

CET3904E NPN  
CET3906E PNP

**ENHANCED SPECIFICATION  
SURFACE MOUNT SILICON  
COMPLEMENTARY TRANSISTORS**



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**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR CET3904E and CET3906E Low  $V_{CE(SAT)}$  NPN and PNP transistors, respectively, are designed for applications where ultra small size and power dissipation are the prime requirements. Packaged in an SOT-883L surface mount package, these components provide performance characteristics suitable for the most demanding size constrained applications.

**MARKING CODES: CET3904E: C  
CET3906E: D**

**FEATURES:**

- Device is **Halogen Free** by design
- 250mW power dissipation
- Low  $V_{CE(SAT)}$  0.1V TYP @ 50mA
- Small, TLP™ 1x0.4mm, SOT-883L leadless, low profile, surface mount package

**APPLICATIONS:**

- DC-DC converters
- Battery powered devices including cell phones and digital cameras

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

◆ <b>Collector-Base Voltage</b>	Collector-Emitter Voltage
◆ <b>Emitter-Base Voltage</b>	Continuous Collector Current
	Power Dissipation (Note 1)
	Power Dissipation (Note 2)
	Operating and Storage Junction Temperature
	Thermal Resistance (Note 1)
	Thermal Resistance (Note 2)

SYMBOL		UNITS
$V_{CBO}$	60	V
$V_{CEO}$	40	V
$V_{EBO}$	6.0	V
$I_C$	200	mA
$P_D$	250	mW
$P_D$	430	mW
$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$
$\theta_{JA}$	500	$^\circ\text{C}/\text{W}$
$\theta_{JA}$	290	$^\circ\text{C}/\text{W}$

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

SYMBOL	TEST CONDITIONS	MIN	NPN TYP	PNP TYP	MAX	UNITS
$I_{CEV}$	$V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$				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
$V_{BE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$	0.65	0.75	0.75	0.85	V
$V_{BE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.85	0.85	0.95	V

- ◆ Enhanced specification

Notes: 1) FR-4 epoxy PC board, standard mounting conditions.  
2) FR-4 epoxy PC board with collector mounting pad area of 1 cm<sup>2</sup>.

R3 (25-September 2018)

CET3904E NPN  
CET3906E PNP



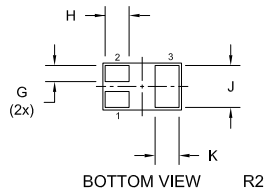
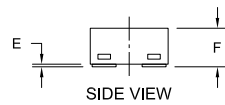
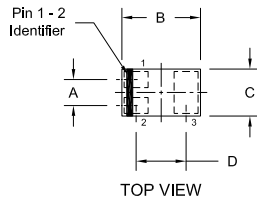
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**ELECTRICAL CHARACTERISTICS - Continued: ( $T_A=25^\circ\text{C}$ )**

SYMBOL	TEST CONDITIONS	MIN	NPN TYP	PNP TYP	MAX	UNITS
◆ $h_{FE}$	$V_{CE}=1.0\text{V}, I_C=0.1\text{mA}$	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 $\Omega$
$h_{re}$	$V_{CE}=10\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	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	$\mu\text{S}$
NF	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}, R_S=1.0\text{k}\Omega, f=10\text{Hz to } 15.7\text{kHz}$				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
$t_s$	$V_{CC}=3.0\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1.0\text{mA}$				200	ns
$t_f$	$V_{CC}=3.0\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1.0\text{mA}$				50	ns

◆ Enhanced specification

**SOT-883L CASE - MECHANICAL OUTLINE**



SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.014		0.35	
B	0.037	0.041	0.95	1.05
C	0.022	0.026	0.55	0.65
D	0.026		0.65	
E	0.000	0.002	0.00	0.05
F	0.012	0.016	0.30	0.40
G	0.005	0.007	0.13	0.18
H	0.008	0.012	0.20	0.30
J	0.018	0.022	0.45	0.55
K	0.008	0.012	0.20	0.30

SOT-883L (REV:R2)

**LEAD CODE:**

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

**MARKING CODES:**

CET3904E: C  
CET3906E: D

R3 (25-September 2018)



## OUTSTANDING SUPPORT AND SUPERIOR SERVICES

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### 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

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- 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

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### 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).

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