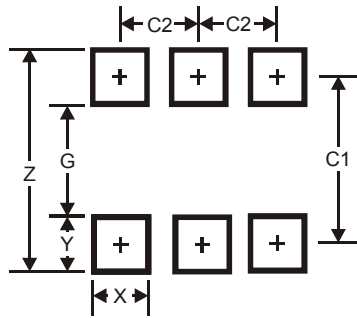
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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
α	0°	8°	-
<b>All Dimensions in mm</b>			

**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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