AQT506/504

Current Regulator Diode

SC70-3, SOT23-3, TO92 Packages

Product Specification | Revision 1.0 | July 10, 2004

General Description

The AQT506/504 is a 2-terminal current regulator capable of delivering a constant current over a wide voltage range, and requires no separate voltage source or supporting components.

The AQT506/504 is a bipolar integrated circuit that replaces legacy JFET devices.

Its low cost, small size, and simplicity makes the current regulator diode ideal for applications requiring an isolated constant current source.

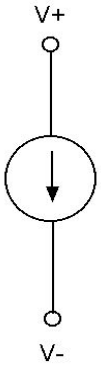
Applications

- Audio circuits
- Timing circuits
- Current source or sink
- Current limiting circuits

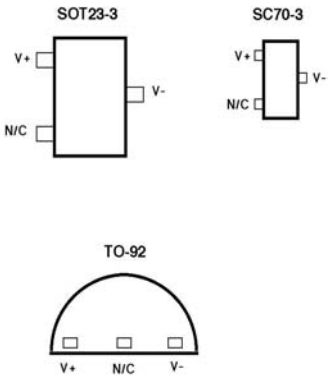
Features

- No separate voltage source required
- Excellent temperature performance
- High Dynamic Impedance
- Offered in SOT23 & SC70 packages

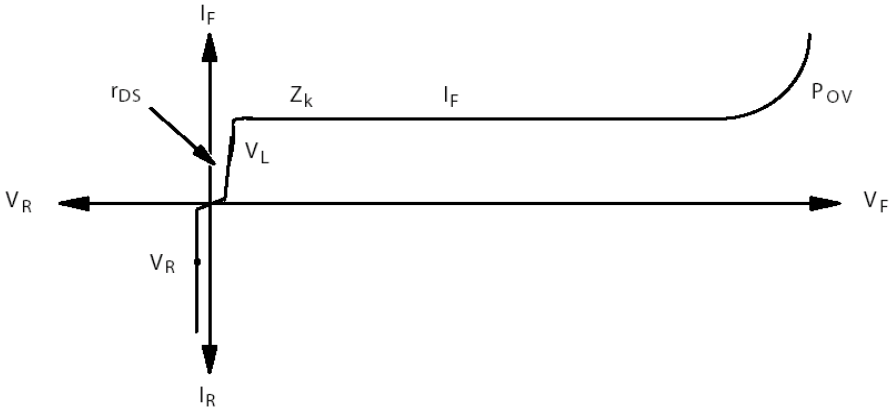
Block Diagram



Pin Configuration (Top View)



Electrical Characteristic



Ordering Information

Device	Operating Tj	%Tol	Pkg Type	I FWD	Wrap	Order Number
AQT506	0C˚ ≤100C˚	20	TO-92-2	1.4mA	BULK	AQ506FV-N2-14-BU
AQT506	0C˚ ≤100C˚	20	SOT-23-3	1.4mA	T&R	AQ506FV-M2-14-TR
AQT506	0C˚ ≤100C˚	20	SC70-3	1.4mA	T&R	AQ506FV-C3-14-TR
AQT504	0C˚ ≤100C˚	20	TO-92-2	0.7mA	BULK	AQ504FV-N2-07-BU
AQT504	0C˚ ≤100C˚	20	SOT-23-3	0.7mA	T&R	AQ504FV-M3-07-TR
AQT504	0C˚ ≤100C˚	20	SC70-3	0.7mA	T&R	AQ504FV-C3-07-TR

Absolute Maximum Ratings

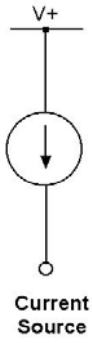
Parameter	Value	Unit
Peak Forward Voltage	36	V
Reverse Current	50	mA
Operating Junction Temperature	150	ºC
Lead Temperature (soldering 10 seconds)	300	ºC
Storage Temperature Range	-80 to +150	ºC

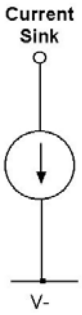
Electrical Specifications

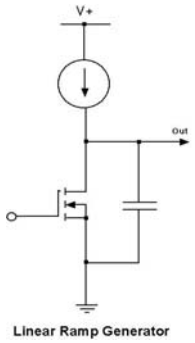
Electrical characteristics are guaranteed over the full temperature range 0ºC ≤ Tj ≤ 100ºC. Ambient temperature must be de-rated based upon power dissipation and package thermal characteristics.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
POV	Peak Operating Voltage	IF= 1.1 • IF max	36	45		Volts
VR	Reverse Voltage	IR= 1mA		0.8		Volts
CF	Capacitance	VF=25V, f = 1MHz		2.2		pF
IF	Regulator Current	AQT506, VF= 25V	1.12	1.40	1.68	mA
		AQT504, VF= 25V	0.61	0.70	0.84	
Zd	Dynamic Impedance	VF= 25V	.33	1.5		MΩ
Zk	Knee Impedance	VF= 6V		.25		MΩ
VL	Limiting Voltage	IF= 0.8 • If min		1.1	2.5	V
TC	Temperature Coefficient	VF=25V 0°C ≤ TA ≤ 100 °C		.19		%/°C

Typical Applications

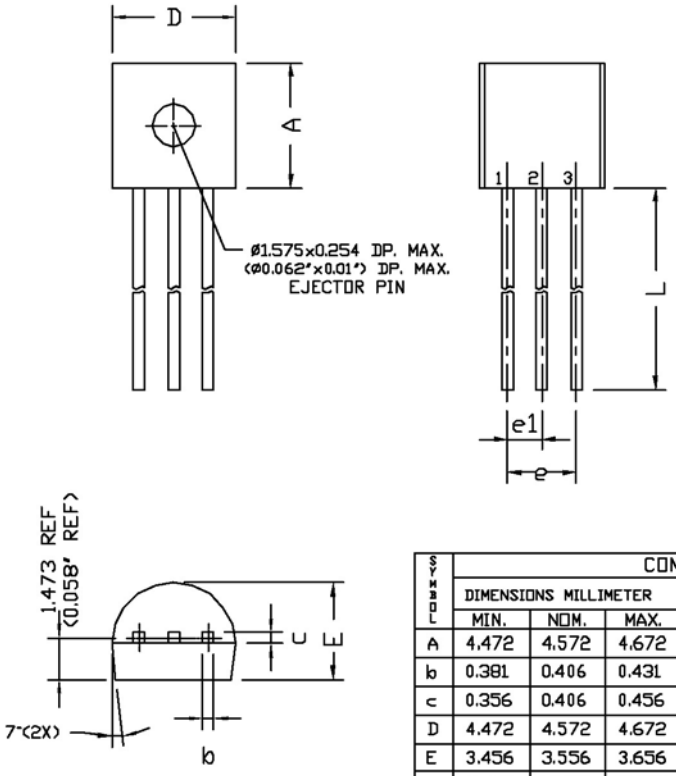






Package Dimensions

TO92-2*, TO92-3



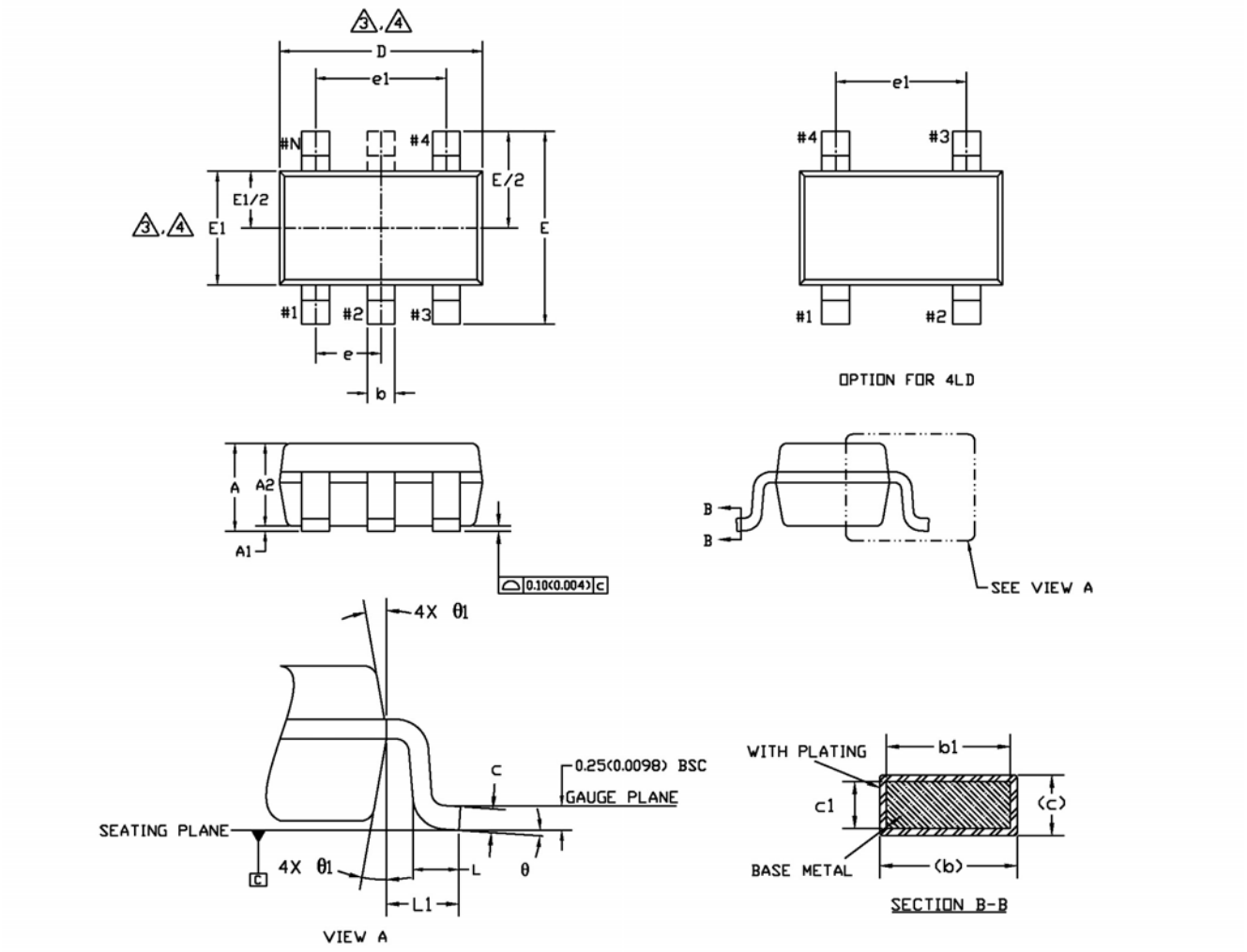
SYMBOL	COMMON					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	4.472	4.572	4.672	0.176	0.180	0.184
b	0.381	0.406	0.431	0.015	0.016	0.017
c	0.356	0.406	0.456	0.014	0.016	0.018
D	4.472	4.572	4.672	0.176	0.180	0.184
E	3.456	3.556	3.656	0.136	0.140	0.144
e	2.413	2.540	2.667	0.095	0.100	0.105
e1	1.143	1.270	1.397	0.045	0.050	0.055
L	13.87	13.97	14.07	0.546	0.550	0.554

NOTES :

1. CONTROLLING DIMENSION : MILLIMETER. CONVERTED INCH DIMENSION ARE NOT NECESSARILY EXACT.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5, 1973.
3. FOR 2 LEAD PACKAGE CENTER LEAD IS CLIPPED

Package Dimensions (contd.)

SOT23-3, SOT23-5, SOT23-4, SOT23-6



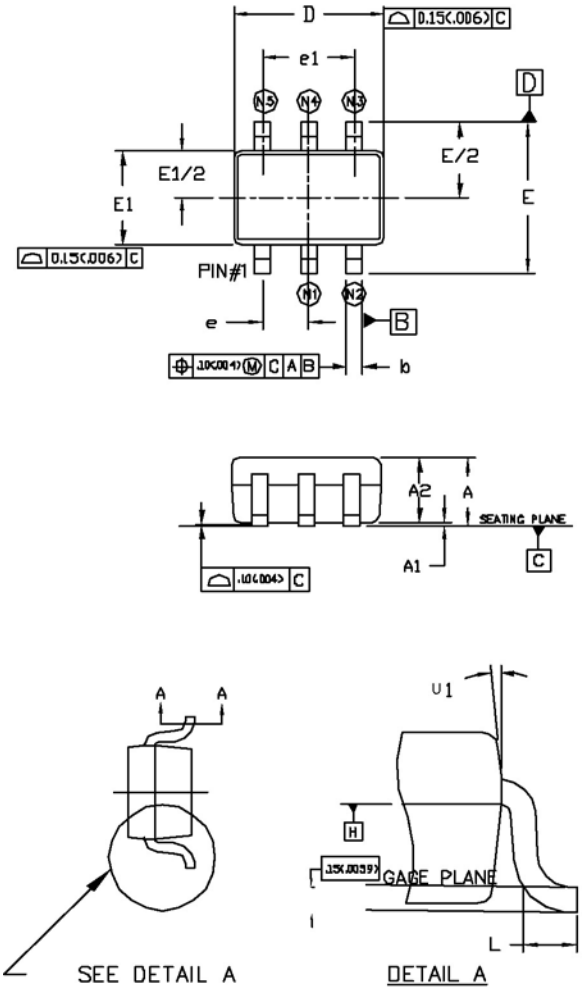
SYMBOL	COMMON					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.20	1.30	1.40	0.047	0.051	0.055
A1	0.05	-	0.15	0.002	-	0.006
A2	0.90	1.15	1.30	0.035	0.045	0.051
b	0.35	-	0.50	0.013	-	0.020
b1	0.35	0.40	0.45	0.013	0.015	0.017
c	0.08	-	0.22	0.003	-	0.008
c1	0.08	0.13	0.20	0.003	0.005	0.007
D	2.90 BSC			0.114 BSC		
E	2.80 BSC			0.110 BSC		
E1	1.60 BSC			0.062 BSC		
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.074 BSC		
L	0.35	0.45	0.55	0.013	0.017	0.021
L1	0.60 REF.			0.023 REF.		
θ	0°	4°	8°	0°	4°	8°
θ1	10° TYP			10° TYP		

NOTE :

1. Dimensioning and tolerancing per ASME Y 14.5 M - 1994.
2. Dimensions are in millimeters.Converted inch dimension are not necessarily exact.
3. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 0.15 mm per side.
   Dimension E1 does not include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.15 mm per side.
4. Top package may be smaller than the bottom package Dimension D and E1 are determine at the outermost extremes of the plastic body exclusive of mold flash gate burrs and interlead flash.
5. Terminal numbers are shown for reference only. Die is facing up for molding. Die is facing down for trim/form.

Package Dimensions (contd.)

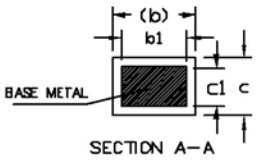
SC70-3, SC70-4, SC70-5, SC70-6



NOTE :

1. CONTROLLING DIMENSION : MILLIMETER. CONVERTED INCH DIMENSION ARE NOT NECESSARILY EXACT.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH,PROTRUSION OR GATE BURR, MOLD FLASH,PROTRUSION OR GATE BURR SHALL NOT EXCEED 0.15MM(0.006") PER END. DIMENSION E1 DO NOT INCLUDE INTER-LEAD FLASH OR PROTRUSION,INTER-LEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15MM (0.006") PER SIDE.
4. THE PACKAGE TOP BE SMALLER THAN THE PACKAGE BOTTOM. DIMENSION D AND E1 ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY

SYMBOL	COMMON					
	DIMENSIONS MILLIMETER			DIMENSIONS INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	–	1.10	0.031	–	0.043
A1	0	–	0.10	0	–	0.004
A2	0.80	0.90	1.00	0.031	0.035	0.040
b	0.15	–	0.30	0.006	–	0.012
b1	0.15	0.20	0.25	0.006	0.008	0.010
c	0.08	–	0.25	0.003	–	0.010
c1	0.08	0.13	0.20	0.003	0.005	0.008
D	1.90	2.10	2.15	0.074	0.082	0.084
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.050	0.055
e	0.65 BSC			0.0255 BSC		
e1	1.30 BSC			0.0512 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
U	0°	–	8°	0°	–	8°
U1	4°	–	10°	4°	–	10°



PIN CODE	LEAD COUNT			
	3	4	5	6
N1	–	–	2	2
N2	2	2	3	3
N3	–	3	4	4
N4	3	–	–	5
N5	–	4	5	6

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