

Features

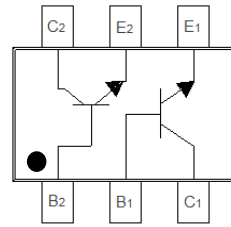
- $BV_{ECO} > 40V$
- $I_C = 200mA$ High Collector Current
- Pair of NPN Transistors that are Intrinsically Matched (Note 1)
- 2% Matching on Current Gain (h_{FE})
- 2mV Matching on Base-Emitter Voltage (V_{BE})
- Fully Internally Isolated in a Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 2 & 3)**
- **Halogen and Antimony Free. "Green" Device (Note 4)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, 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

- 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

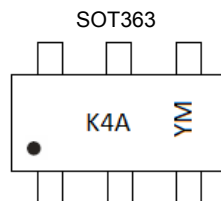


Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DMMT3904W-7-F	AEC-Q101	K4A	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) & 2015/863/EU (RoHS 3) compliant.
 3. 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.
 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K4A = Product Type Marking Code
 YM = Date Code Marking
 Y or \underline{Y} = Year (ex: H = 2020)
 M = Month (ex: 2 = February)

Date Code Key

Year	2002	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	O	...	H	I	J	K	L	M	N	O	P	R

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_{CBO}	60	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6.0	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 6) Total Device	P_D	200	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ\text{C}$

ESD Ratings (Note 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

Notes: 6. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR-4 PCB; the device is measured under still air conditions whilst operating in a steady-state.
 7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics – Total Device

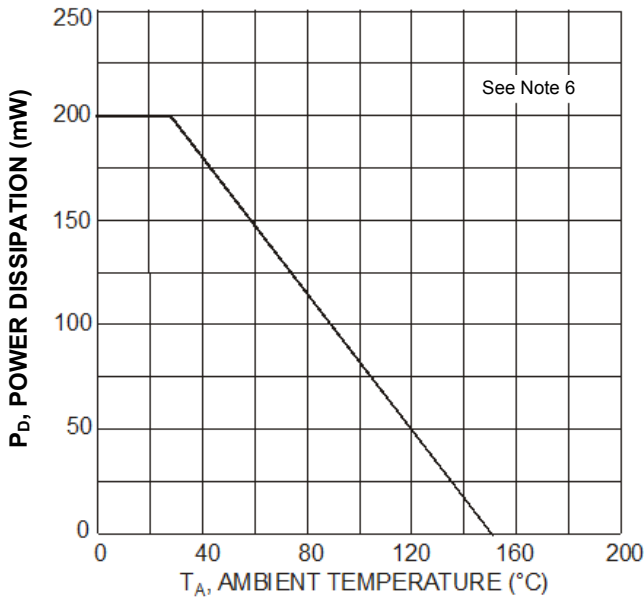


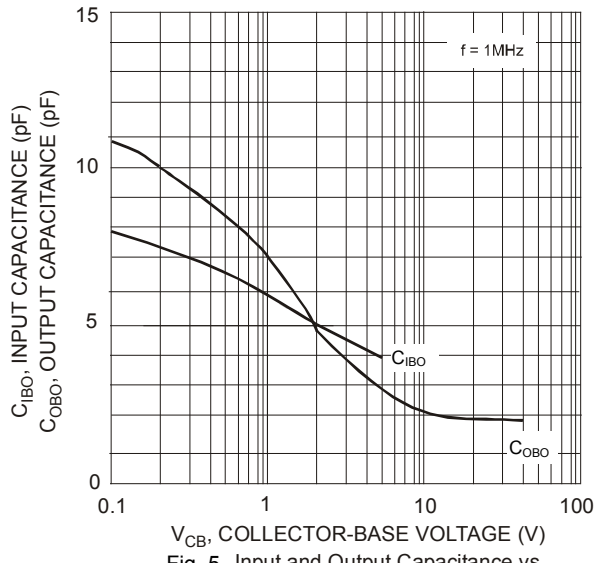
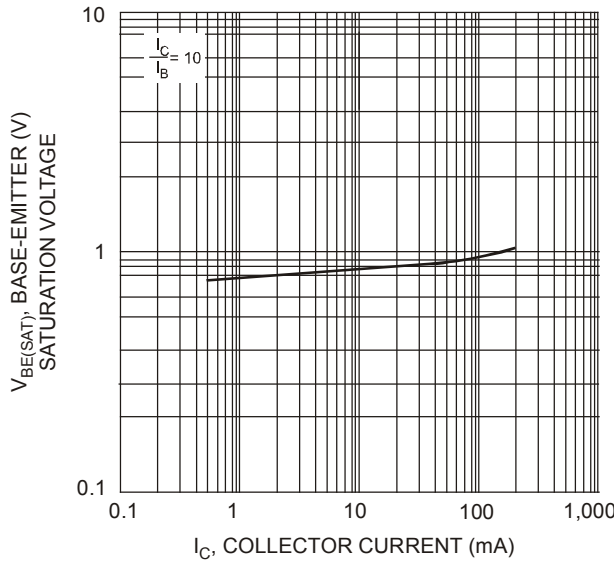
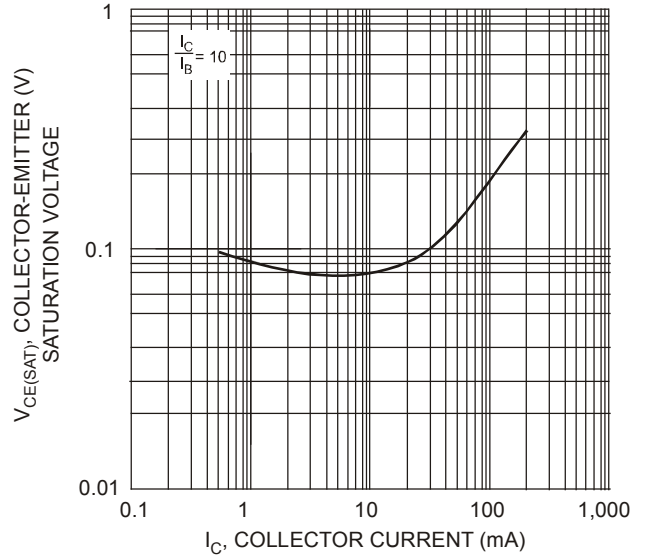
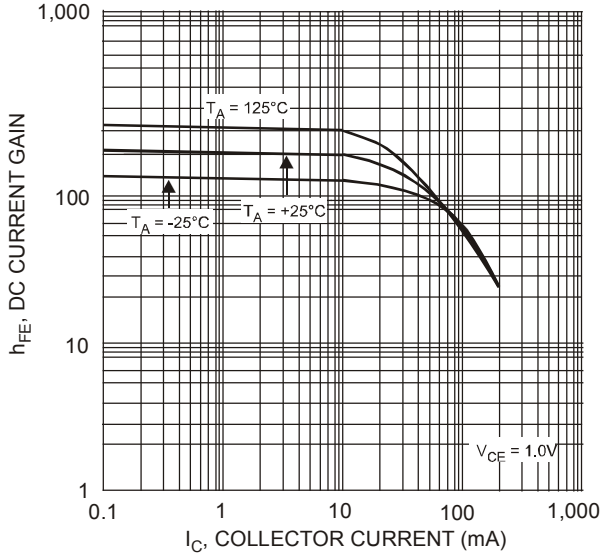
Fig. 1, Power Derating Curve (Total Device)

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	60	—	—	V	$I_C = 100\mu\text{A}$, $I_E = 0$
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	40	—	—	V	$I_C = 1.0\text{mA}$, $I_B = 0$
Emitter-Base Breakdown Voltage	BV_{EBO}	6.0	—	—	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	$V_{CE} = 30\text{V}$, $V_{EB(OFF)} = 3.0\text{V}$
ON CHARACTERISTICS (Note 8)						
DC Current Gain	h_{FE}	40 70 100 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	$V_{CE(sat)}$	—	—	200 300	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	$V_{BE(sat)}$	650 —	—	850 950	mV	$I_C = 10\text{mA}$, $I_B = 1.0\text{mA}$ $I_C = 50\text{mA}$, $I_B = 5.0\text{mA}$
MATCHING CHARACTERISTICS						
DC Current Gain Matching (Note 9)	h_{FE1} / h_{FE2}	—	1	2	%	$I_C = 2\text{mA}$, $V_{CE} = 5\text{V}$
Base-Emitter Voltage Matching (Note 10)	$V_{BE1} - V_{BE2}$	—	1	2	mV	$I_C = 2\text{mA}$, $V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)1} / V_{CE(sat)2}$	—	1	2	%	$I_C = 10\text{mA}$, $I_B = 1.0\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)1} / V_{BE(sat)2}$	—	1	2	%	$I_C = 10\text{mA}$, $I_B = 1.0\text{mA}$
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance	C_{obo}	—	—	4.0	pF	$V_{CB} = 5.0\text{V}$, $f = 1.0\text{MHz}$, $I_E = 0$
Input Capacitance	C_{ibo}	—	—	8.0	pF	$V_{EB} = 0.5\text{V}$, $f = 1.0\text{MHz}$, $I_C = 0$
Input Impedance	h_{ie}	1.0	—	10	k Ω	$V_{CE} = 10\text{V}$, $I_C = 1.0\text{mA}$, $f = 1.0\text{kHz}$
Voltage Feedback Ratio	h_{re}	0.5	—	8	$\times 10^{-4}$	
Small Signal Current Gain	h_{fe}	100	—	400	—	
Output Admittance	h_{oe}	1.0	—	40	μS	
Current Gain-Bandwidth Product	f_T	300	—	—	MHz	$V_{CE} = 20\text{V}$, $I_C = 10\text{mA}$, $f = 100\text{MHz}$
Noise Figure	NF	—	—	5.0	dB	$V_{CE} = 5.0\text{V}$, $I_C = 100\mu\text{A}$, $R_S = 1.0\text{k}\Omega$, $f = 1.0\text{kHz}$
SWITCHING CHARACTERISTICS						
Delay Time	t_D	—	—	35	ns	$V_{CC} = 3.0\text{V}$, $I_C = 10\text{mA}$,
Rise Time	t_R	—	—	35	ns	$V_{BE(on)} = -0.5\text{V}$, $I_{B1} = 1.0\text{mA}$
Storage Time	t_S	—	—	200	ns	$V_{CC} = 3.0\text{V}$, $I_C = 10\text{mA}$, $I_{B1} = -I_{B2} = 1.0\text{mA}$
Fall Time	t_F	—	—	50	ns	

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

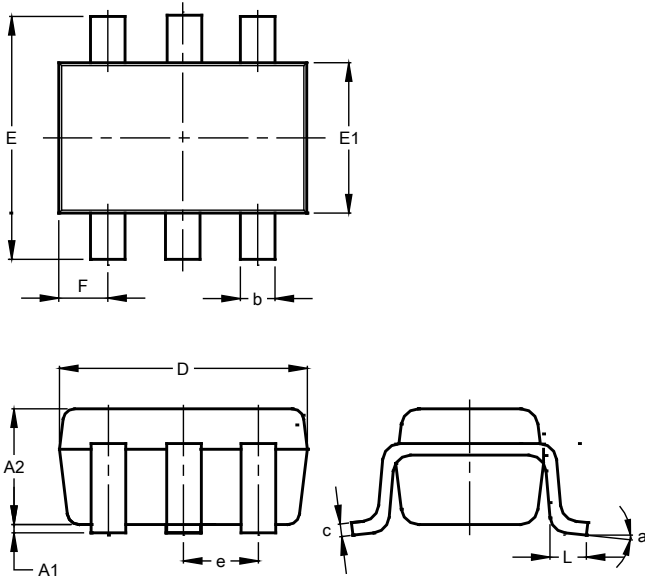
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT363

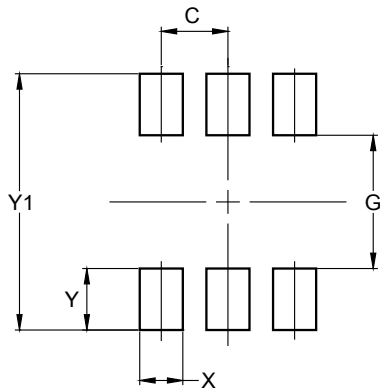


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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

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