

PRELIMINARY

FM IF DETECTOR FOR CORDLESS PHONES

DESCRIPTION

The AA32416 is a low operation voltage FM IF detector IC. It includes IF circuit, FM detector circuit, RSSI circuit, and noise detector circuit. It is suitable for cordless phones.

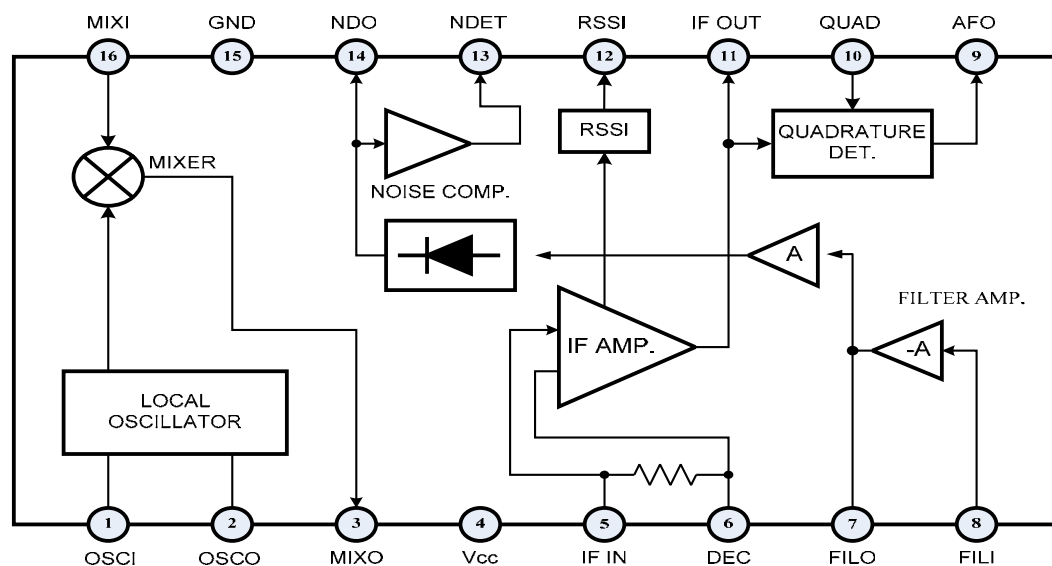
FEATURES

- Operating frequency: 10M ~ 100MHz
- Low-voltage operation
- Excellent temperature characteristic
- High sensitivity
- High intercept point
- Small package used
- Built in 2 nd MIX

APPLICATIONS

- Cordless phones.
- Amateur short wave radios
- Portable wireless equipment

BLOCK DIAGRAM



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PIN DESCRIPTION

OSCI	1	16	MIXI
OSCO	2	15	GND
MIXO	3	14	NDO
V _{CC}	4	13	NDET
IF IN	5	12	RSSI
DEC	6	11	IF OUT
FILO	7	10	QUAD
FILI	8	9	AFO

TOP VIEW

PIN NO.	PIN NAME	FUNCTION
1	OSCI	Local oscillator input pin
2	OSCO	Local oscillator output pin
3	MIXO	Mix output pin, connect ceramic filter
4	VCC	Power supply
5	IF IN	IF amplifier input pin
6	DEC	IF amplifier bypass pin
7	FILO	Filter amplifier output pin
8	FILI	Filter amplifier input pin
9	AFO	Demodulated signal output terminal
10	QUAD	Phase shift signal input terminal of FM demodulator
11	IF OUT	IF amplifier output pin
12	RSSI	RSSI output pin
13	NDET	Noise comparator output pin
14	NDO	Noise detector output pin
15	GND	GND pin
16	MIXI	Mixer input pin

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■ ABSOLUTE MAXIMUM RATING

Ta=25°C

SYMBOL	PARAMETER	RATINGS	UNIT
V _{CC}	Power supply voltage	7	V
P _d	Power dissipation	350*	mW
T _{opr}	Operating temperature	-30~+85	°C
T _{stg}	Storage temperature	-55~+125	°C

*Reduced by 3.5mW for each increase in Ta of 1°C over 25°C.

■ ELECTRICAL CHARACTERISTICS

Ta=25°C, V_{CC}=2.0V, f_{IN(Mix)}=21.7MHz,
f_{IN(IF)}=450 KHz, Δf=±1.5KHzdev, fm=1 KHz, all AC levels open (EMF) display

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
I _Q	Quiescent current	No input	2.1	3.0	4.2	mA
G _{VC}	Conversion gain	Tested after ceramic filter(-3dB loss)	15	18	21	dB
I _P	Intercept point		---	-11	---	dBm
R _{IN}	Input impedance		---	5.5	---	kΩ
C _{IN}	Input impedance		---	4.6	---	pF
R _O	Output impedance		1.2	1.8	2.4	kΩ
S	12dB SINAD sensitivity		---	8	---	dBμV
V _O	FM detector output	V _{IN (IF)} =80dBμV	79	100	126	mVrms
S/N	Signal-to-noise ratio	V _{IN (IF)} =80dBμV	43	63	---	dB
ARM	AM rejection ratio	V _{IN (IF)} =80dBμV, AM=30%	---	40	---	dB
R _{IN}	Input resistance		1.2	1.8	2.4	kΩ
V _{RSSI1}	RSSI output voltage	V _{CC} =3V, V _{IN (IF)} =50dBμV	0.7	1.0	1.45	V
V _{RSSI2}	RSSI output voltage	V _{CC} =3V, V _{IN (IF)} =100dBμV	1.6	2.3	2.9	V
V _{NDET}	Output voltage	V _{NREC} =0.2V, I _{SINK} =0.2mA	---	0.1	0.5	V
I _{LEAK}	Output leakage current	V _{NREC} =0.7V, V _{NDET} =2V,	---	0	5	μA
V _{TH-H}	Noise detection high level	Pin 14 voltage so that V _{NDET} ≤ 0.5V	0.5	0.6	0.7	V

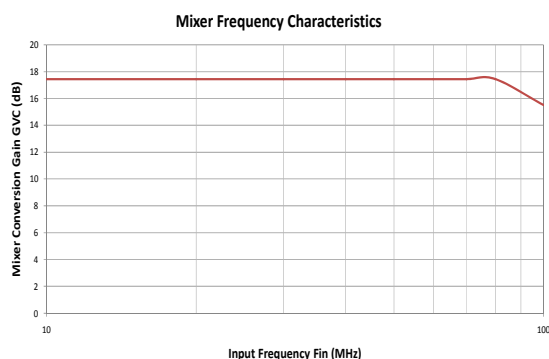
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SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
V_{TH-L}	Noise detection low level	Pin 14 voltage so that $I_{SINK} \leq 5\mu A$	0.5	0.6	0.7	V
Hys	Noise detection hysteresis width	Hysteresis width between V_{TH-H} and V_{TH-L} above	2.0	3.5	5.0	dB

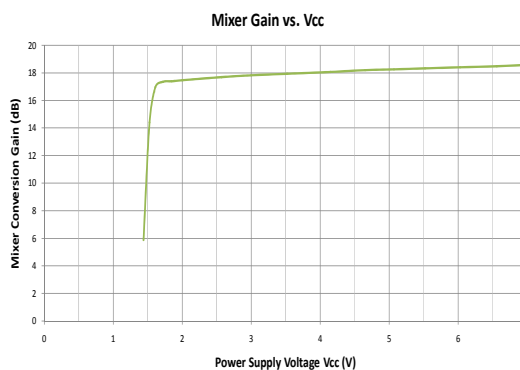
CHARACTERISTIC DIAGRAM

Mixer Frequency Characteristics



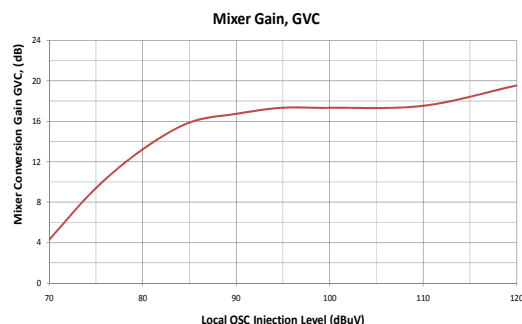
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Mixer Conversion Gain vs. Power Supply Voltage V_{CC}



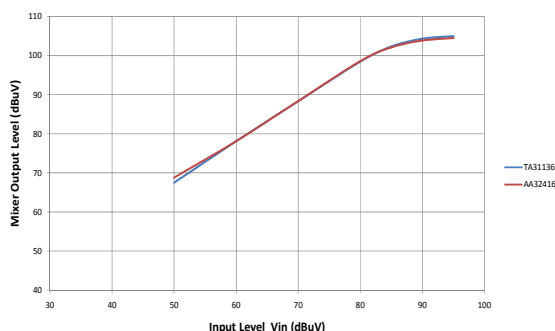
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Mixer Conversion Gain vs. Local OSC Injection Level



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Mixer Intercept Point Characteristics

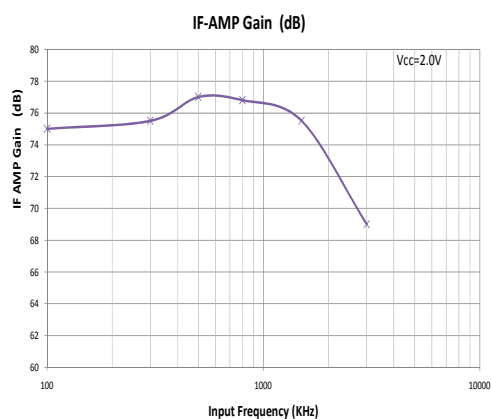


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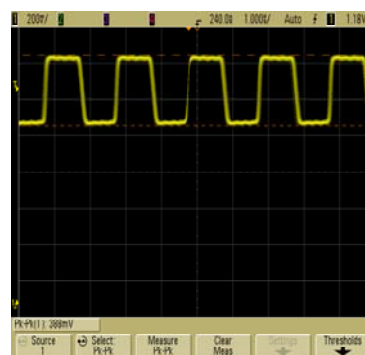
IF AMP Gain
Frequency Characteristics



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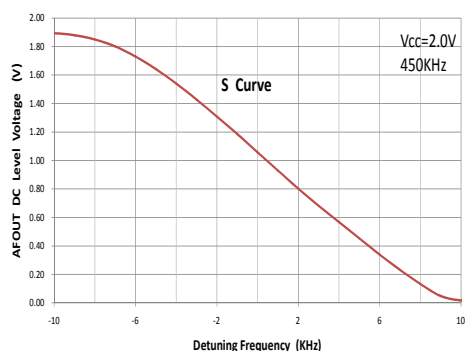
IFOUT Waveform

Input Condition:
IFin = 500KHz, 60 dBuV, Vcc=2.0V



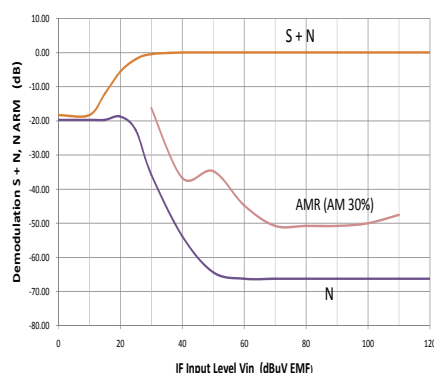
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IF Input
Detuning Characteristics



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IF AMP Input
Demodulation Characteristics

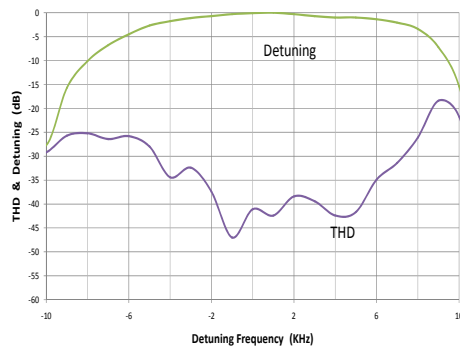


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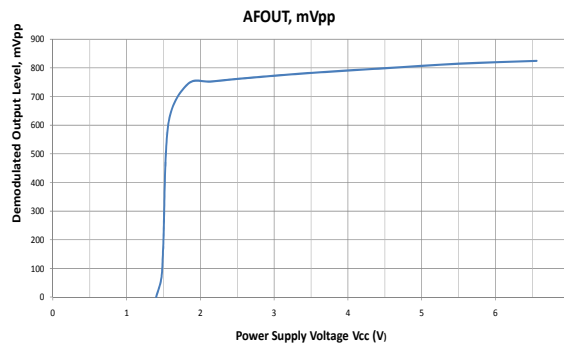
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IF Input
Detuning Characteristics



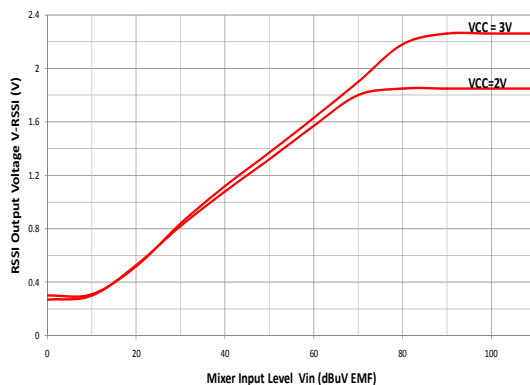
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AFOUT Amplitude vs.
Power Supply Voltage Vcc



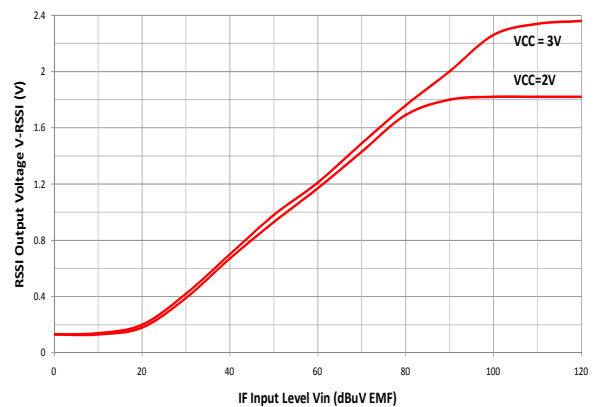
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RSSI Characteristics
vs. Mixer Input



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RSSI Characteristics
vs. IF Input

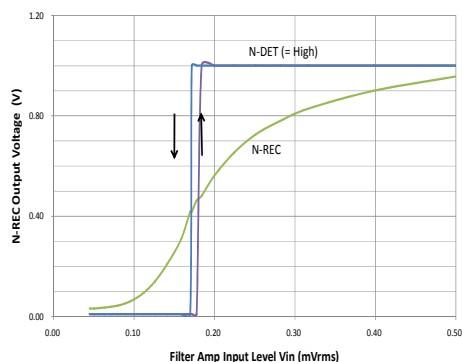


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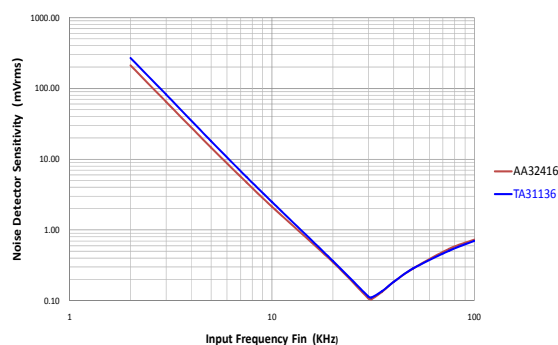
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Noise Detection Characteristics



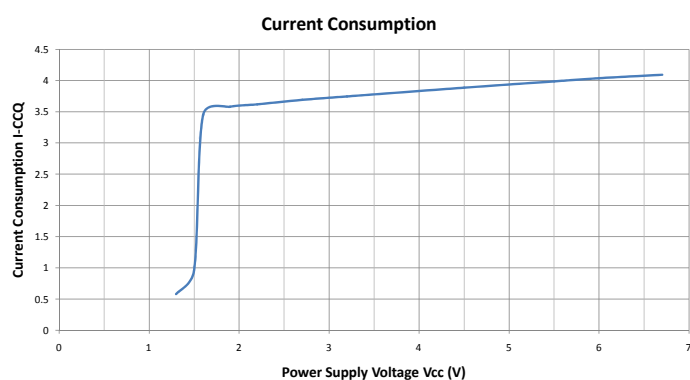
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Noise Detection Frequency Characteristics



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Current Consumption vs. Power Supply Voltage

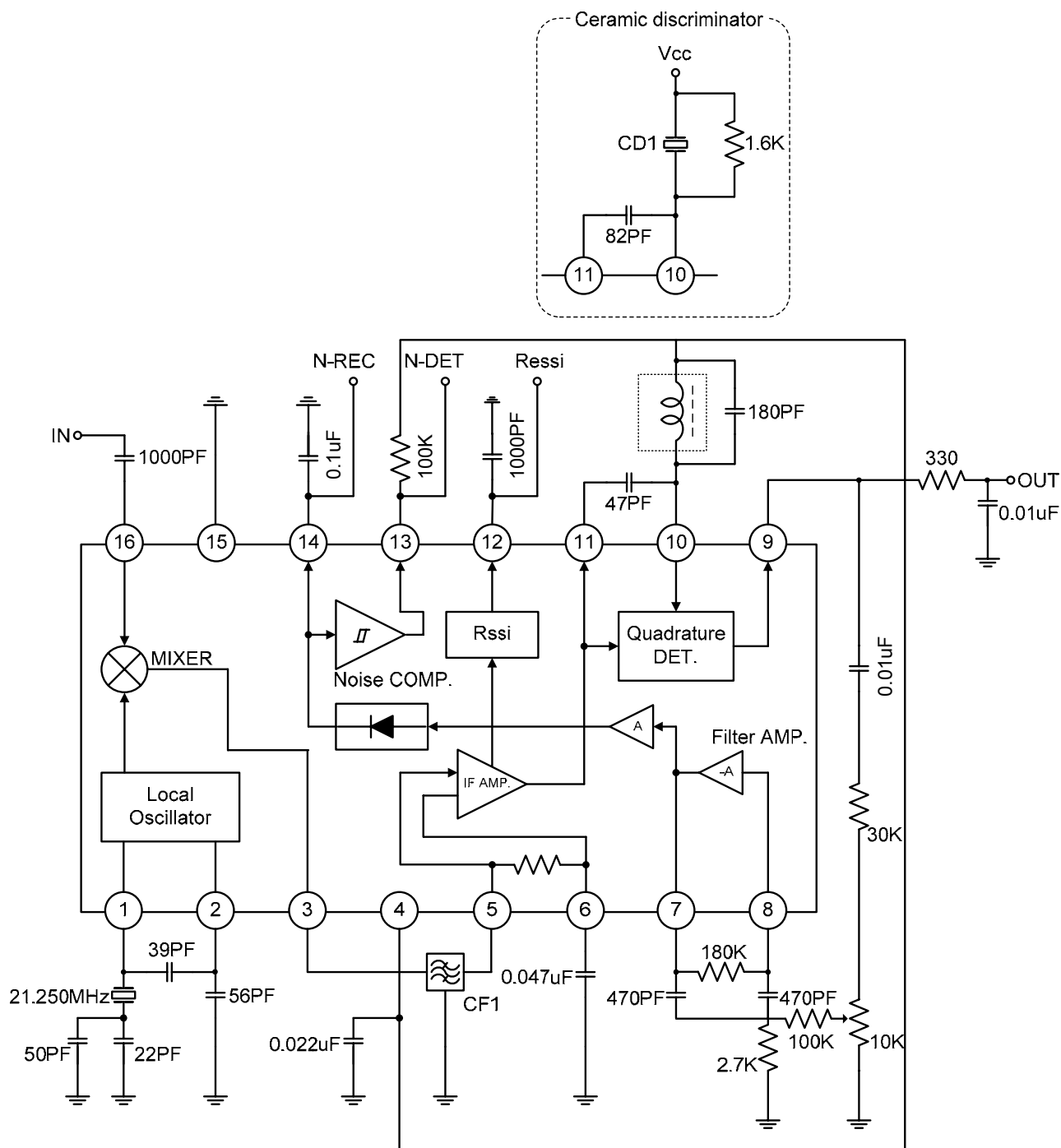


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■ APPLICATION CIRCUIT



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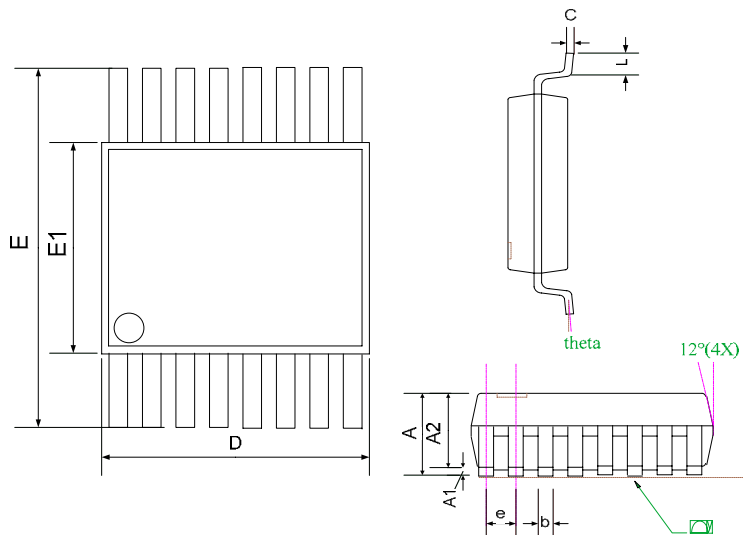
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ORDERING INFORMATION

ORDER NO.	PACKAGE	PACKING	Q'TY	MARK CHART
AA32416A	TSSOP 16L	TAPE & REEL	2,500ea	<div> AA32416  XXXX A </div>

PACKAGE DIMENSIONS

TSSOP 16L



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.20	---	---	0.048
A1	0.05	---	0.15	0.002	---	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19	---	0.30	0.007	---	0.012
C	0.09	---	0.20	0.004	---	0.008
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
e	---	0.65	---	---	0.026	---
L	0.45	0.60	0.75	0.018	0.024	0.030
y	---	---	0.10	---	---	0.004
theta	0°	---	8°	0°	---	8°

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS
2. TOLERANCE ± 0.1 mm UNLESS OTHERWISE SPECIFIED
3. COPLANARITY : 0.1 mm
4. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. FOLLOWED FROM JEDEC MO-153