

CMBT3904E NPN
CMBT3906E PNP

**ENHANCED SPECIFICATION
SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTORS**



SOT-923 CASE



www.centralemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR CMBT3904E (NPN) and CMBT3906E (PNP) are general purpose transistors with enhanced specifications. These devices are ideal for applications where ultra small size and power dissipation are the prime requirements. Packaged in the SOT-923 package, these transistors provide performance characteristics suitable for the most demanding size constrained applications. This product is only manufactured with gold bonding wire.

**MARKING CODES: CMBT3904E: B
CMBT3906E: G**

FEATURES

- Very Small Package Size
- 200mA Collector Current
- Low $V_{CE(SAT)}$ (0.1V TYP @ 50mA)
- Miniature 0.8 x 0.6 x 0.4mm
Ultra Low height profile Surface Mount Package

APPLICATIONS

- DC-DC Converters
- Voltage Clamping
- Protection Circuits
- Battery powered applications including:
Cell Phones, Digital Cameras, Pagers,
PDAs, Laptop Computers, etc.

MAXIMUM RATINGS: ($T_A=25^{\circ}\text{C}$)

* Collector-Base Voltage	
Collector-Emitter Voltage	
* Emitter-Base Voltage	
Continuous Collector Current	
Power Dissipation	
Operating and Storage Junction Temperature	
Thermal Resistance	

SYMBOL

V_{CBO}	60
V_{CEO}	40
V_{EBO}	6.0
I_C	200
P_D	100
T_J, T_{stg}	-65 to +150
θ_{JA}	1250

UNITS

V
V
V
mA
mW
$^{\circ}\text{C}$
$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS: ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

SYMBOL	TEST CONDITIONS	NPN		PNP		UNITS
		MIN	TYP	TYP	MAX	
I_{CEV}	$V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$				50	nA
* BV_{CBO}	$I_C=10\mu\text{A}$	60	115	90		V
BV_{CEO}	$I_C=1.0\text{mA}$	40	60	55		V
* BV_{EBO}	$I_E=10\mu\text{A}$	6.0	7.5	7.9		V
* $V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$		0.057	0.050	0.100	V
* $V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.100	0.100	0.200	V
$V_{BE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	0.650	0.750	0.750	0.850	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.850	0.850	0.950	V

*Enhanced specification

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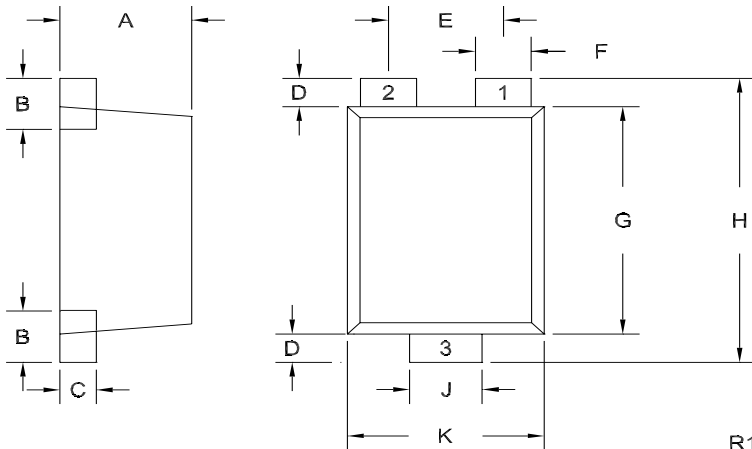


ELECTRICAL CHARACTERISTICS - Continued: ($T_A=25^\circ\text{C}$)

SYMBOL	TEST CONDITIONS	NPN		PNP		UNITS
		MIN	TYP	TYP	MAX	
* h_{FE}	$V_{CE}=1.0\text{V}$, $I_C=0.1\text{mA}$	90	240	130		
* h_{FE}	$V_{CE}=1.0\text{V}$, $I_C=1.0\text{mA}$	100	235	150		
h_{FE}	$V_{CE}=1.0\text{V}$, $I_C=10\text{mA}$	100	215	150	300	
* h_{FE}	$V_{CE}=1.0\text{V}$, $I_C=50\text{mA}$	70	110	120		
h_{FE}	$V_{CE}=1.0\text{V}$, $I_C=100\text{mA}$	30	50	55		
f_T	$V_{CE}=20\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$	300				MHz
C_{ob}	$V_{CB}=5.0\text{V}$, $I_E=0$, $f=1.0\text{MHz}$				4.0	pF
C_{ib}	$V_{BE}=0.5\text{V}$, $I_C=0$, $f=1.0\text{MHz}$				12	pF
h_{ie}	$V_{CE}=10\text{V}$, $I_C=1.0\text{mA}$, $f=1.0\text{kHz}$	1.0			12	k Ω
h_{re}	$V_{CE}=10\text{V}$, $I_C=1.0\text{mA}$, $f=1.0\text{kHz}$	0.1			10	$\times 10^{-4}$
h_{fe}	$V_{CE}=10\text{V}$, $I_C=1.0\text{mA}$, $f=1.0\text{kHz}$	100			400	
h_{oe}	$V_{CE}=10\text{V}$, $I_C=1.0\text{mA}$, $f=1.0\text{kHz}$	1.0			60	μS
NF	$V_{CE}=5.0\text{V}$, $I_C=100\mu\text{A}$, $R_S=1.0\text{k}\Omega$, $f=10\text{Hz}$ to 15.7kHz				4.0	dB
t_d	$V_{CC}=3.0\text{V}$, $V_{BE}=0.5\text{V}$, $I_C=10\text{mA}$, $I_{B1}=1.0\text{mA}$				35	ns
t_r	$V_{CC}=3.0\text{V}$, $V_{BE}=0.5\text{V}$, $I_C=10\text{mA}$, $I_{B1}=1.0\text{mA}$				35	ns
t_s	$V_{CC}=3.0\text{V}$, $I_C=10\text{mA}$, $I_{B1}=I_{B2}=1.0\text{mA}$				170	ns
t_f	$V_{CC}=3.0\text{V}$, $I_C=10\text{mA}$, $I_{B1}=I_{B2}=1.0\text{mA}$				80	ns

*Enhanced specification

SOT-923 CASE - MECHANICAL OUTLINE



DIMENSIONS				
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.015	0.016	0.39	0.41
B	0.007		0.18	
C	0.003	0.006	0.08	0.14
D	0.004		0.10	
E	0.014		0.35	
F	0.005	0.009	0.12	0.22
G	0.030	0.033	0.75	0.85
H	0.035	0.043	0.90	1.10
J	0.007	0.011	0.17	0.27
K	0.022	0.026	0.55	0.65

SOT-923 (REV: 1)

LEAD CODE:

- 1) Base
- 2) Emitter
- 3) Collector

MARKING CODES:

CMBT3904E: B
CMBT3906E: G

R4 (20-October 2023)

OUTSTANDING SUPPORT AND SUPERIOR SERVICES



PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2nd day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

CONTACT US

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For the latest version of Central Semiconductor's **LIMITATIONS AND DAMAGES DISCLAIMER**, which is part of Central's Standard Terms and Conditions of sale, visit: www.centrasemi.com/terms



<https://www.centrasemi.com>

Product End of Life Notification

PDN ID:	PDN01273
Notification Date:	2/19/25
Last Buy Date:	8/19/25
Last Shipment Date	2/19/26

Summary: All devices manufactured in the SOT-923 package are discontinued and now classified as End of Life (EOL).

Available options are:

1. Orders will be accepted for products with available inventory.
2. Last Time Buy (LTB) may be available for certain items.
3. A replacement product not available at the time of this notice, may be under development.

Please contact your Central Semiconductor Customer Service Representative at 001.631.435.1110

Although Central Semiconductor makes every effort to continue to produce devices that have been proclaimed EOL (End of Life) by other manufacturers, it is an accepted industry practice to discontinue certain devices when customer demand falls below a minimum level of sustainability. Accordingly, the following product(s) have been transitioned to End of Life status as part of Central's ongoing Product Portfolio Management. Any replacement products are noted below. The effective date for placing last purchase orders will be six (6) months from the date of this notice and twelve (12) months from the notice date for final shipments, and minimum order quantities may apply. The last purchase and shipment dates may be extended if inventory is available.

*** All Plating types (PBFREE, TIN/LEAD) for each item listed are included in this notice.**

Central Part Number	Suggested Replacement
CMBT3904E BK	N/A
CMBT3904E TR	N/A
CMBT3906E BK	N/A
CMBT3906E TR	N/A

Central would be happy to assist you by providing additional information or technical data to help locate an alternate source if we have no replacement available. If you would like assistance, please visit <https://my.centrasemi.com/submit-inquiry?type=ER> to submit an online inquiry.

DISCLAIMER: This End of Life (EOL) notification is in accordance with JEDEC standard JESD48 - Product Discontinuance. Central Semiconductor will make every effort to offer life-time buy (LTB) opportunities and/or offer replacement devices to existing customers for discontinued devices, however, one or both may not be possible for all devices. Please contact your local Central Semiconductor sales representative for LTB opportunities/additional information.