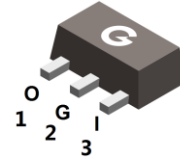
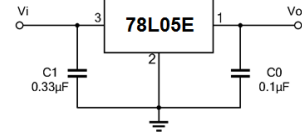


### Features

- If adequate heat sinking is provided, they can deliver over 100mA output current
- Thermal overload protection
- Short circuit current limiting
- Output voltage of 5V
- Over Temperature Protection Point: 170°C
- RoHS compliant with Halogen-free

HF



SOT-89

### Mechanical Data

- Case: SOT-89
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

### Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| BL78L05E    | SOT-89  | 1000 pcs / Tape & Reel | 78L05        |

### Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter              | Symbol          | Value | Unit |
|------------------------|-----------------|-------|------|
| Input Voltage          | V <sub>I</sub>  | 30    | V    |
| Maximum Output Current | I <sub>CM</sub> | 100   | mA   |

### Thermal Characteristics

| Parameter                                 | Symbol           | Value      | Unit |
|-------------------------------------------|------------------|------------|------|
| Power Dissipation (T <sub>A</sub> = 25°C) | P <sub>D</sub>   | 0.7        | W    |
| Thermal Resistance Junction-to-Air        | R <sub>θJA</sub> | 178        | °C/W |
| Thermal Resistance Junction-to-Case       | R <sub>θJC</sub> | 120        | °C/W |
| Operating Temperature Range               | T <sub>OPR</sub> | -40 ~ +125 | °C   |
| Junction Temperature                      | T <sub>J</sub>   | 150        | °C   |
| Storage Temperature Range                 | T <sub>STG</sub> | -65 ~ +150 | °C   |

### Electrical Characteristics ( $I_O = 40\text{mA}$ , $V_I = 10\text{V}$ , $C_I = 0.33\mu\text{F}$ , $C_O = 0.1\mu\text{F}$ , $T_J = 0^\circ\text{C}$ to $125^\circ\text{C}$ unless otherwise specified)

| Parameter                | Symbol                  | Test Condition                                                                        | Min. | Typ. | Max. | Unit                 |
|--------------------------|-------------------------|---------------------------------------------------------------------------------------|------|------|------|----------------------|
| Output Voltage           | $V_O$                   | $T_J = 25^\circ\text{C}$                                                              | 4.8  | 5.0  | 5.2  | V                    |
|                          |                         | $1\text{mA} < I_O < 40\text{mA}$<br>$7\text{V} \leq V_I \leq 20\text{V}$              | 4.75 | -    | 5.25 | V                    |
|                          |                         | $1\text{mA} < I_O < 70\text{mA}$ , $V_I = 10\text{V}$                                 | 4.75 | -    | 5.25 | V                    |
| Line Regulation          | $\Delta V_O$            | $7\text{V} \leq V_I \leq 20\text{V}$ , $T_J = 25^\circ\text{C}$                       | -    | 55   | 150  | mV                   |
|                          |                         | $8\text{V} \leq V_I \leq 20\text{V}$ , $T_J = 25^\circ\text{C}$                       | -    | 2    | 100  | mV                   |
| Load Regulation          | $\Delta V_O$            | $1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$                    | -    | 11   | 60   | mV                   |
|                          |                         | $1\text{mA} \leq I_O \leq 40\text{mA}$ , $T_J = 25^\circ\text{C}$                     | -    | 5    | 30   | mV                   |
| Quiescent Current        | $I_Q$                   | $T_J = 25^\circ\text{C}$                                                              | -    | 3    | 5.5  | mA                   |
|                          |                         | $T_J = 125^\circ\text{C}$                                                             | -    | -    | 5.5  | mA                   |
| Quiescent Current Change | $\Delta I_Q$            | $8\text{V} \leq V_I \leq 20\text{V}$                                                  | -    | -    | 1.5  | mA                   |
|                          |                         | $1\text{mA} \leq I_O \leq 40\text{mA}$                                                | -    | -    | 0.1  | mA                   |
| Output Voltage Drift     | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ , $0 \leq T_J \leq 125^\circ\text{C}$                              | -    | 0.65 | -    | mV/ $^\circ\text{C}$ |
| Output Noise Voltage     | $V_N$                   | $10\text{Hz} \leq f \leq 100\text{kHz}$ , $T_J = 25^\circ\text{C}$                    | -    | 40   | -    | $\mu\text{V}$        |
| Ripple Rejection         | RR                      | $8\text{V} \leq V_I \leq 18\text{V}$ , $f = 120\text{Hz}$<br>$T_J = 25^\circ\text{C}$ | 41   | 90   | -    | dB                   |
| Dropout Voltage          | $V_D$                   | $T_J = 25^\circ\text{C}$                                                              | -    | 1.7  | -    | V                    |

### TYPICAL CHARACTERISTICS (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

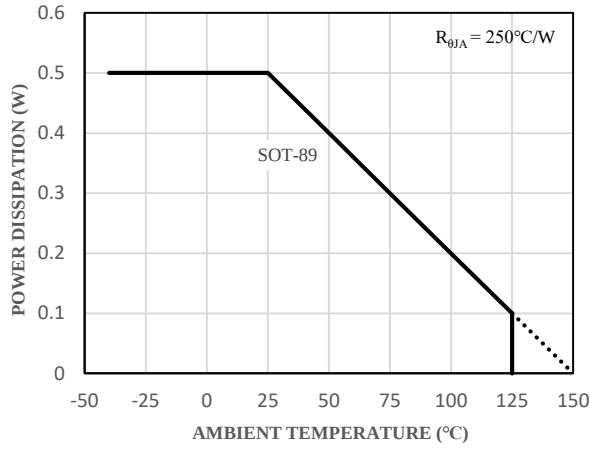


Fig 1 Power Dissipation vs. Temperature

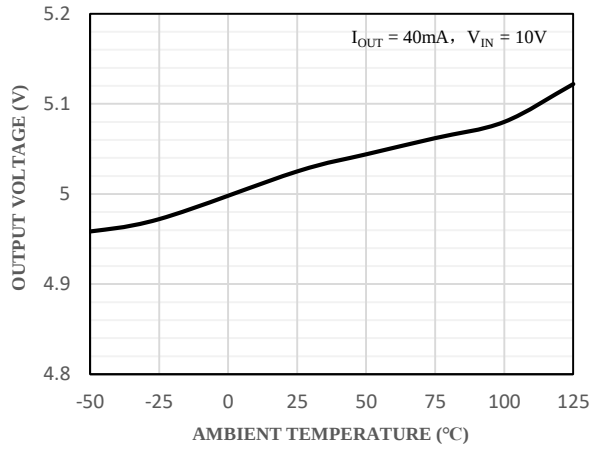


Fig 2 Output Voltage vs. Temperature

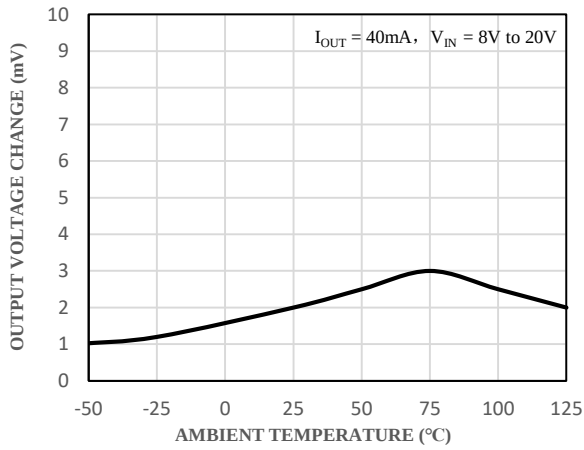


Fig 3 Line Regulation vs. Temperature

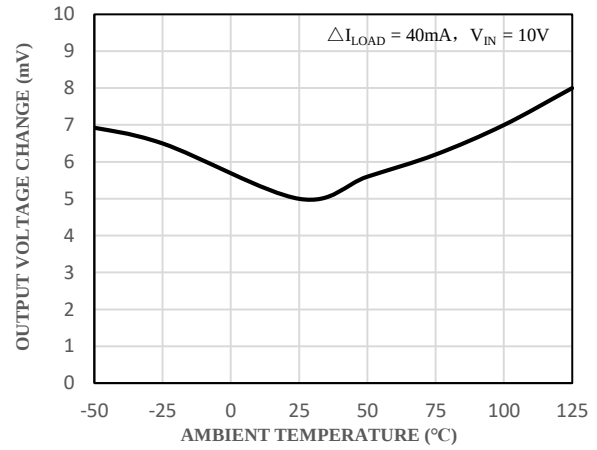


Fig 4 Load Regulation vs. Temperature

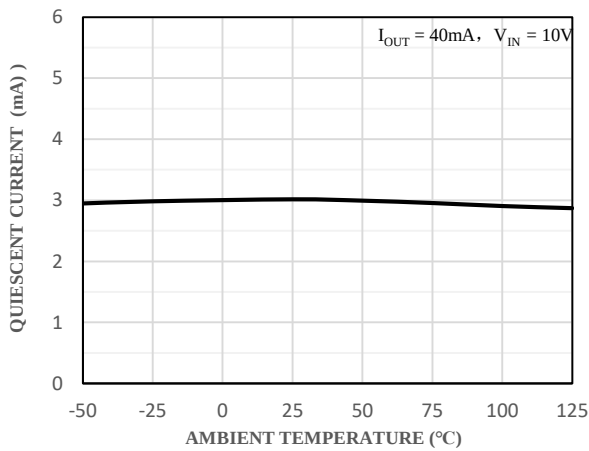


Fig 5 Quiescent Current vs. Temperature

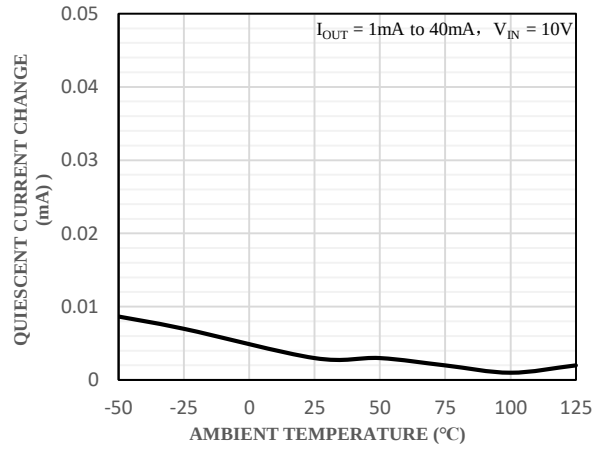
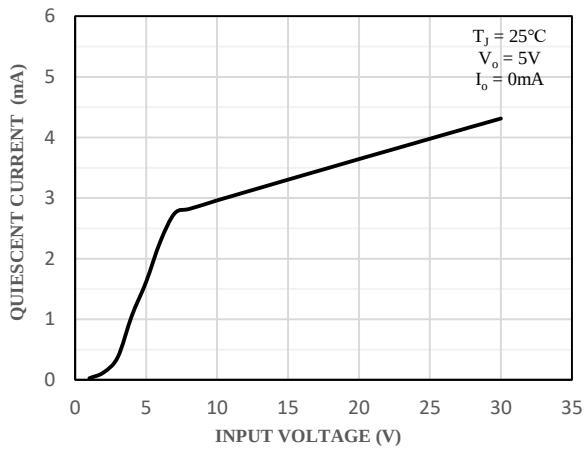
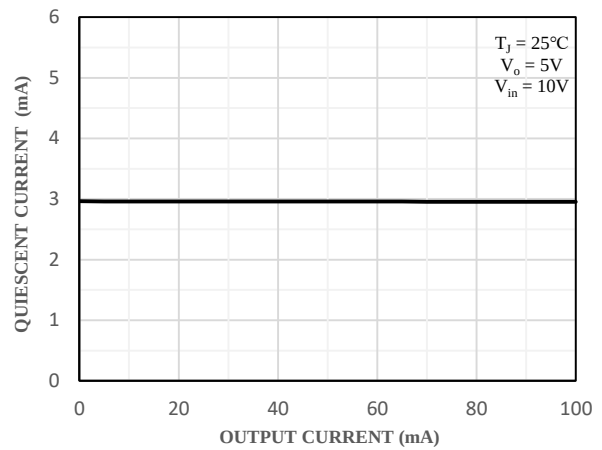


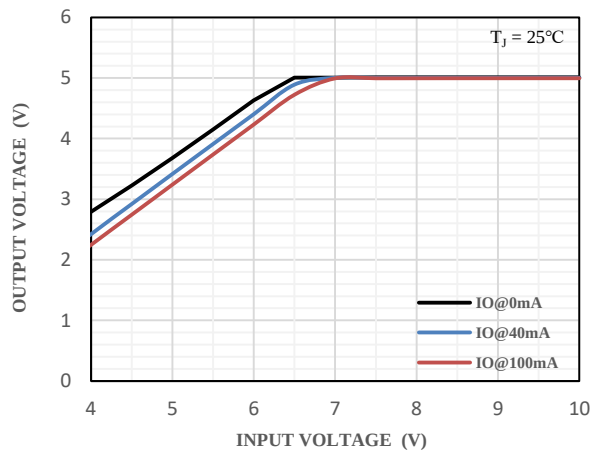
Fig 6 Quiescent Current Change vs. Temperature



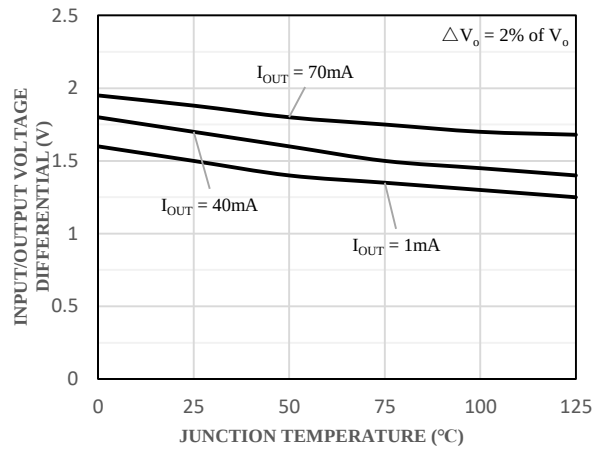
**Fig 7** Quiescent Current vs. Input Voltage



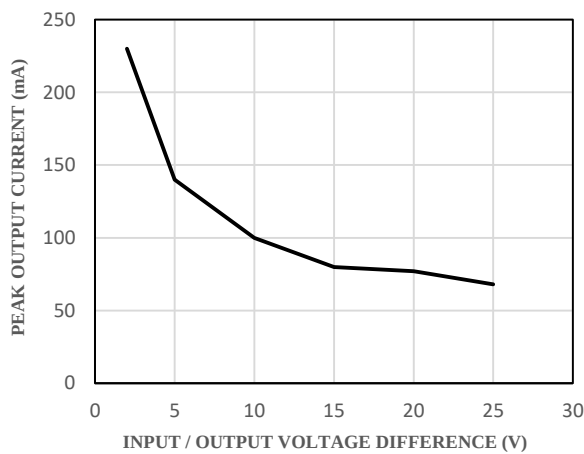
**Fig 8** Quiescent Current vs. Output Current



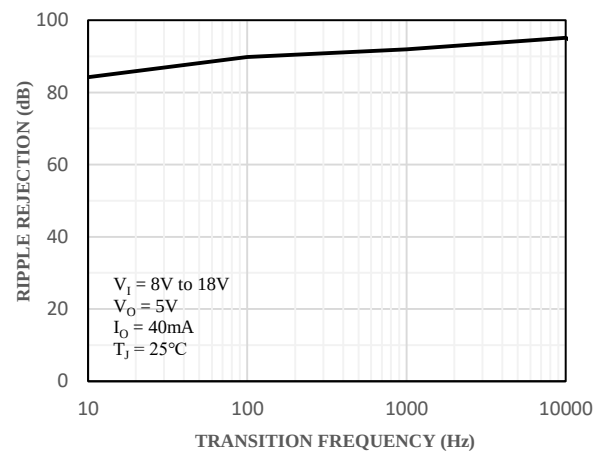
**Fig 9** Output Voltage vs. Input Voltage



**Fig 10** Dropout Voltage vs. Junction Temperature

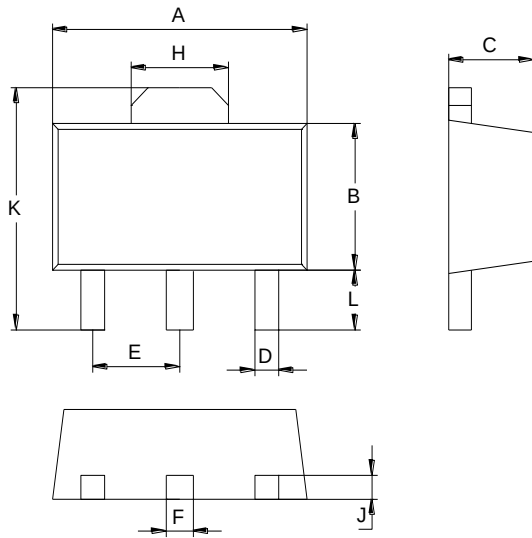


**Fig 11** Peak Output Current vs. Dropout Voltage Difference



**Fig 12** Ripple Rejection vs. Transition Frequency

### Package Outline Dimensions (Unit: mm)



| SOT-89    |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 4.30 | 4.70 |
| B         | 2.25 | 2.65 |
| C         | 1.30 | 1.70 |
| D         | 0.30 | 0.50 |
| E         | 1.40 | 1.60 |
| F         | 0.38 | 0.58 |
| H         | 1.60 | 1.80 |
| J         | 0.30 | 0.50 |
| L         | 0.90 | 1.10 |
| K         | 3.95 | 4.35 |

## Mounting Pad Layout (Unit: mm)

## SOT-89

