

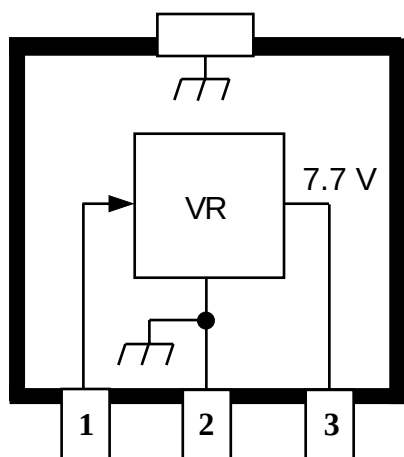
# 8178

Data Sheet  
27468.23

## PRODUCT PREVIEW

(Subject to change without notice)  
October 9, 2001

## LOW-DROPOUT, 7.7 V PREREGULATOR



Designed specifically to meet the stringent requirements of automotive applications, the A8178LLT provides an output voltage of 7.7 V  $\pm 15\%$  for supply voltages greater than 6.9 V. This device also provides a low-dropout tracking output for supply voltages down to 2.5 V. This regulator is intended to be used with sensitive automotive electronics systems that do not have the capability of low dropout operation and cannot withstand the high-voltage transients typical of automotive applications. This 7.7 V preregulator will withstand all ISO pulses (ignition coil disconnect requires an external diode) and will continue to operate during positive power supply transients (noise).

This device is supplied in a small-outline plastic transistor package for surface-mount applications. The A8178LLT is furnished in the SOT-89/TO-243AA for increased allowable package power dissipation.

### ABSOLUTE MAXIMUM RATINGS

Input Voltage,  $V_I$  . . . . . 30 V

Reverse Input Voltage,  $V_{RI}$  . . . . -120 V

Output Current,  $I_O$  . . . . . TBD\*

Operating Temperature Range,

$T_A$  . . . . . -40°C to +150°C

Junction Temperature,  $T_J$  . . . . +150°C

Storage Temperature Range,

$T_S$  . . . . . -40°C to +170°C

\* Output current rating is limited by input voltage, duty cycle, and ambient temperature. Under any set of conditions, do not exceed a junction temperature of +150°C. See next page.

*This document contains information on a product under development. Allegro MicroSystems, Inc. reserves the right to change or discontinue this product without notice.*

Always order by complete part number: **A8178LLT**.

# 8178

## LOW-DROPOUT, 7.7 V PREREGULATOR

### ELECTRICAL CHARACTERISTICS over operating temperature range.

| Characteristic            | Symbol                     | Test Conditions                                     | Limits      |      |      |       |
|---------------------------|----------------------------|-----------------------------------------------------|-------------|------|------|-------|
|                           |                            |                                                     | Min.        | Typ. | Max. | Units |
| Output Voltage            | $V_O$                      | $6.9\text{ V} \leq V_I \leq 24\text{ V}$            | 6.5         | 7.7  | 8.8  | V     |
|                           |                            | $2.5\text{ V} \leq V_I \leq 6.9\text{ V}$           | $V_I - 0.4$ | —    | —    | V     |
|                           |                            | $V_I = 120\text{ V}$ , pulse test                   | —           | —    | 11   | V     |
| Output Volt. Temp. Coeff. | $\alpha_{VO}$              |                                                     | —           | —    | TBD  | mV/°C |
| Line Regulation           | $\Delta V_{O(\Delta V_I)}$ |                                                     | —           | —    | TBD  | mV    |
| Load Regulation           | $\Delta V_{O(\Delta I_O)}$ |                                                     | —           | —    | TBD  | mV    |
| Quiescent Current         | $I_Q$                      | $V_I = 13.5\text{ V}$ , $I_O = 0$                   | —           | —    | 2.5  | mA    |
|                           |                            | $2.5\text{ V} \leq V_I \leq 8\text{ V}$ , $I_O = 0$ | —           | —    | 5.6  | mA    |
| Power Dissipation         | $P_d$                      | $V_I = 13.5\text{ V}$ , $I_O = 15\text{ mA}$        | —           | —    | 130  | mW    |
| Thermal Resistance*       | $R_{\theta JA}$            |                                                     | —           | 200  | —    | °C/W  |

Typical values are at  $T_A = +25^\circ\text{C}$  and are given for circuit design information only.

\*Mounted on 2.24" x 2.24" solder-coated copper-clad board in still air.

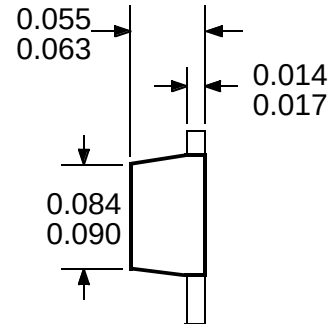
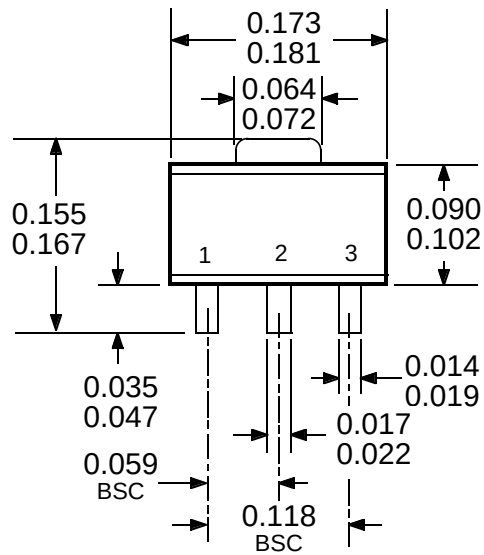
### INTERNAL PROTECTIVE FEATURES

| ISO Pulse No. | Test                                                  | Test Conditions (at $T_A = +25^\circ\text{C}$ )                                                              |
|---------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1             | Inductive Turn Off (Negative)                         | $V_S = -100\text{ V}$ , $R_S = 10\ \Omega$ , $t_r = 1\ \mu\text{s}$ , $t_d = 2\text{ ms}$                    |
| 2             | Inductive Turn Off (Positive)                         | $V_S = 100\text{ V}$ , $R_S = 10\ \Omega$ , $t_r = 1\ \mu\text{s}$ , $t_d = 50\ \mu\text{s}$ , non-operating |
| 3a            | Capacitive/Inductive Coupling (Neg)                   | $V_S = -150\text{ V}$ , $R_S = 50\ \Omega$ , $t_r = 50\text{ ns}$ , $t_d = 100\text{ ns}$                    |
| 3b            | Capacitive/Inductive Coupling (Pos)                   | $V_S = 100\text{ V}$ , $R_S = 50\ \Omega$ , $t_r = 50\text{ ns}$ , $t_d = 100\text{ ns}$                     |
| 4             | Reverse Battery                                       | $V_S = -14\text{ V}$ , $t_d = 20\text{ s}$ , non-operating                                                   |
| 5             | Load Dump                                             | $V_S = 86.5\text{ V}$ , $R_S = 0.5\ \Omega$ , $t_r = 5\text{ ms}$ , $t_d = 400\text{ ms}$                    |
| 6             | Ignition Coil Disconnect<br>EXTERNAL PROTECTION REQ'D | $V_S = -300\text{ V}$ , $R_S = 30\ \Omega$ , $t_r = 60\ \mu\text{s}$ , $t_d = 300\ \mu\text{s}$              |
| 7             | Field Decay (Negative)                                | $V_S = -80\text{ V}$ , $R_S = 10\ \Omega$ , $t_r = 5\text{ ms}$ , $t_d = 100\text{ ms}$                      |



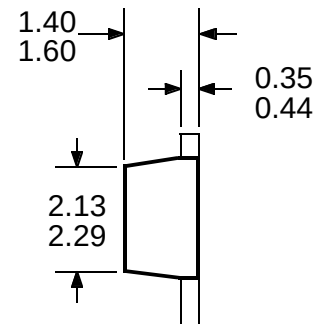
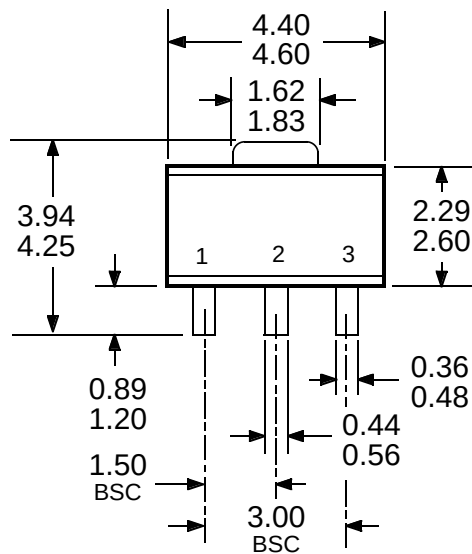
## A8178LLT

Dimensions in Inches  
(for reference only)



Dwg. MA-009-3 in

Dimensions in Millimeters  
(controlling dimensions)



Dwg. MA-009-3 mm

- NOTES:
1. Lead spacing tolerance is non-cumulative.
  2. Exact body and lead configuration at vendor's option within limits shown.

**8178**  
**LOW-DROPOUT,**  
**7.7 V PREREGULATOR**

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