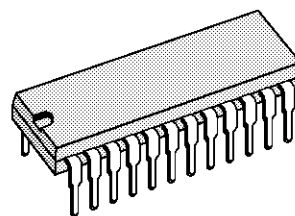


## MULTISTANDARD VIDEO AND SOUND IF SYSTEM

- GAIN CONTROLLED IF AMPLIFIER
- VIF OPERATING FREQUENCY UP TO 50MHz
- SYNCHRONOUS DETECTOR
- WHITE SPOT INVERTER
- VERY LOW DIFFERENTIAL ERROR
- VERY LOW PHASE ERROR
- INTERNAL AGC SWITCH (B/G - L)
- AGC TOP. SYNCH. FOR STANDARD B/G
- AGC TOP WHITE FOR STANDARD L
- QUASI SPLIT SOUND FOR STANDARD B/G
- SOUND DETECTOR FOR STANDARD L
- VIDEO MUTING FACILITY
- SEPARATED SOUND OUTPUT
- OPERATES WITHOUT EXTERNAL GATING PULSE

The Sound IF section acts as a Quasi Split Sound (QSS) subsystem in B/G transmission and allows a second Sound IF with high rejection of the video information.

The DC switch can modify the Sound IF configuration to process AM modulated Sound signals (L). The TDA8120B is assembled in a 24 pin dual in line power package.



**DIP24**  
(Plastic Package)

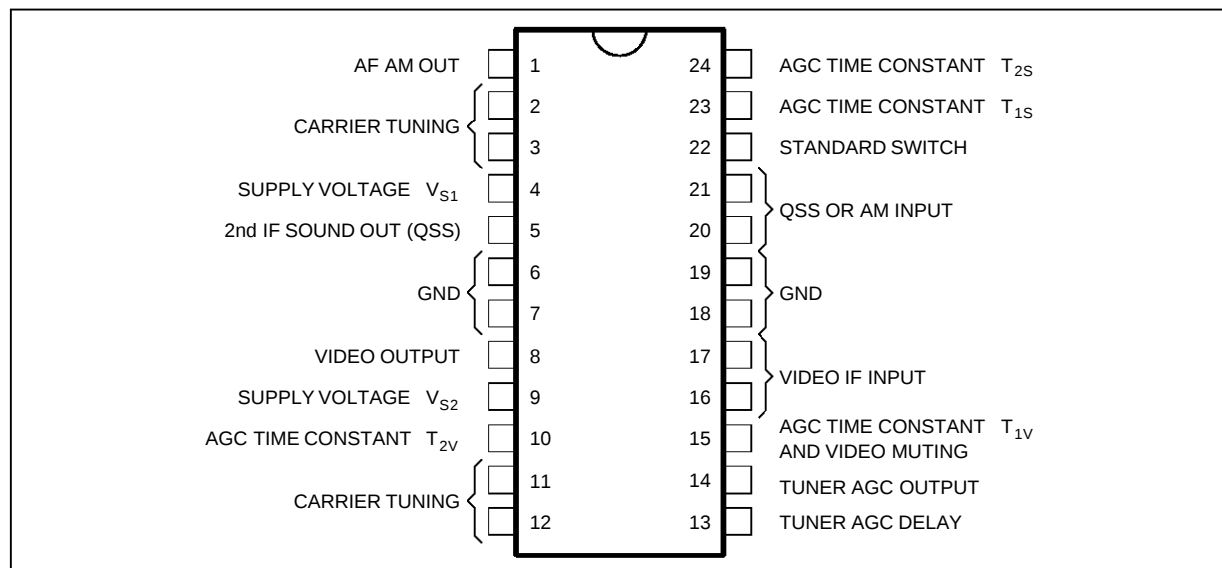
**ORDER CODE : TDA8120B**

### DESCRIPTION

The TDA8120B is a monolithic IC for TV video IF and Sound IF amplification and demodulation that can operate with all the TV standards.

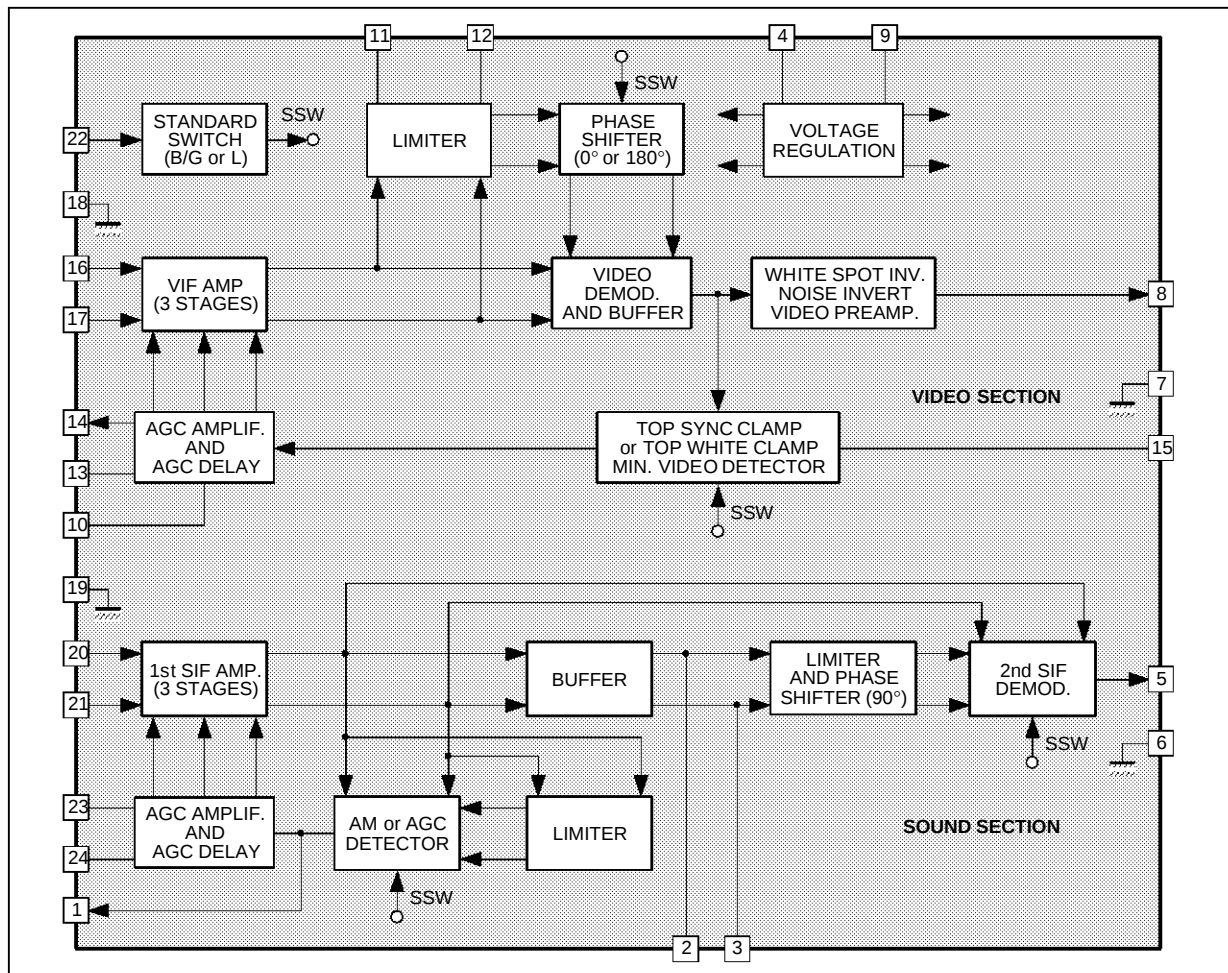
The Video IF section can handle negative (B/G) or positive (L) modulated video signals by means of DC switching.

### PIN CONNECTIONS



8120B-01.EPS

## BLOCK DIAGRAM



8120B-02.EPS

## ABSOLUTE MAXIMUM RATINGS

| Symbol           | Parameter                                                          | Value       | Unit               |
|------------------|--------------------------------------------------------------------|-------------|--------------------|
| $V_4, V_9$       | Supply Voltage $V_s$                                               | 15          | V                  |
| $I_8, I_5, I_1$  | Video Out, QSS <sub>out</sub> , AF AM Out, DC Output Current       | 10          | mA                 |
| $I_{22}, I_{15}$ | Pin 22 and Pin 15 Input Current                                    | 1           | mA                 |
| $P_{tot}$        | Total Power Dissipation ( $T_{amb} = 70\text{ }^{\circ}\text{C}$ ) | 2           | W                  |
| $T_{stg}, T_j$   | Storage and Junction Temperature                                   | - 40 to 150 | $^{\circ}\text{C}$ |
| $V_{14}$         | Voltage at Pin 14                                                  | $V_s$       |                    |

8120B-01.TBL

## THERMAL DATA

| Symbol          | Parameter          | Value  | Unit                 |
|-----------------|--------------------|--------|----------------------|
| $R_{th\ j-amb}$ | Thermal Resistance | Max 40 | $^{\circ}\text{C/W}$ |

8120B-02.TBL

**ELECTRICAL CHARACTERISTICS** ( $V_S = 12V$ ,  $T_{amb} = 25^\circ C$ )

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------|-----------|-----------------|------|------|------|------|
|--------|-----------|-----------------|------|------|------|------|

VIDEO IF SECTION  $V_I = 10\text{ mV}_{RMS}$  (black field),  $F_O = 38.9\text{MHz}$  ; unless otherwise specified

|                 |                                                    |                                                                                                                         |      |          |      |           |
|-----------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|----------|------|-----------|
| $V_S$           | Supply Voltage (Pins 4 and 9)                      |                                                                                                                         | 10.8 | 12       | 13.2 | V         |
| $I_S$           | Supply Current                                     | $V_I = 0$                                                                                                               |      | 120      |      | mA        |
| $V_{8H}$        | Top White Level                                    | $V_I = 0$ , $R_L = 1.5k\Omega$                                                                                          | 5.5  | 6        | 6.5  | V         |
| $V_{8L}$        | Top Synchronous Level                              |                                                                                                                         | 2.7  | 3        | 3.3  | V         |
| $V_8$           | Video Output B/G                                   | Modulation Depth, $D = 90\%$ , $R_L = 1.5k\Omega$                                                                       | 2.2  | 3        | 3.4  | $V_{pp}$  |
| $V_8$           | Video Output L                                     | $R_L = 1.5k\Omega$ , $M = 100\%$                                                                                        | 2.2  | 3        | 3.4  | $V_{pp}$  |
| $\Delta V_8$    | Video Output Variation between Standards B/G and L | $M = 100\%$                                                                                                             |      | $\pm 2$  |      | %         |
| $-I_8$          | Output Current                                     | $R_L = 1.5k\Omega$                                                                                                      |      | 4        |      | mA        |
| $I_8$           | Input Current                                      |                                                                                                                         | 2    |          |      | mA        |
| $I_{14}$        | Tuner AGC Current Capability                       |                                                                                                                         |      | 4.5      |      | mA        |
| S/N             | Signal to Noise Ratio                              | $B = 5\text{MHz}$ , $D = 90\%$                                                                                          | 50   |          |      | dB        |
| $\Delta V_I$    | AGC Range                                          | $\Delta V_8 = 1\text{dB}$ , $D = 90\%$                                                                                  | 60   |          |      | dB        |
| B               | Bandwidth                                          | $\Delta V_8 = -3\text{dB}$ , $D = 90\%$                                                                                 | 7    |          |      | MHz       |
| $V_{16-17}$     | Input Sensitivity for Full Output Signal           | $D = 90\%$                                                                                                              |      | 50       |      | $\mu V$   |
| $V_8$           | Carrier Leakages                                   | $F_O = 38.9\text{MHz}$<br>$F_O = 77.8\text{MHz}$                                                                        |      | 20<br>50 |      | mV<br>mV  |
| dG              | Differential Gain                                  | Subcarrier Modulated Staircase Video Signal, $D = 90\%$                                                                 |      |          | 10   | %         |
| d $\phi$        | Differential Phase                                 | Subcarrier Modulated Staircase Video Signal, $D = 90\%$                                                                 |      |          | 10   | degree    |
| d <sub>IM</sub> | Intermodulation Product 1.07MHz                    | Video Carrier Relative Level = 0dB<br>Chroma Subcarrier Relative Level = -3.2dB<br>Sound Carrier Relative Level = -20dB |      | 50       |      | dB        |
| $R_i$           | Input Resistance (between Pins 16 and pin 17)      |                                                                                                                         |      | 1.5      |      | $k\Omega$ |
| $C_i$           | Input Capacitance (between Pins 16 and pin 17)     |                                                                                                                         |      | 2        |      | pF        |

QUASI SPLIT SOUND CHANNEL OR FRENCH SOUND CHANNEL (see notes 1 and 2)

|              |                                                                                                                |                                                                                                                                                                     |          |     |    |            |
|--------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|----|------------|
| $V_{20-21}$  | Input Sensitivity for Full Output Signal (between Pins 20 and 21)                                              | R Channel Missing                                                                                                                                                   |          | 50  |    | $\mu V$    |
| $\Delta V_I$ | AGC Range                                                                                                      | $\Delta V_5 = 1\text{dB}$ , R Channel Missing                                                                                                                       | 60       |     |    | dB         |
| $V_5$        | Output Voltage Standard B/G                                                                                    | $R_L = 600\Omega$ , AC Coupled, $F_O = 5.5\text{MHz}$                                                                                                               |          | 100 |    | $mV_{RMS}$ |
| $I_5$        | Output Current                                                                                                 |                                                                                                                                                                     |          | 2.5 |    | mA         |
| $Z_5$        | Small Signal Output Impedance (QSS)                                                                            | $F_O = 5.5\text{MHz}$ or $F_O = 5.74\text{MHz}$                                                                                                                     |          |     | 50 | $k\Omega$  |
| $R_i$        | Input Resistance (between Pin 21 and Pin 20)                                                                   |                                                                                                                                                                     |          | 1.5 |    | $k\Omega$  |
| $C_i$        | Input Capacitance (between Pin 21 and Pin 20)                                                                  |                                                                                                                                                                     |          | 2   |    | pF         |
| S/N          | Noise Ratio QSS (after SIF limitation and FM demodulation)<br>$F_O = 5.50\text{MHz}$<br>$F_O = 5.74\text{MHz}$ | Channel R or Channel L Switched off<br>$F_m = 1\text{kHz}$ , $\Delta f = \pm 30\text{kHz}$<br>Carrier Modulated with Syncs. Pulses Only.<br>CCIR 468-2 Recommendant | 60<br>58 |     |    | dB         |
| $V_1$        | Output Voltage Standard L                                                                                      |                                                                                                                                                                     | 0.58     | 0.7 | 1  | $V_{RMS}$  |
| $I_1$        | Output Current                                                                                                 |                                                                                                                                                                     |          | 2.5 |    | mA         |
| $Z_1$        | AF Output Impedance (L)                                                                                        |                                                                                                                                                                     |          |     | 50 | $\Omega$   |
| S/N          | Noise Ratio AM Standard L                                                                                      | $B_N = 20\text{kHz}$                                                                                                                                                | 46       |     |    | dB         |

8120B-03.TBL

## TDA8120B

### ELECTRICAL CHARACTERISTICS (continued)

| Symbol                                                                | Parameter                    | Test Condition s | Min.   | Typ. | Max.           | Unit   |
|-----------------------------------------------------------------------|------------------------------|------------------|--------|------|----------------|--------|
| QUASI SPLIT SOUND CHANNEL OR FRENCH SOUND CHANNEL (see notes 1 and 2) |                              |                  |        |      |                |        |
| d                                                                     | Distorsion                   |                  |        |      | 2              | %      |
| V <sub>22</sub>                                                       | B/G Operation<br>L Operation |                  | 2<br>0 |      | 5<br>0.8       | V<br>V |
| V <sub>15</sub>                                                       | Video Muting                 |                  | 8      |      | V <sub>S</sub> | V      |

8120B-04.TBL

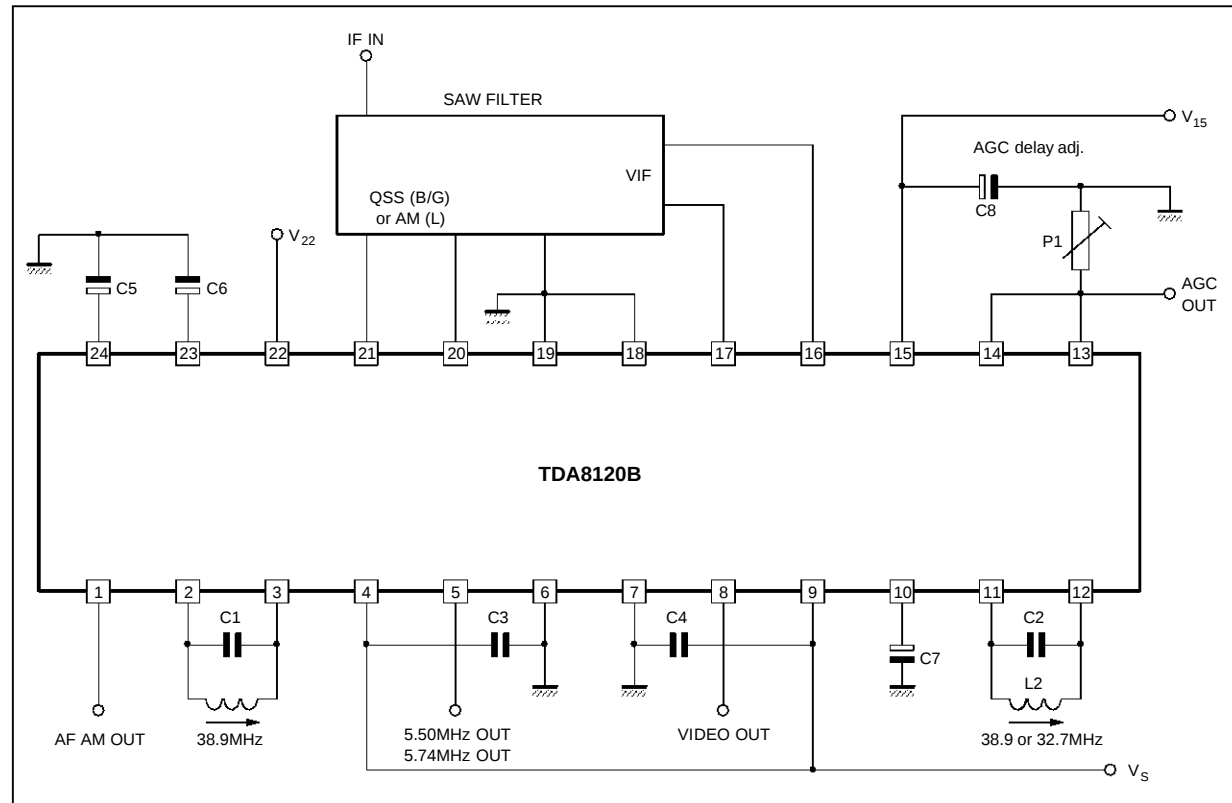
#### Notes : 1. QUASI SPLIT SOUND CHANNEL

Video carrier relative level = 0dB  
 $\Delta f = 0$  | Sound carrier relative level = 13dB (mono or L) f = 38.9MHz  
 Sound carrier relative level = -20dB (R) f = 33.4MHz  
 V<sub>i</sub> = 10mV Video carrier modulated with syncs ; V<sub>22</sub> = 2V, unless otherwise specified.  
 f = 33.16MHz

#### 2. FRENCH SOUND CHANNEL

V<sub>i</sub> = 10mV (Carrier level) ; f<sub>0</sub> = 39.2MHz ; F<sub>m</sub> = 1kHz ; m = 80% ; V<sub>22</sub> = 0.8V, unless otherwise specified.

### TEST CIRCUIT



8120B-03.EPS

## CIRCUIT OPERATION

The TDA8120B (see block diagram) consists of a video section and a sound section. The integration of both sections on the same chip requires a high isolation at IF frequencies. This is achieved by physically separating the two sections, with separate power supplies and ground pins. In addition, special care has been taken in the choice of pad positions for the IF inputs and sound/video outputs.

The video section consists of three AC-coupled IF stages with more than 60dB AGC range, flat amplitude/frequency response from 10 to 85MHz and linearized phase slope from 30 to 50MHz. Video carrier regeneration is performed by a tuned limiter. The carrier is then applied to the video demodulator through a special circuit which switches the carrier phase from 0 to 180° so that the video polarity can be maintained constant when the standard switches from B/G to L. A noise inverter and a white spot inverter are included to eliminate ultra-black and white pulses.

A top sync or a top white clamping circuit and a minimum DC video component detector are implemented by two double comparators the characteristics of which may be controlled by an external control input to adapt to the modulation type for each standard. The voltage at the output of the two comparators is memorized by an external capacitor and used to drive the AGC network, which allows an input regulation of the video carrier from less than 100μV to 100mV. A delayed control storage

with current output for the turner AGC completes the video section.

The sound section consists of three IF stages with the same characteristics as the video IF stages and an identical network to control and set the gains of the three IF amplifiers. The output of the third IF stage feeds the AM/AGC detector and the QSS section.

The AM/AGC detector consists of a wideband limiter for AM sound regeneration or video carrier regeneration used to feed the synchronous multiplier and consequently to obtain the AM demodulated audio signal. In addition, a DC voltage proportional to the peak-to-peak value of the video carrier is produced. Two comparators complete the sound AGC loop.

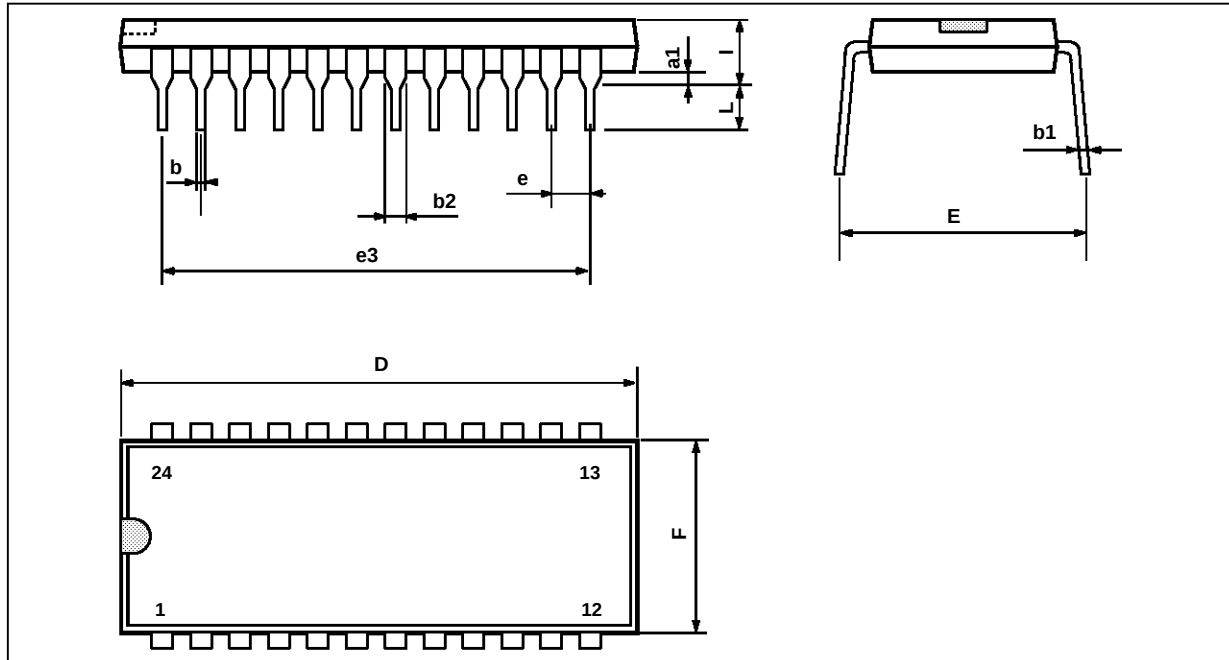
The subsequent QSS section consists of a reference amplifier tuned to the video IF which buffers a wideband limiter to reject completely the video AM information without introducing incidental phase modulation (IPM).

Following the limiter there are a 90° phase shifter and a linear-to-logarithmic converter which drives a linear multiplier as a demodulator for the intercarrier 2nd sound IF. This quadrature multiplier rejects all video components transmitted in DSB that is low frequency components of the video signal.

In addition to the sound and video sections, the TDA8120B includes a block for standard switching (B/G or L) controlled by a TTL-compatible input.

## PACKAGE MECHANICAL DATA

24 PINS - PLASTIC DIP



PM-DIP24.EPS

| Dimensions | Millimeters |       |       | Inches |       |       |
|------------|-------------|-------|-------|--------|-------|-------|
|            | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| a1         |             | 0.63  |       |        | 0.025 |       |
| b          |             | 0.45  |       |        | 0.018 |       |
| b1         | 0.23        |       | 0.31  | 0.009  |       | 0.012 |
| b2         |             | 1.27  |       |        | 0.050 |       |
| D          |             |       | 32.2  |        |       | 1.268 |
| E          | 15.2        |       | 16.68 | 0.598  |       | 0.657 |
| e          |             | 2.54  |       |        | 0.100 |       |
| e3         |             | 27.94 |       |        | 1.100 |       |
| F          |             |       | 14.1  |        |       | 0.555 |
| i          |             | 4.445 |       |        | 0.175 |       |
| L          |             | 3.3   |       |        | 0.130 |       |

DIP24.TBL

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