

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	$^\circ\text{C}$
$\theta_{JA}$	500	$^\circ\text{C/W}$

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

SYMBOL	TEST CONDITIONS	NPN		PNP	MAX	UNITS
		MIN	TYP	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



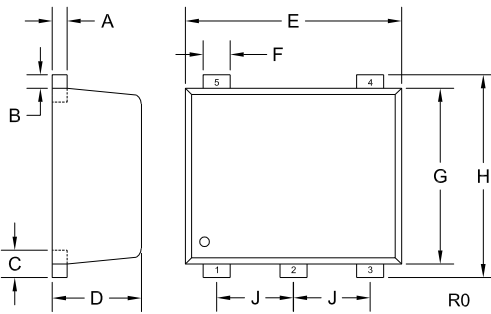
**ENHANCED SPECIFICATION  
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**ELECTRICAL CHARACTERISTICS - Continued:**

SYMBOL	TEST CONDITIONS	NPN		PNP		MAX	UNITS
		MIN	TYP	TYP	MAX		
$h_{FE}$	$V_{CE}=1.0V, I_C=10mA$	100	215	150	300		
◆ $h_{FE}$	<b><math>V_{CE}=1.0V, I_C=50mA</math></b>	<b>70</b>	<b>110</b>	<b>120</b>			
$h_{FE}$	$V_{CE}=1.0V, I_C=100mA$	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		kΩ
$h_{re}$	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	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

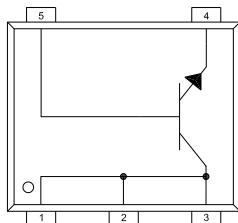
◆ Enhanced Specification

**SOT-953 CASE - MECHANICAL OUTLINE**



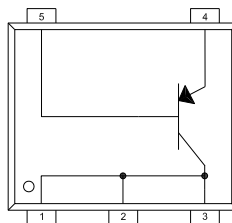
SYMBOL	DIMENSIONS			
	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.002	0.006	0.050	0.150
B	0.002	0.006	0.050	0.150
C	0.005	0.007	0.125	0.175
D	0.016	0.020	0.400	0.500
E	0.037	0.041	0.950	1.050
F	0.004	0.008	0.100	0.200
G	0.030	0.033	0.750	0.850
H	0.037	0.041	0.950	1.050
J	0.014		0.350	

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)