CMBT3904E NPN
CMBT3906E PNP

ENHANCED SPECIFICATION
SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTORS

ENHANCED E SPECIFICATION

SOT-923 CASE

Central Semiconductor™

www.centralsemi.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°C)	**SYMBOL**		**UNITS**
*	**Collector-Base Voltage**	**V_{CBO}**	**60**	**V**
	Collector-Emitter Voltage	V_{CEO}	40	V
*	**Emitter-Base Voltage**	**V_{EBO}**	**6.0**	**V**
	Continuous Collector Current	I_C	200	mA
	Power Dissipation	P_D	100	mW
	Operating and Storage Junction Temperature	T_J, T_{stg}	-65 to +150	°C
	Thermal Resistance	Θ_{JA}	1250	°C/W

ELECTRICAL CHARACTERISTICS: (T_A=25°C unless otherwise noted)

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

*Enhanced specification

CMBT3904E NPN
CMBT3906E PNP

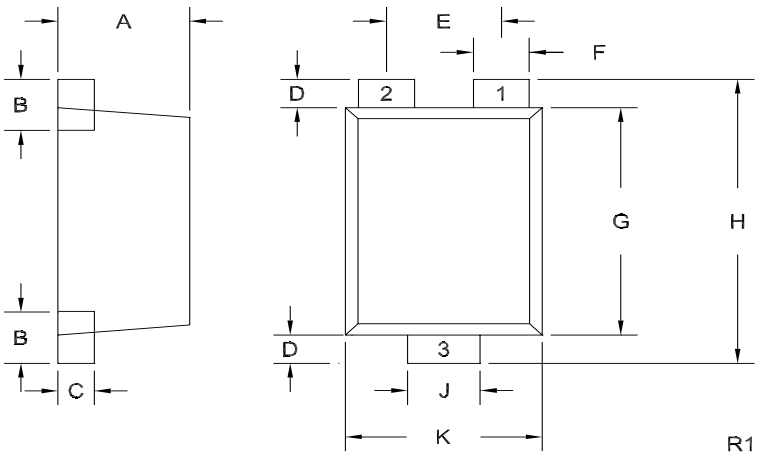
ENHANCED SPECIFICATION
SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTORS

ELECTRICAL CHARACTERISTICS - Continued: (T_A=25°C)

	SYMBOL	TEST CONDITIONS	NPN MIN	NPN TYP	PNP TYP	PNP MAX	UNITS
*	**h_{FE}**	**V_{CE}=1.0V, I_C=0.1mA**	**90**	**240**	**130**		
*	**h_{FE}**	**V_{CE}=1.0V, I_C=1.0mA**	**100**	**235**	**150**		
	h_{FE}	V_{CE}=1.0V, I_C=10mA	100	215	150	300	
*	**h_{FE}**	**V_{CE}=1.0V, I_C=50mA**	**70**	**110**	**120**		
	h_{FE}	V_{CE}=1.0V, I_C=100mA	30	50	55		
	f_T	V_{CE}=20V, I_C=10mA, f=100MHz	300				MHz
	C_{ob}	V_{CB}=5.0V, I_E=0, f=1.0MHz				4.0	pF
	C_{ib}	V_{BE}=0.5V, I_C=0, f=1.0MHz				12	pF
	h_{ie}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	1.0			12	kΩ
	h_{re}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	0.1			10	$x10^{-4}$
	h_{fe}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	100			400	
	h_{oe}	V_{CE}=10V, I_C=1.0mA, f=1.0kHz	1.0			60	μS
	NF	V_{CE}=5.0V, I_C=100μA, R_S =1.0kΩ, f=10Hz to 15.7kHz				4.0	dB
	t_d	V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA				35	ns
	t_r	V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA				35	ns
	t_s	V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA				170	ns
	t_f	V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA				80	ns

*Enhanced specification

SOT-923 CASE - MECHANICAL OUTLINE



DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	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

Corporate Headquarters & Customer Support Team

Central Semiconductor Corp.
145 Adams Avenue
Hauppauge, NY 11788 USA
Main Tel: (631) 435-1110
Main Fax: (631) 435-1824
Support Team Fax: (631) 435-3388
www.centralsemi.com

Worldwide Field Representatives:
www.centralsemi.com/wwreps

Worldwide Distributors:
www.centralsemi.com/wwdistributors