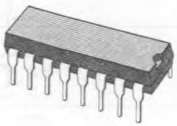
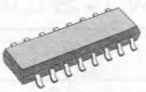
# SWITCHED CAPACITOR MASK PROGRAMMABLE FILTER

- 6TH ORDER
- SELECTIVITY FACTOR : Q = 7
- GAIN AT CENTER FREQUENCY : 0dB (typ)
- LOW STOPBAND ATTENUATION : 40dB (typ)
- HIGH STOPBAND ATTENUATION : 40dB (typ)
- CLOCK TO CENTER FREQ. RATIO : 48
- CLOCK FREQUENCY RANGE : 1 TO 1200kHz
- CENTER FREQUENCY RANGE : 20.8Hz TO 25kHz

**Note :** For general characteristics, see TSG85XX specifications. For non standard quality level, consult SGS-THOMSON general ordering information.



**P**
**DIP-16**
(Plastic Package)



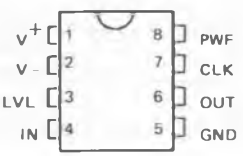
**FP**
**SO-16**
(Plastic Micropackage)

**P**
**DIP-8**
(Plastic Package)

## DESCRIPTION

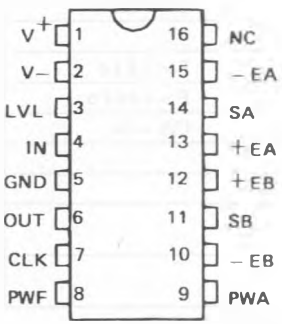
The TSG8550 is a HCMOS Cauer band-pass filter.

## PIN CONNECTIONS



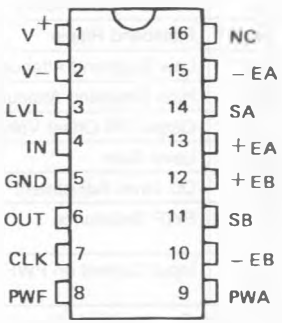

8 pins : FILTER ONLY
DIP-8 Package

E88TSG8550-01




16 pins : FILTER + 2 OP-AMPs
DIP-16 Package

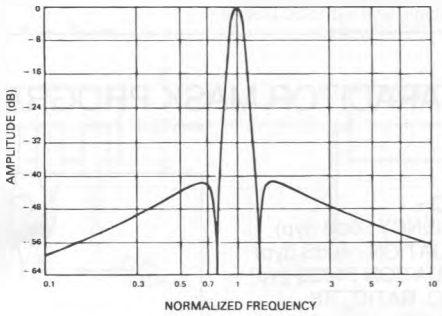
E88TSG8550-02




SO-16 Package

E88TSG8550-03

## AMPLITUDE RESPONSE CURVE




E88TSG8550-04

## FILTER SPECIFICATIONS

Band-pass Filter : TSG8550 : Type : CAUER ; Order : 6
$V^+ = 5V$, $V^- = -5V$, T = 25°C, RL = 5kΩ, CL = 100pF, $I_{PWF} = 50\mu A$

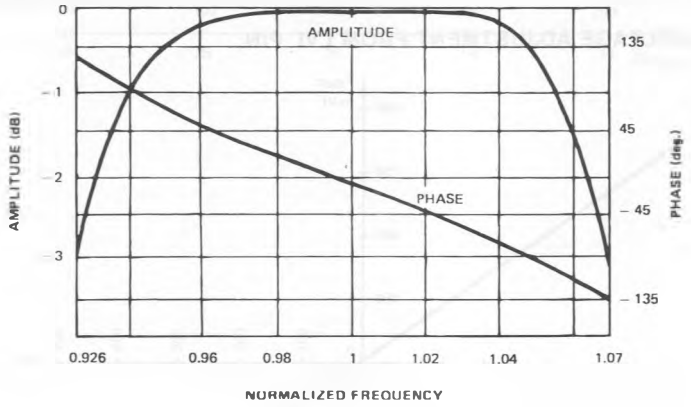
| Symbol | Parameter | | Typ. | Tested Limits | Unit |
|---|---|---|---|---|---|
| Fe | External Clock Frequency | | 1<br>1200(*) | | kHz (min)<br>kHz (max) |
| Fi | Internal Sampling Frequency | | 0.5<br>600(*) | | kHz (min)<br>kHz (max) |
| Fe/Fo | Clock to Center Frequency Ratio | | 48 ± 1% | | |
| Fo | Center Frequency | | 0.0208<br>25(*) | | kHz (min)<br>kHz (max) |
| Go | Gain at Center Frequency | Typ. Go = – 0.2dB<br>for Fe = 48kHz | 0 | 0<br>– 2 | dB (max)<br>dB (min) |
| Flc | Low Cutoff Frequency | Flc = 0.971 Fo | 0.0204<br>24.5(*) | | kHz (min)<br>kHz (max) |
| Fhc | High Cutoff Frequency | Fhc = 1.035 Fo | 0.0216<br>25.9(*) | | kHz (min)<br>kHz (max) |
| BW | – 3dB Bandwidth | [0.926 Fo, 1.07 Fo] | 0.003<br>3.15(*) | | kHz (min)<br>kHz (max) |
| Q | Selectivity Coefficient | Q = Fo/BW | 7 | | |
| Ap | Passband Ripple | | 0.05 | 0.3 | dB (max) |
| Als | Low Stopband Attenuation | F < 0.8 Fo | 40.5 | 40 | dB (min) |
| Ahs | High Stopband Attenuation | F > 1.24 Fo | 40.5 | 40 | dB (min) |
| Voff | Output DC Offset Voltage | LVL = 0V | ± 100 | ± 200 | mV (max) |
| LG | Level Gain | | – 1.7 | | |
| LVL | DC Level Adjustment | | ± 118 | | mV (max) |
| $R_{PWF}$ | PWF Resistance | | 10<br>72 | | kΩ (min)<br>kΩ (max) |
| $I_{PWF}$ | Input Current on PWF | | 50<br>250 | | µA (min)<br>µA (max) |

(*) At maximum Fe : - stopband attenuation Als > 39dB for F < 0.8Fo
(with $I_{pwf} = 250\mu A$) - stopband attenuation Ahs > 42dB for F > 1.24Fo
- passband ripple $A_p = 0.3dB$
- Gain at center freq. $G_0 = -1.5dB$
- – 3dB bandwidth BW = 3.15kHz [0.926Fo, 1.052Fo]
- Selectivity Q = 7.9

## FILTER SPECIFICATIONS (continued)

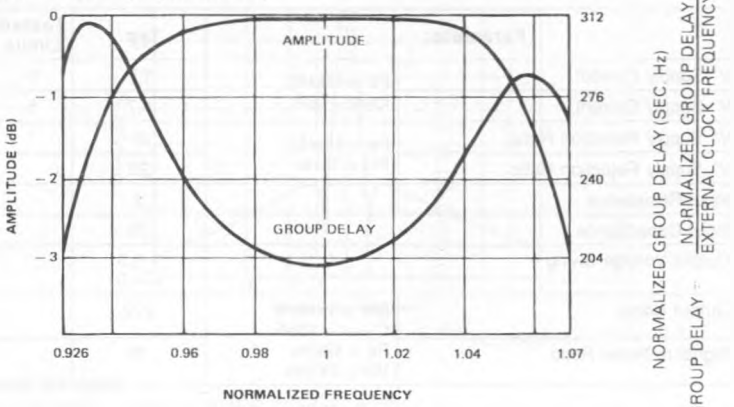
| Symbol | Parameter | | Typ. | Tested Limits | Unit |
|---|---|---|---|---|---|
| $I^+$ | $V^+$ Supply Current | Fe = 48kHz<br>Ipwa = 0µA | 1.7 | 5 | mA (max) |
| $I^-$ | $V^-$ Supply Current | | 1.7 | 5 | mA (max) |
| $PSRR^+$ | $V^+$ Supply Rejection Ratio | Fe = 48kHz<br>Fin = 1kHz | 9 | | dB |
| $PSRR^-$ | $V^-$ Supply Rejection Ratio | | 20 | | dB |
| Rin | Input Resistance | | 3 | | MΩ |
| Cin | Input Capacitance | | 20 | | pF |
| Vo | Output Voltage Swing | | + 3.5<br>− 4.5 | | Vp-p (max) |
| Vn | Output Noise | BW = 144kHz<br>$C_{PWF}$ = 33pF<br>Fe = 48kHz<br>Vin = 2Vrms | 272 | | µVrms |
| SNR | Signal to Noise Ratio | | 78 | | dB |

## PHASE RESPONSE CURVE (in passband)



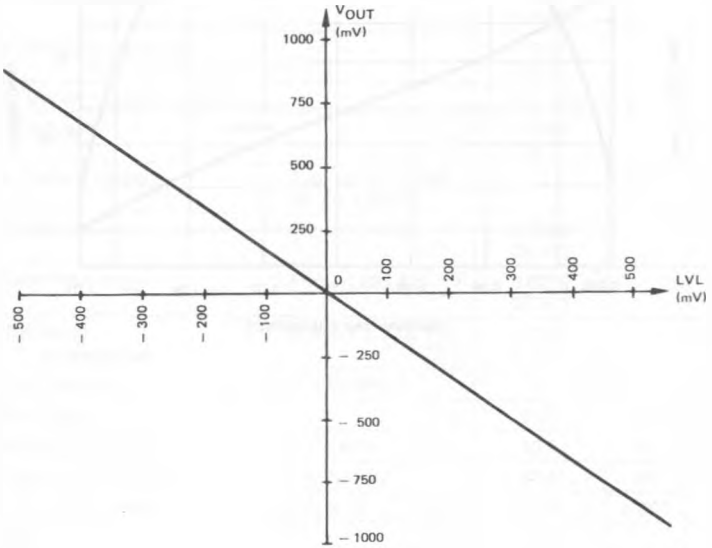

E88TSG8550-05

## GROUP DELAY CURVE (in passband)



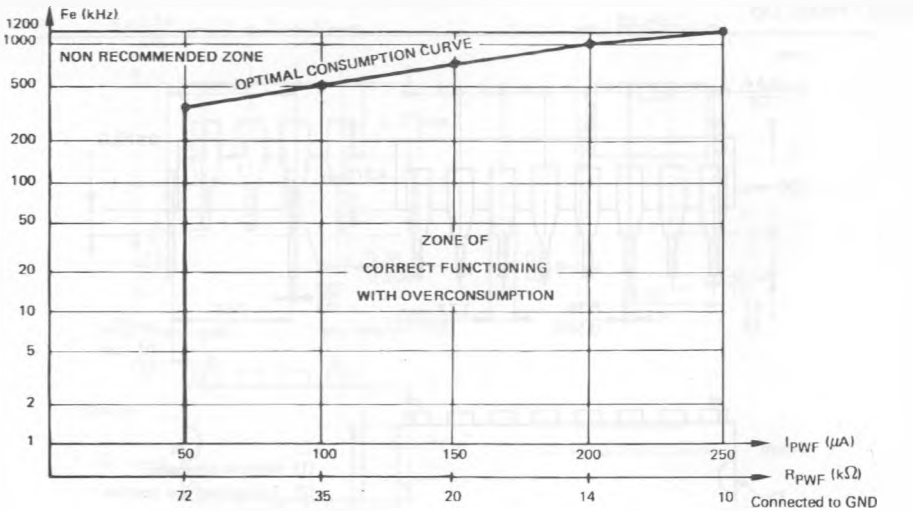

E88TSG8550-06

## OUTPUT DC VOLTAGE ADJUSTMENT FROM LVL PIN




E88TSG8550-07

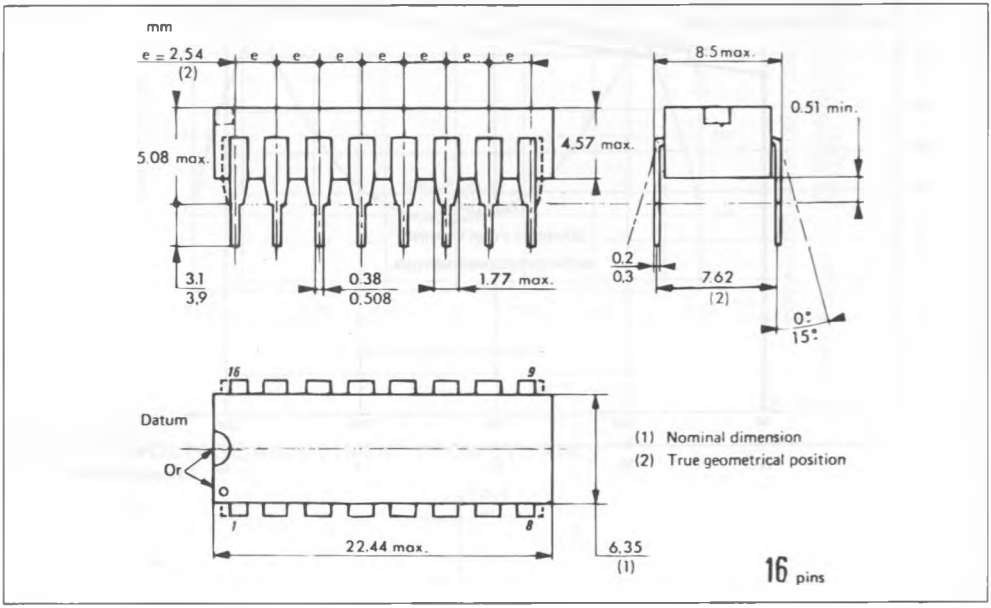
## USER'S GUIDE FOR $I_{PWF}$ AND $R_{PWF}$ CHOICE



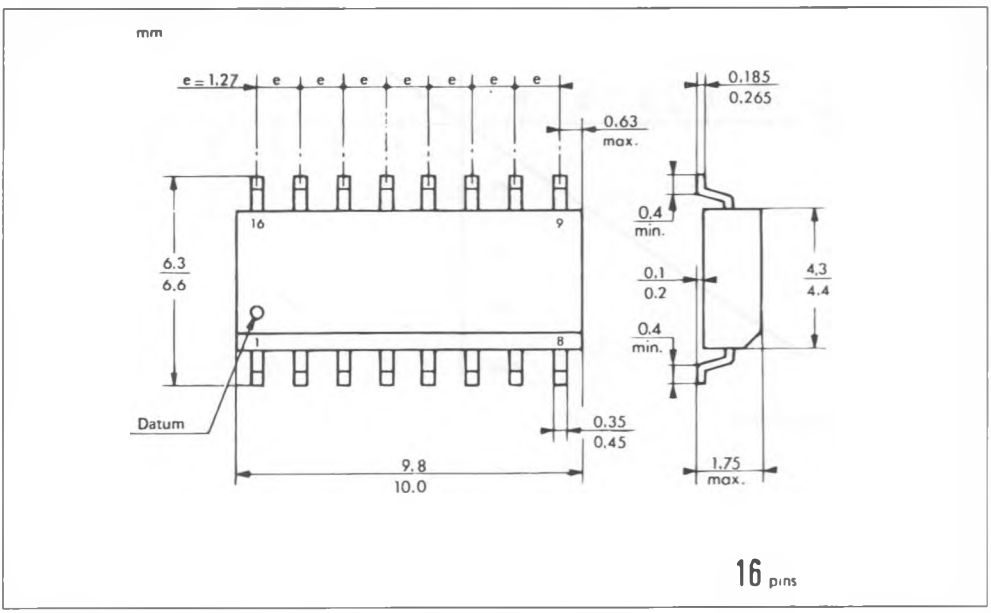

E88TSG8550-08

## PACKAGE MECHANICAL DATA

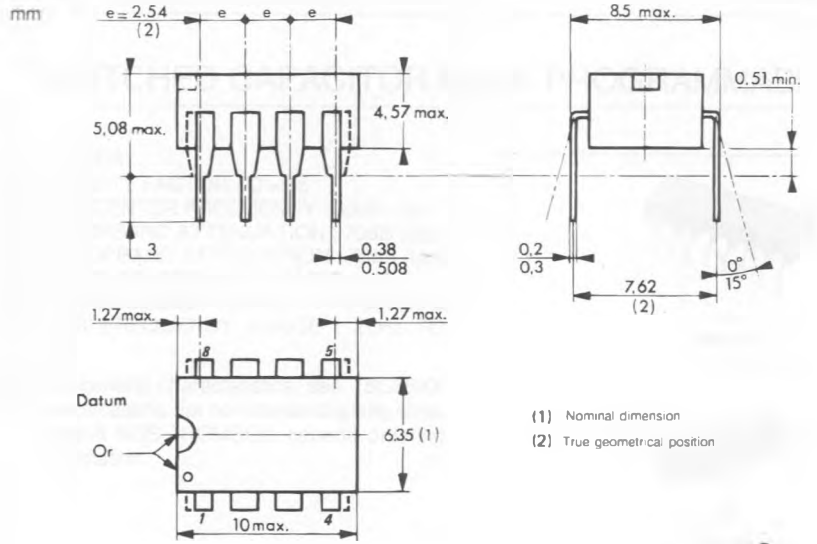
16 PINS - Plastic Dip




16 PINS - Plastic Micropackage



8 PINS - Plastic Dip




## ORDER CODES

| | |
|---|---|
| Plastic | 16 Pins Package : TSG8550XP |
| Ceramic | 16 Pins Package : TSG8550XC |
| Cerdip | 16 Pins Package : TSG8550XJ |
| Plastic | 8 Pins Package : TSG85501XP |

X : Temperature Range = C : 0°C + 70°C
I : – 25°C + 85°C
V : – 40°C + 85°C
M : – 55°C + 125°C