

CMST3904 NPN  
CMST3906 PNP

**SUPERmini™  
COMPLEMENTARY  
SILICON TRANSISTOR**

**SUPERmini™**



**SOT-323 CASE**

# Central™

**Semiconductor Corp.**

## DESCRIPTION:

The CENTRAL SEMICONDUCTOR CMST3904, CMST3906 types are complementary silicon transistors manufactured by the epitaxial planar process, epoxy molded in a SUPERmini™ surface mount package, designed for small signal general purpose amplifier and switching applications.

## MARKING CODES:

**CMST3904: 1AC**

**CMST3906: 2AC**

## MAXIMUM RATINGS: (T<sub>A</sub>=25°C)

	SYMBOL	CMST3904	CMST3906	UNITS
Collector-Base Voltage	V <sub>CBO</sub>	60	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0	5.0	V
Continuous Collector Current	I <sub>C</sub>	200		mA
Power Dissipation	P <sub>D</sub>	250		mW
Operating and Storage				
Junction Temperature	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150		°C
Thermal Resistance	θ <sub>JA</sub>	500		°C/W

## ELECTRICAL CHARACTERISTICS: (T<sub>A</sub>=25°C unless otherwise noted)

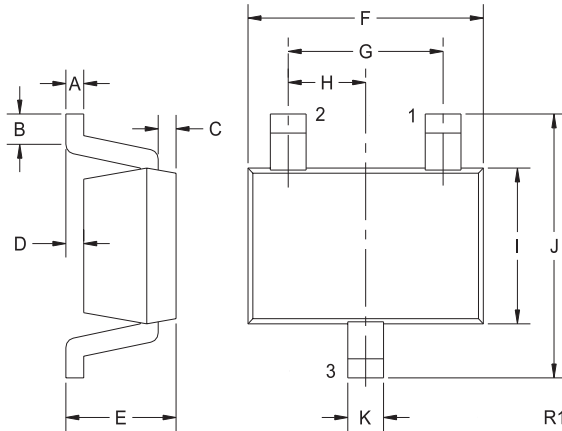
SYMBOL	TEST CONDITIONS	CMST3904		CMST3906		UNITS
		MIN	MAX	MIN	MAX	
I <sub>CEV</sub>	V <sub>CE</sub> =30V, V <sub>EB</sub> =3.0V		50		50	nA
BV <sub>CBO</sub>	I <sub>C</sub> =10μA		60		40	V
BV <sub>CEO</sub>	I <sub>C</sub> =1.0mA		40		40	V
BV <sub>EBO</sub>	I <sub>E</sub> =10μA		6.0		5.0	V
V <sub>CE(SAT)</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =1.0mA		0.20		0.25	V
V <sub>CE(SAT)</sub>	I <sub>C</sub> =50mA, I <sub>B</sub> =5.0mA		0.30		0.40	V
V <sub>BE(SAT)</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =1.0mA	0.65	0.85	0.65	0.85	V
V <sub>BE(SAT)</sub>	I <sub>C</sub> =50mA, I <sub>B</sub> =5.0mA		0.95		0.95	V
h <sub>FE</sub>	V <sub>CE</sub> =1.0V, I <sub>C</sub> =0.1mA	40		60		
h <sub>FE</sub>	V <sub>CE</sub> =1.0V, I <sub>C</sub> =1.0mA	70		80		
h <sub>FE</sub>	V <sub>CE</sub> =1.0V, I <sub>C</sub> =10mA	100	300	100	300	
h <sub>FE</sub>	V <sub>CE</sub> =1.0V, I <sub>C</sub> =50mA	60		60		
h <sub>FE</sub>	V <sub>CE</sub> =1.0V, I <sub>C</sub> =100mA	30		30		
f <sub>T</sub>	V <sub>CE</sub> =20V, I <sub>C</sub> =10mA, f=100MHz	300		250		MHz

R2 (26-September 2002)

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

SYMBOL	TEST CONDITIONS	CMST3904		CMST3906		UNITS
		MIN	MAX	MIN	MAX	
$C_{ob}$	$V_{CB}=5.0\text{V}$ , $I_E=0$ , $f=1.0\text{MHz}$		4.0		4.5	pF
$C_{ib}$	$V_{BE}=0.5\text{V}$ , $I_C=0$ , $f=1.0\text{MHz}$		8.0		10	pF
$h_{ie}$	$V_{CE}=10\text{V}$ , $I_C=1.0\text{mA}$ , $f=1.0\text{kHz}$	1.0	10	2.0	12	$k\Omega$
$h_{re}$	$V_{CE}=10\text{V}$ , $I_C=1.0\text{mA}$ , $f=1.0\text{kHz}$	0.5	8.0	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	100	400	
$h_{oe}$	$V_{CE}=10\text{V}$ , $I_C=1.0\text{mA}$ , $f=1.0\text{kHz}$	1.0	40	3.0	60	$\mu\text{mhos}$
NF	$V_{CE}=5.0\text{V}$ , $I_C=100\text{mA}$ , $R_S=1.0k\Omega$ $f=10\text{Hz}$ to $15.7\text{kHz}$		5.0		4.0	dB
$t_d$	$V_{CC}=3.0\text{V}$ , $V_{BE}=0.5$ , $I_C=10\text{mA}$ , $I_{B1}=1.0\text{mA}$		35		35	ns
$t_r$	$V_{CC}=3.0\text{V}$ , $V_{BE}=0.5$ , $I_C=10\text{mA}$ , $I_{B1}=1.0\text{mA}$		35		35	ns
$t_s$	$V_{CC}=3.0\text{V}$ , $I_C=10\text{mA}$ , $I_{B1}=I_{B2}=1.0\text{mA}$		200		225	ns
$t_f$	$V_{CC}=3.0\text{V}$ , $I_C=10\text{mA}$ , $I_{B1}=I_{B2}=1.0\text{mA}$		50		75	ns

## SOT-323 CASE - MECHANICAL OUTLINE



DIMENSIONS				
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.004	0.008	0.10	0.20
B	0.004	-	0.10	-
C	0.004	0.008	0.10	0.20
D	-	0.004	-	0.10
E	0.031	0.043	0.80	1.10
F	0.071	0.087	1.80	2.20
G	0.051		1.30	
H	0.026		0.65	
I	0.045	0.053	1.15	1.35
J	0.079	0.087	2.00	2.20
K	0.008	0.016	0.20	0.40

SOT-323 (REV: R1)

### LEAD CODE:

- 1) BASE
- 2) EMITTER
- 3) COLLECTOR

### MARKING CODES:

CMST3904: 1AC  
CMST3906: 2AC

R2 (26-September 2002)

$C_{ob}$	$V_{CB}=5.0V, I_E=0, f=1.0MHz$		4.0		4.5	pF
$C_{ib}$	$V_{BE}=0.5V, I_C=0, f=1.0MHz$		8.0		10	pF
$h_{ie}$	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0	10	2.0	12	$k\Omega$
$h_{re}$	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	0.5	8.0	0.1	10	$\times 10^{-4}$
$h_{fe}$	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	100	400	100	400	
$h_{oe}$	$V_{CE}=10V, I_C=1.0mA, f=1.0kHz$	1.0	40	3.0	60	$\mu mhos$
NF	$V_{CE}=5.0V, I_C=100mA, R_S=1.0k\Omega$ $f=10Hz$ to $15.7kHz$		5.0		4.0	dB
$t_d$	$V_{CC}=3.0V, V_{BE}=0.5, I_C=10mA, I_{B1}=1.0mA$		35		35	ns
$t_r$	$V_{CC}=3.0V, V_{BE}=0.5, I_C=10mA, I_{B1}=1.0mA$		35		35	ns
$t_s$	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$		200		225	ns
$t_f$	$V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$		50		75	ns