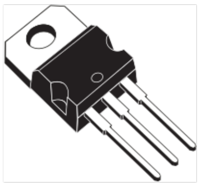
PB137

Positive voltage regulator for battery charger

Features

- Reverse leakage current less than 10 µA
- Three terminal fixed version (13.7 V) output current in excess of 1.5 A
- Available in ± 1 % (AC) selection at 25 °C
- Typical dropout voltage 2 V
- Temperature range 0 to 150 °C



TO-220

Description

The PB137 is a positive voltage regulator able to provide 1.5 A, at V_O = 13.7 V and is intended as a charger for lead acid battery. The main feature is a reverse leakage current (Max 10 µA at T_J = 0 to 40 °C V_I = floating and V_O = 13.7 V). It is available in TO-220 and it employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat-sinking is provided, they can deliver over 1 A output current.

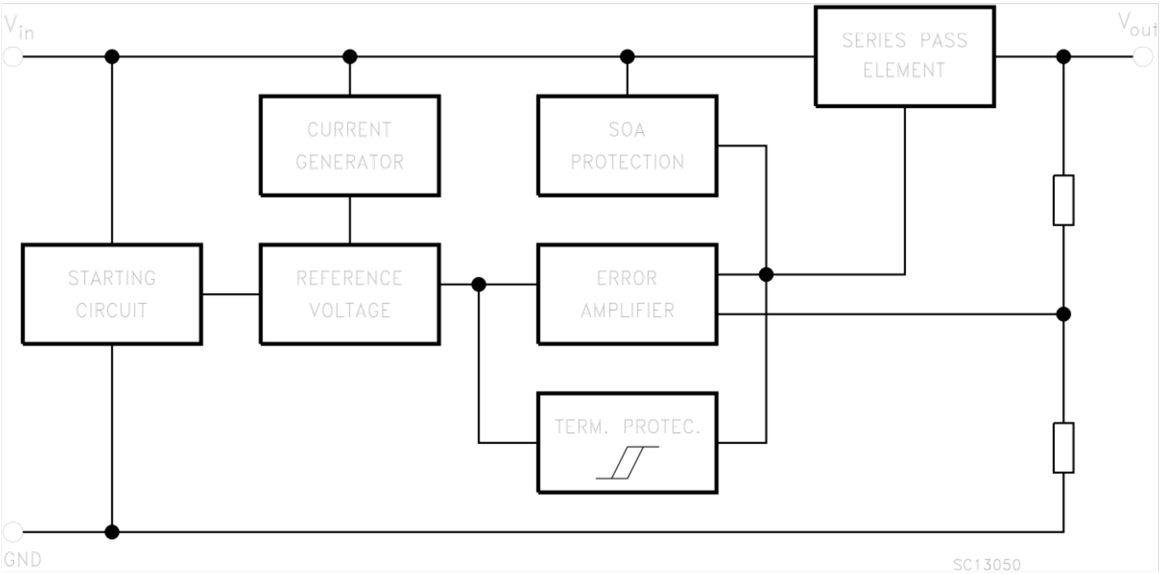
Table 1. Device summary

Order code	Package	Output voltage
PB137ACV	TO-220	1.5 V

Contents

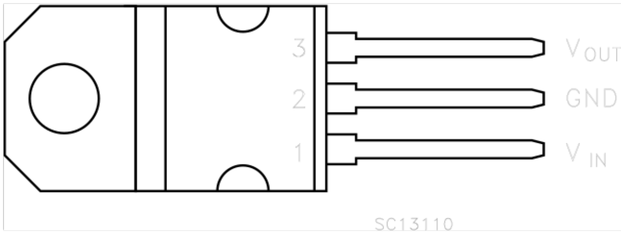
1 Diagram

Figure 1. Schematic diagram



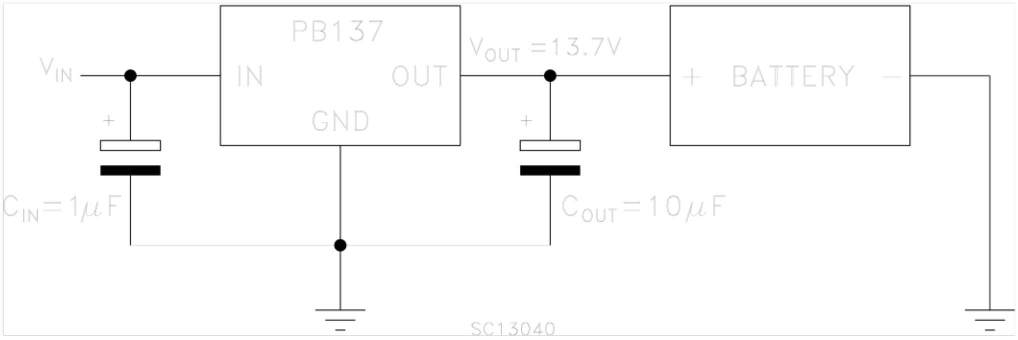
2 Pin configuration

Figure 2. Pin connections (top view)



3 Application

Figure 3. Application circuit



4 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_I	DC input voltage	40	V
I_O	Output current	Internally limited	mA
P_{TOT}	Power dissipation	Internally limited	mW
T_{STG}	Storage temperature range	- 65 to 150	°C
T_{OP}	Operating junction temperature range	0 to 150	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case	5	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	°C/W

5 Electrical characteristics

Refer to the test circuits, V_I = 18 V, I_O = 500 mA, T_J = 0 to 150 °C, C_O = 10 µF unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_O	Output voltage	T_J = 25 °C	13.56	13.7	13.84	V
			13.43	13.7	13.97	
ΔV_O	Line regulation	V_I = 16 to 28.7 V, T_J = 25 °C		60	150	mV
ΔV_O	Load regulation	I_O = 5 to 1500 mA, T_J = 25 °C		65	100	mV
I_d	Quiescent current	T_J = 25 °C		4	8	mA
ΔI_d	Delta quiescent current vs. line	V_I = 16 to 28.7 V			4	mA
ΔI_d	Delta quiescent current vs. load	I_O = 5 to 1000 mA			1.2	mA
V_d	Dropout voltage	I_O = 1 A, T_J = 25 °C		2.1	2.6	V
I_{sc}	Short circuit current	V_I - V_O = 5 V, T_J = 25 °C		2.2		A
eN	Output noise voltage	B = 10 Hz to 10 kHz, T_J = 25 °C		300		µVrms
SVR	Supply voltage rejection	f = 120 Hz, T_J = 25 °C		58		dB
I_{REV}	Reverse leakage current	V_O = 13.7 V, V_I = floating, T_J = 0 to 40 °C		0.1	10	µA
S	Long term stability	T_J = 125 °C, 1000 Hrs			0.5	%

6 Typical characteristics

T_J = 25°C.

Figure 4. Output voltage vs. temperature

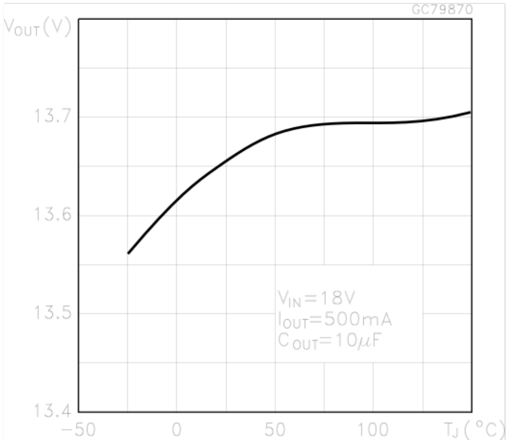


Figure 5. Output voltage vs. input voltage

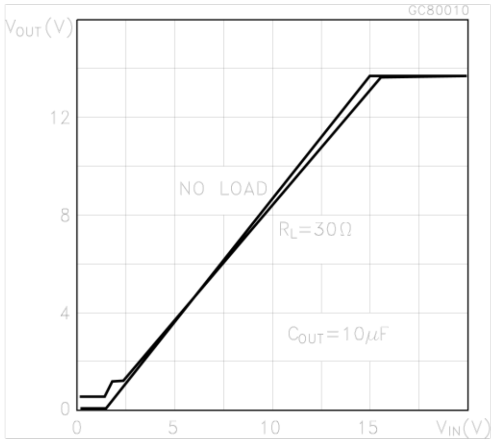


Figure 6. Output voltage vs. output current

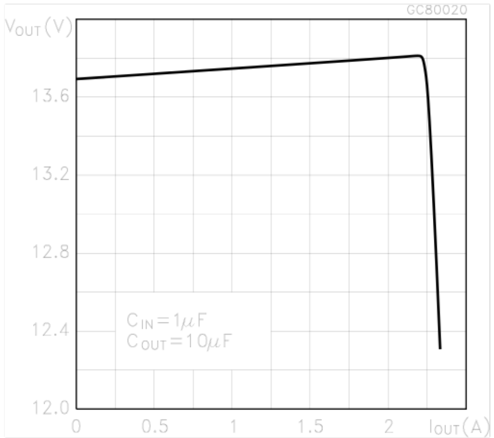


Figure 7. Load regulation vs. temperature

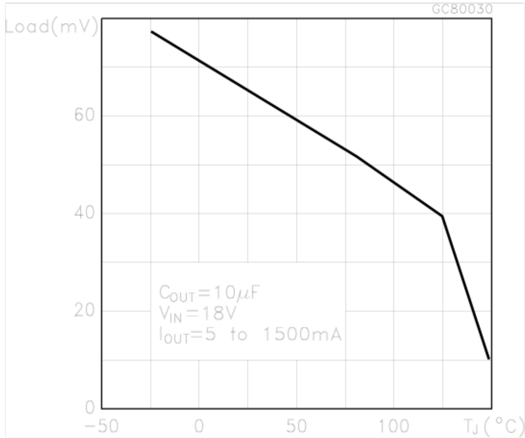


Figure 8. Line regulation vs. temperature

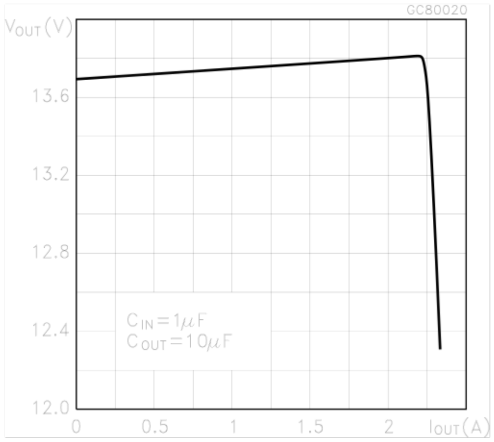


Figure 9. Dropout voltage vs. temperature

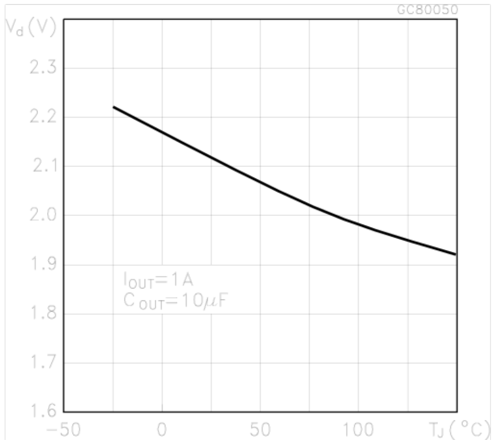


Figure 10. Dropout voltage vs. output current

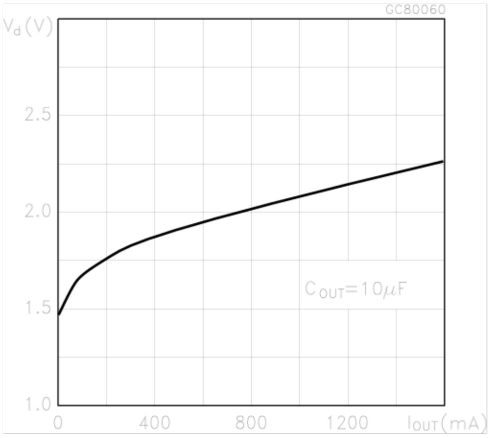


Figure 11. Short circuit current vs. dropout voltage

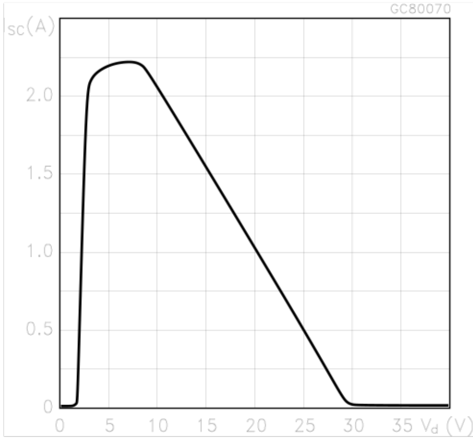


Figure 12. Short circuit current vs. temperature

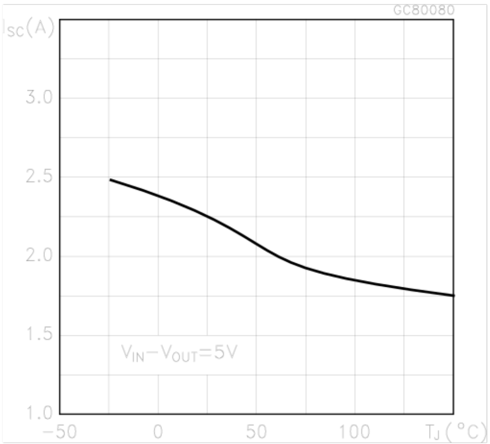


Figure 13. Reverse leakage current vs. temperature

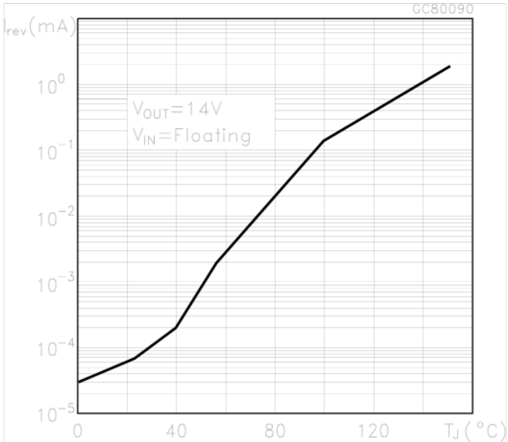


Figure 14. Quiescent current vs. temperature

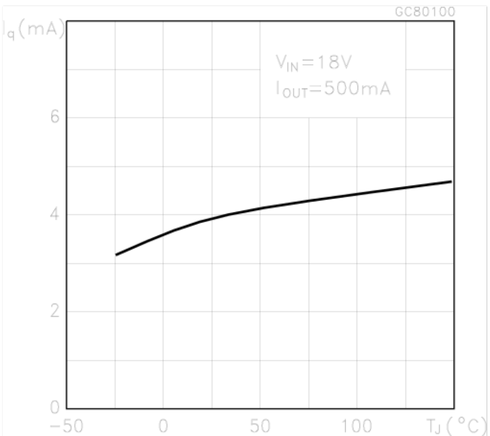


Figure 15. Quiescent current vs. output current

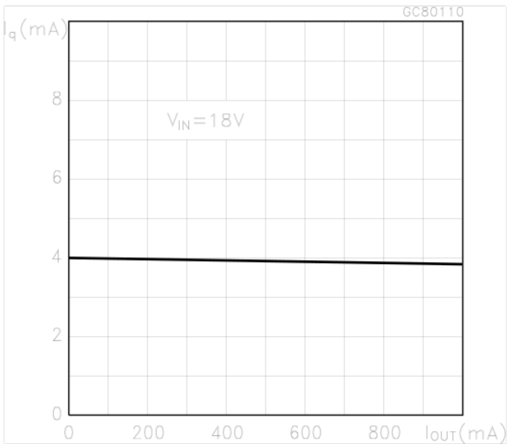


Figure 16. Quiescent current vs. input voltage

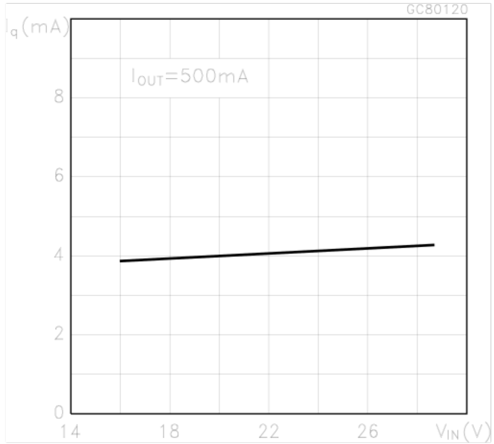


Figure 17. Thermal protection

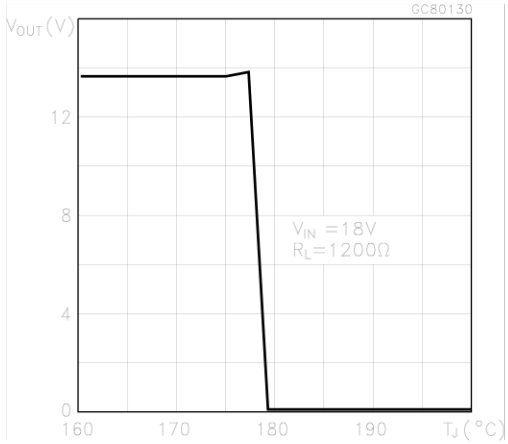


Figure 18. Supply voltage rejection vs. output current

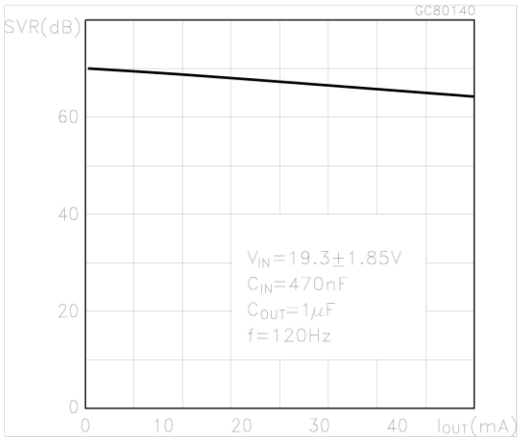


Figure 19. Supply voltage rejection vs. temperature

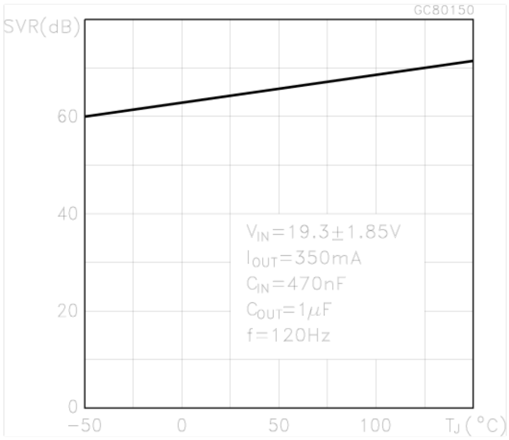
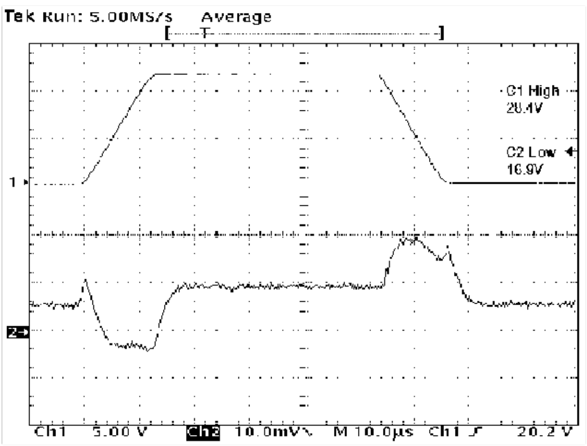
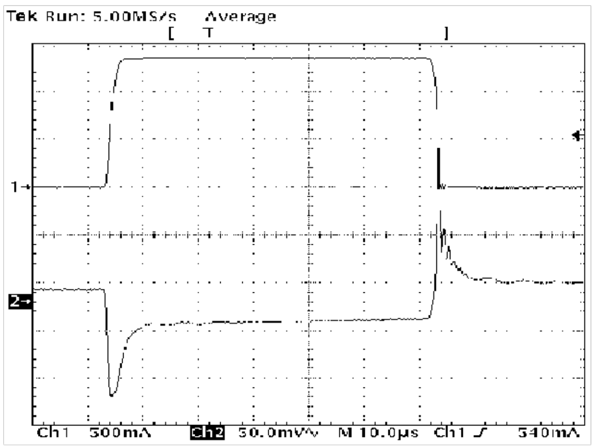


Figure 20. Line transient response



V_I = 17 to 28.4 V, I_O = 0.5 A, C_O = 10 µF

Figure 21. Load transient response



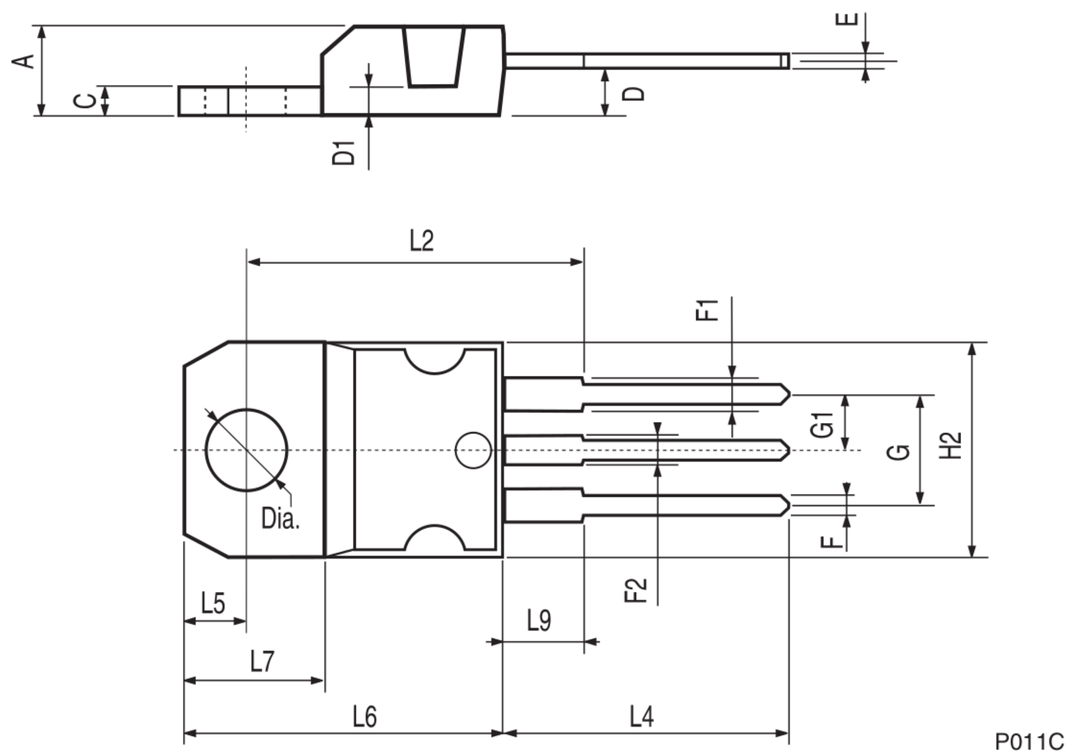
V_I = 18 V, I_O = 5 to 1.5 A, C_I = 1 µF, C_O = 10 µF

7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

TO-220 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



8 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Jun-2004	4	
18-Nov-2010	5	Modified: R_{thJC} value for TO-220 *Table 3 on page 6*.