

CMNT3904E NPN
CMNT3906E PNP

**ENHANCED SPECIFICATION
SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTOR**

FEMTOmini™



SOT-953 CASE



www.centrasemi.com

DESCRIPTION:

The CENTRAL SEMICONDUCTOR CMNT3904E and CMNT3906E 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 FEMTOmini™ SOT-953 package, these components provide performance characteristics suitable for the most demanding size constrained applications.

**MARKING CODES: CMNT3904E: CL
CMNT3906E: CM**

FEATURES

- Very Small Package Size
- Low Package Profile, 0.5mm
- 200mA Collector Current
- Low $V_{CE(SAT)}$ (0.1V Typ @ 50mA)
- Small, FEMTOmini™ 1 x 0.8mm, SOT-953 Surface Mount Package

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

APPLICATIONS

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

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

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

SYMBOL	TEST CONDITIONS				MAX	UNITS
		MIN	<u>NPN</u> TYP	<u>PNP</u> TYP		
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
◆ $V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$.057	.05	0.1	V
◆ $V_{CE(SAT)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$		0.1	0.1	0.2	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
◆ 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		

◆ Enhanced Specification

R2 (25-January 2010)

CMNT3904E NPN
CMNT3906E PNP



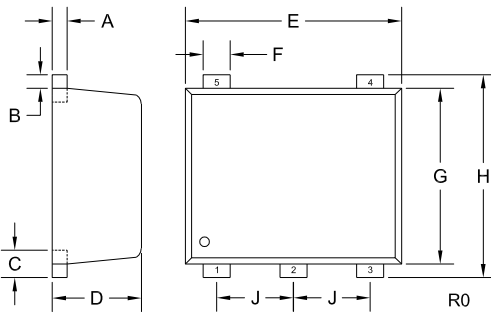
**ENHANCED SPECIFICATION
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SILICON TRANSISTOR**

ELECTRICAL CHARACTERISTICS - Continued:

SYMBOL	TEST CONDITIONS	NPN		PNP		MAX	UNITS
		MIN	TYP	TYP	MAX		
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}	$V_{BE}=0.5V, I_C=0, f=1.0MHz$				8.0		pF
h_{ie}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0			12		k Ω
h_{re}	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	0.1			10		$\times 10^{-4}$
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	$V_{CE}=5.0V, I_C=100\mu A, R_S=1.0k\Omega,$ $f=10Hz$ 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	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$				200		ns
t_f	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$				50		ns

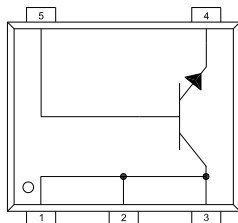
◆ Enhanced Specification

SOT-953 CASE - MECHANICAL OUTLINE



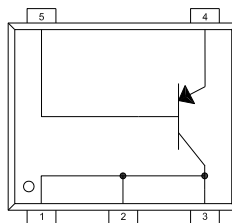
SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.002	0.006	0.050	0.150
B	0.002	0.006	0.050	0.150
C	0.005	0.007	0.125	0.175
D	0.016	0.020	0.400	0.500
E	0.037	0.041	0.950	1.050
F	0.004	0.008	0.100	0.200
G	0.030	0.033	0.750	0.850
H	0.037	0.041	0.950	1.050
J	0.014		0.350	

SOT-953 (REV: R0)



CMNT3904E

MARKING CODE: CL



CMNT3906E

MARKING CODE: CM

LEAD CODE:

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

R2 (25-January 2010)