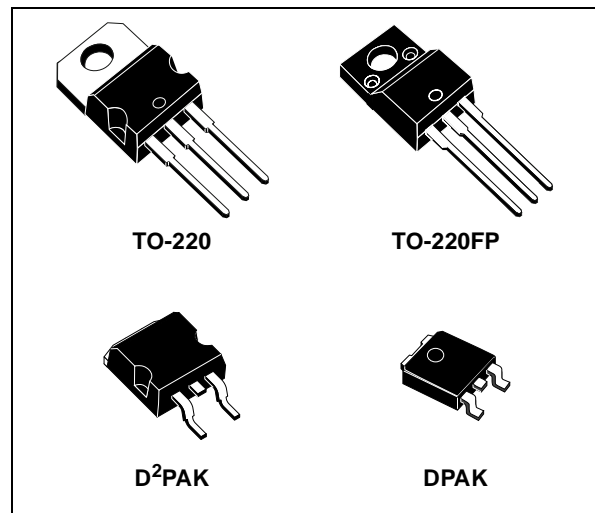


## VERY LOW DROP 1A REGULATOR

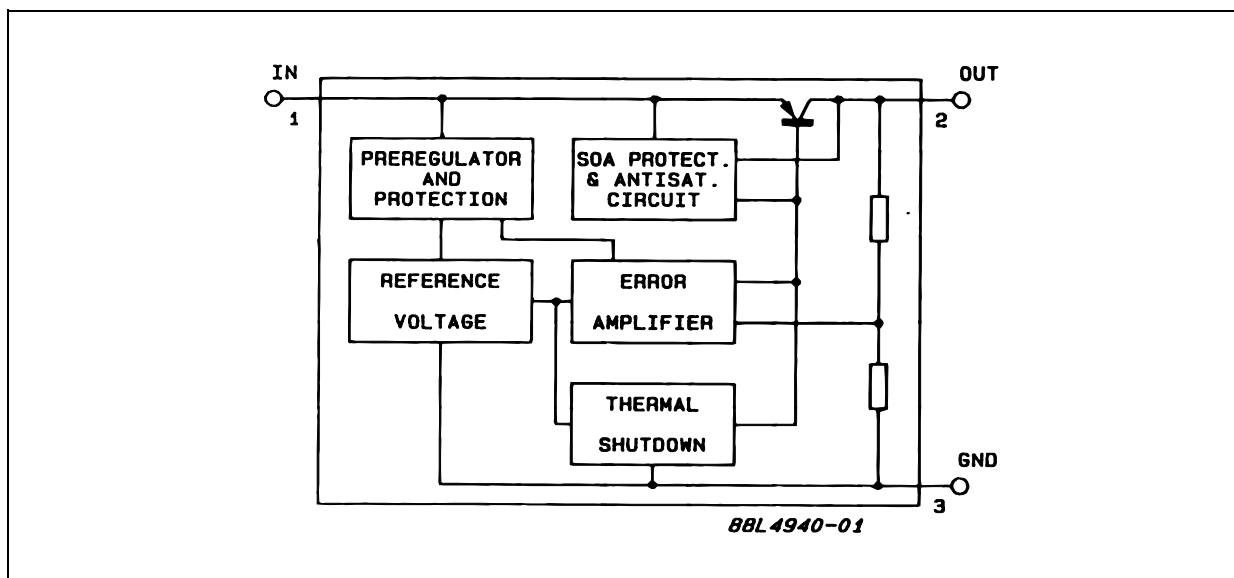
- LOW DROPOUT VOLTAGE (450mV Typ. at 1A)
- VERY LOW QUIESCENT CURRENT
- THERMAL SHUTDOWN
- SHORT CIRCUIT PROTECTION
- REVERSE POLARITY PROTECTION

### DESCRIPTION

The L4941 is a three terminal 5V positive regulators available in TO-220, TO-220FP and D<sup>2</sup>PAK packages, making it useful in a wide range of industrial and consumer applications. Thanks to its very low input/output voltage drop, these devices are particularly suitable for battery powered equipments, reducing consumption and prolonging battery life. It employs internal current limiting, antisaturation circuit, thermal shut-down and safe area protection.



### BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

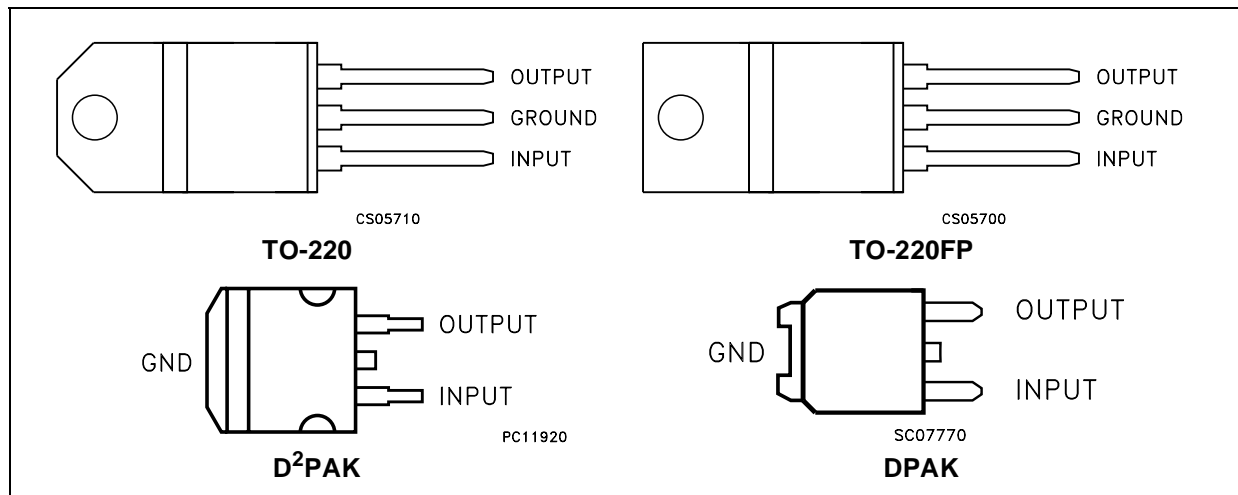
Symbol	Parameter	Value	Unit
$V_I$	Forward Input Voltage	30	V
$V_{IR}$	Reverse Input Voltage ( $R_O=100\Omega$ )	-15	V
$I_O$	Output Current	Internally Limited	mA
$P_D$	Power Dissipation	Internally Limited	mW
$T_{stg}$	Storage Temperature Range	-40 to +150	°C
$T_{op}$	Operating Junction Temperature Range	-40 to +150	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

**THERMAL DATA**

Symbol	Parameter	TO-220	TO-220FP	D <sup>2</sup> PAK	DPAK	Unit
$R_{thj-case}$	Thermal Resistance Junction-case	3	5	3	8	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	50	60	62.5	100	°C/W

**CONNECTION DIAGRAM (top view)**



**ORDERING CODES**

ORDERING CODE	PACKAGE
L4941BV	TO-220
L4941BP	TO-220FP
L4941BD2T	D <sup>2</sup> PAK
L4941BDT (*)	DPAK

(\*) Available in Tape & Reel with the suffix "-TR".

## TEST CIRCUITS

Figure 1 : DC Parameter

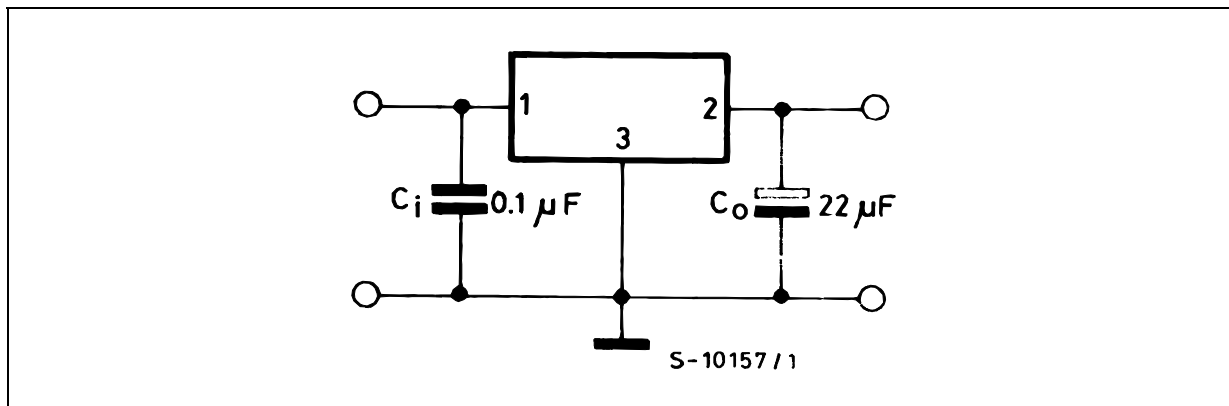


Figure 2 : Load Rejection

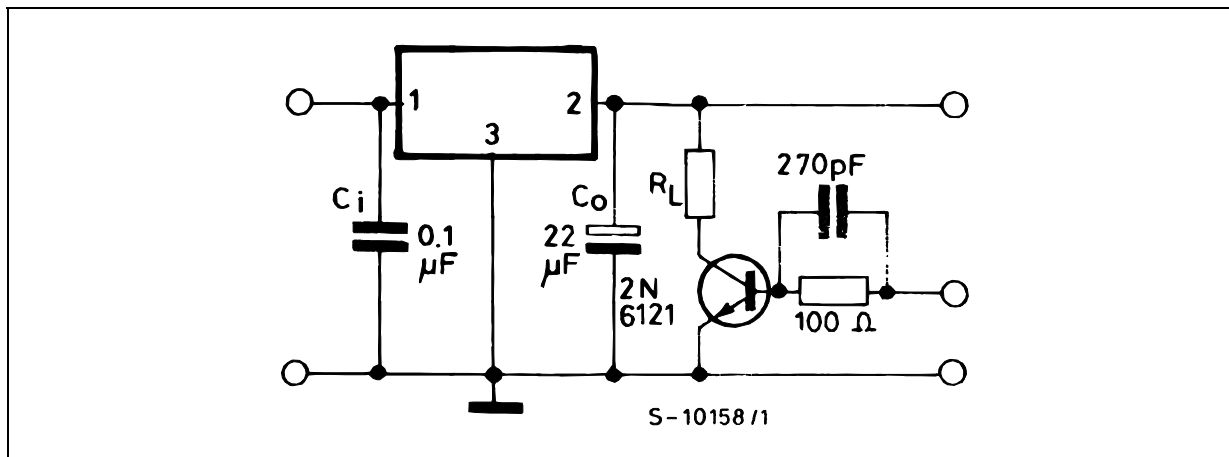
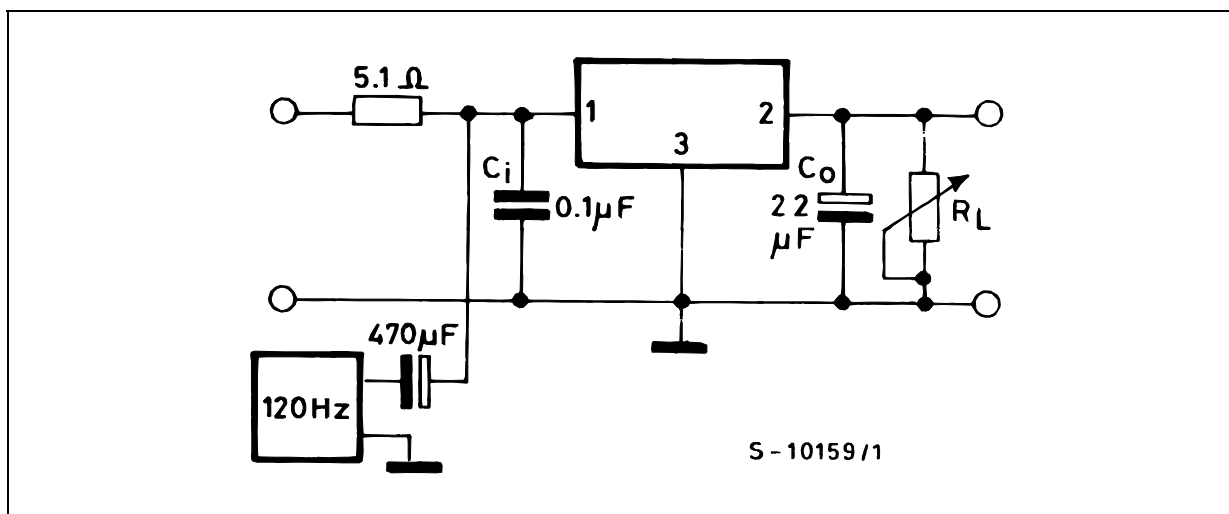


Figure 3 : Ripple Rejection



**ELECTRICAL CHARACTERISTICS** (Refer to test circuit,  $V_I=7V$ ,  $C_I = 0.1\mu F$ ,  $C_O = 22\mu F$ ,  $T_J = 25^\circ C$ , unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_O$	Output Voltage	$I_O = 5mA$ to 1A $V_I = 6$ to 14V	4.8	5	5.2	V
$V_I$	Input Voltage	$I_O = 5$ mA			16	V
$\Delta V_O$	Line Regulation	$V_I = 6$ to 16V $I_O = 5$ mA		5	20	mV
$\Delta V_O$	Load Regulation	$I_O = 5mA$ to 1A		8	20	mV
		$I_O = 0.5A$ to 1A		5	15	mV
$I_q$	Quiescent Current	$I_O = 5$ mA $V_I = 6V$		4	8	mA
		$I_O = 1A$ $V_I = 6V$		20	40	mA
$\Delta I_q$	Quiescent Current Change	$I_O = 5$ mA $V_I = 6$ to 14V			3	mA
		$I_O = 1A$ $V_I = 6$ to 14V			-10	mA
$V_d$	Dropout Voltage	$I_O = 0.5A$		250	450	mV
		$I_O = 1A$		450	700	mV
$\Delta V_O/\Delta T$	Output Voltage Drift			0.6		mv/°C
SVR	Supply Voltage Rejection	$f = 120Hz$ $I_O = 1A$	58	68		dB
$I_{sc}$	Short Circuit Current	$V_I = 14V$		1.6	2.0	A
		$V_I = 6V$		1.8	2.2	A
$Z_O$	Output Impedance	$f = 1KHz$ $I_O = 0.5A$		30		mΩ
$e_N$	Output Noise Voltage	$B = 100Hz$ to 100KHz		30		$\mu V/V_O$

**TYPICAL CHARACTERISTICS**

**Figure 4 :** Dropout Voltage vs Output Current

**Figure 5 :** Dropout Voltage vs Temperature

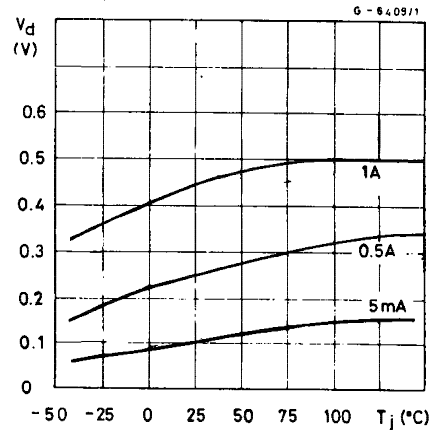
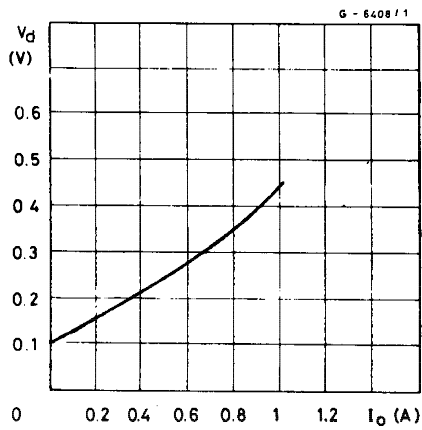


Figure 6 : Output Voltage vs Temperature

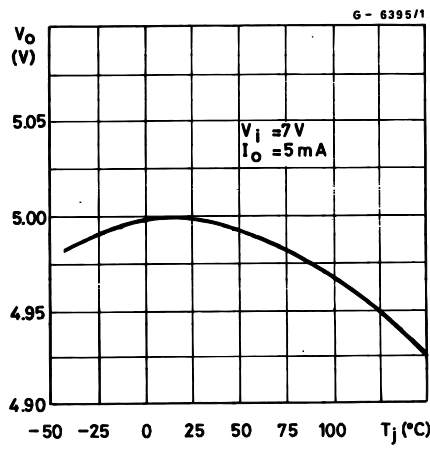


Figure 9 : Quiescent Current vs Output Current

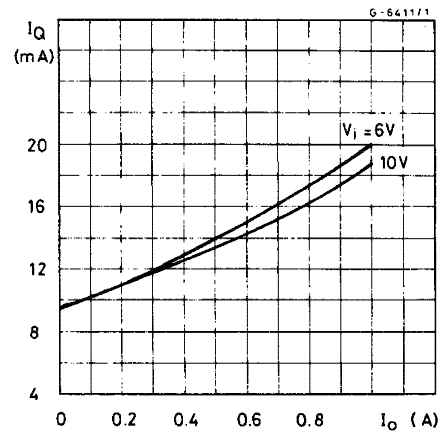


Figure 7 : Quiescent Current vs Temperature

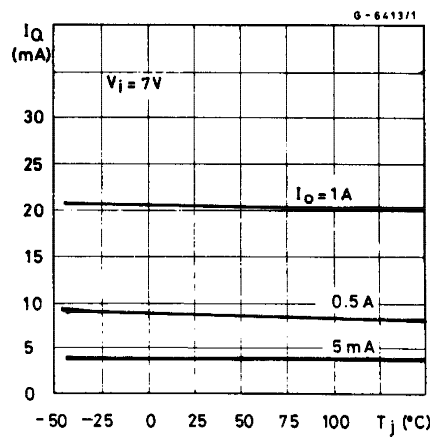


Figure 10 : Short Circuit Current vs Temperature

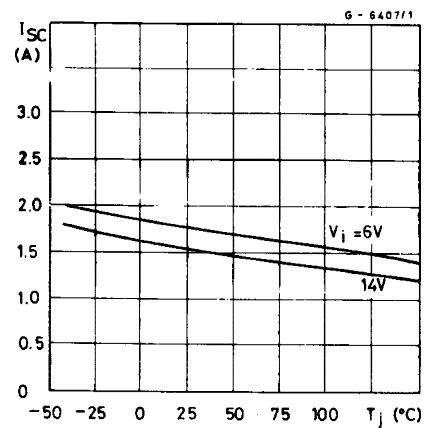


Figure 8 : Quiescent Current vs Input Voltage

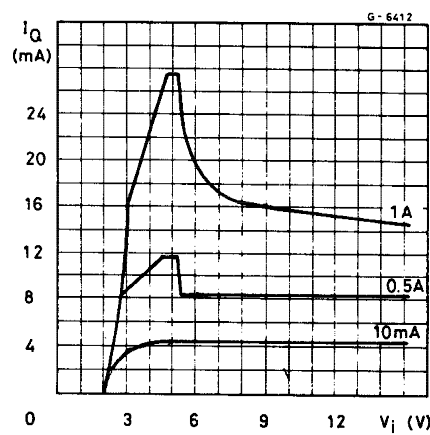


Figure 11 : Peak Output Current vs Input/Output Differential Voltage

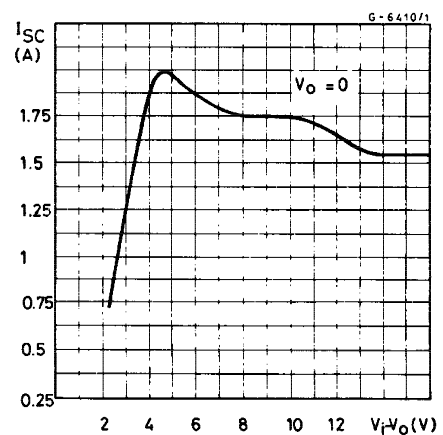


Figure 12 : Low Voltage Behavior

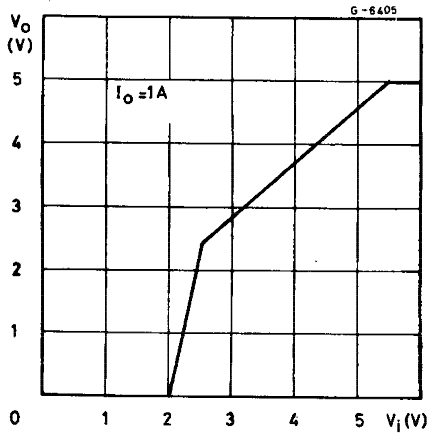


Figure 15 : Load Dump Characteristics

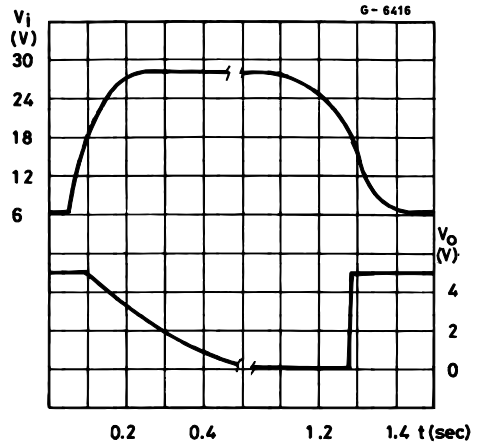


Figure 13 : Supply Voltage Rejection vs Frequency

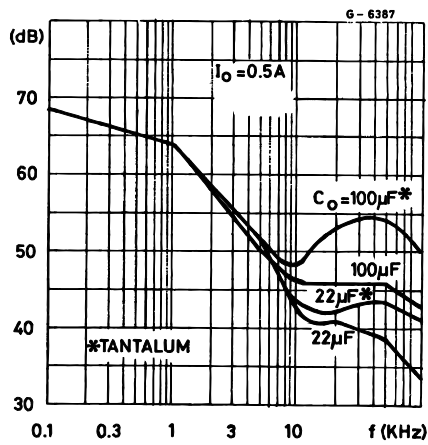


Figure 16 : Line Transient Response

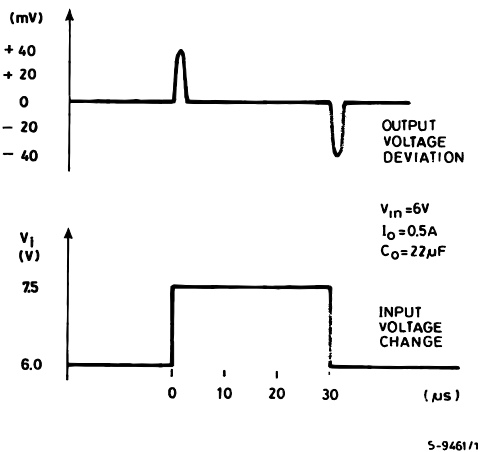


Figure 14 : Supply Voltage Rejection vs Output Current

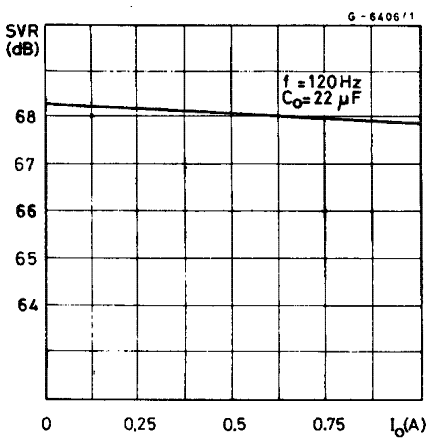


Figure 17 : Total Power Dissipation

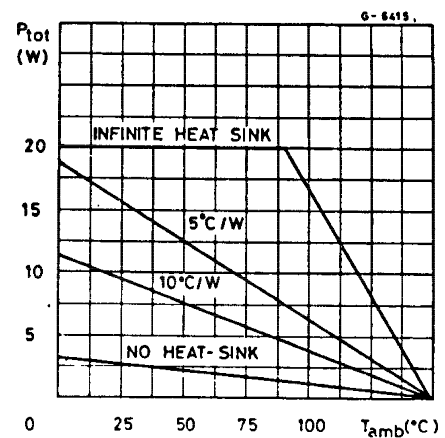


Figure 18 : Load transient Response

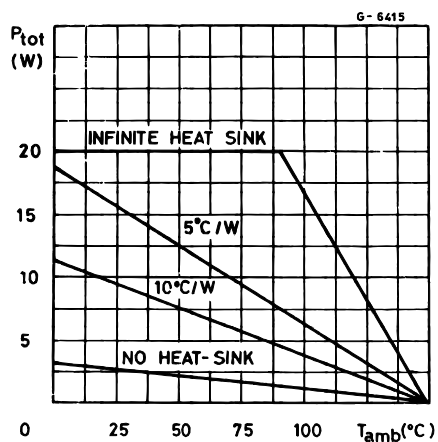


Figure 19 : Distributed Supply with On-card L4940 and L4941 low drop regulator

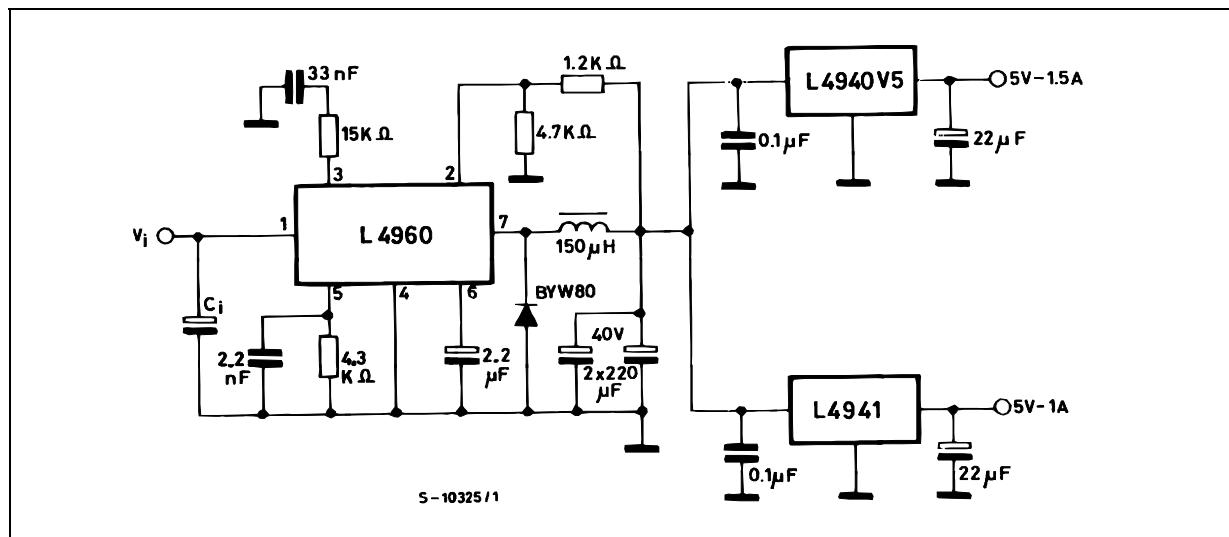
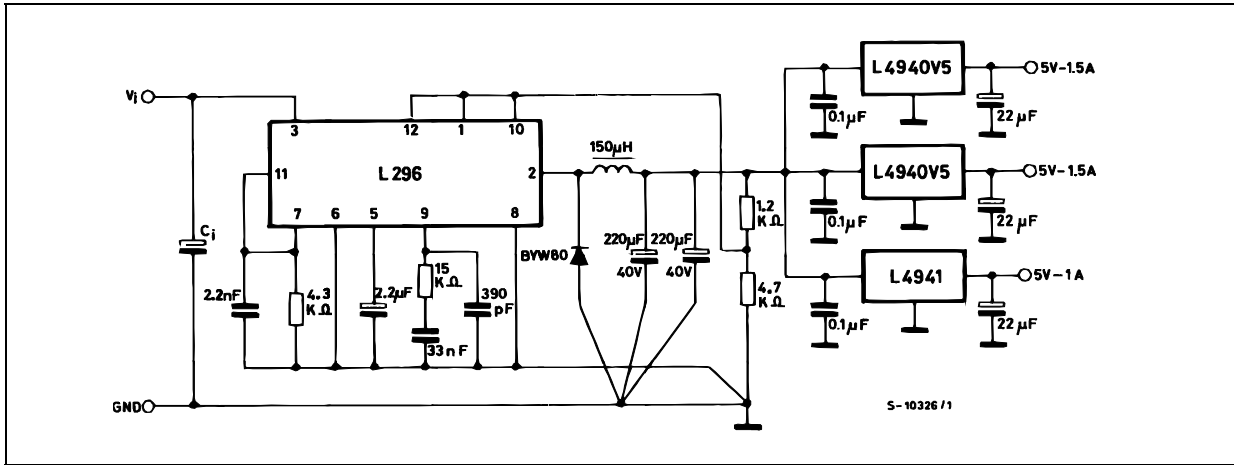


Figure 20 : Distributed Supply with On-card L4940 and L4941 low drop regulator



ADVANTAGES OF THESE APPLICATION ARE:

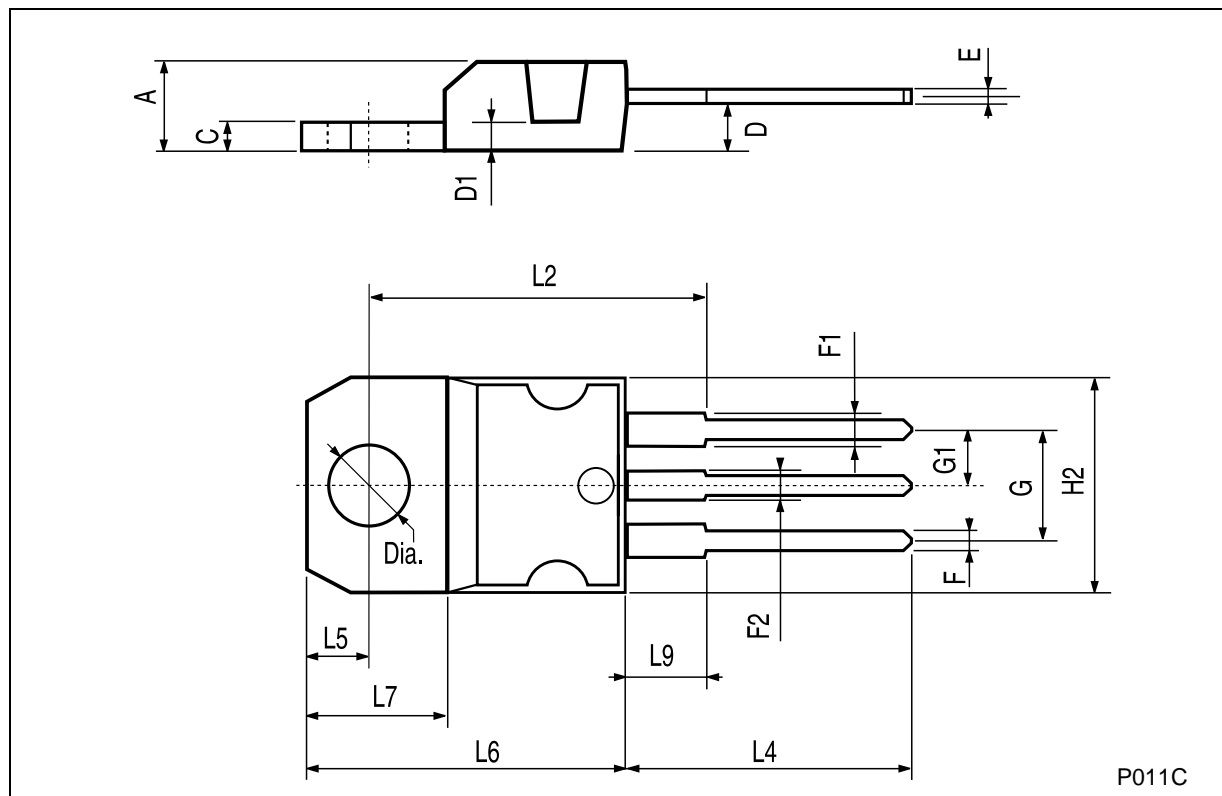
On card regulation with short-circuit and thermal protection on each output.

Very high total system efficiency due to the switching preregulation and very low-drop postregulation



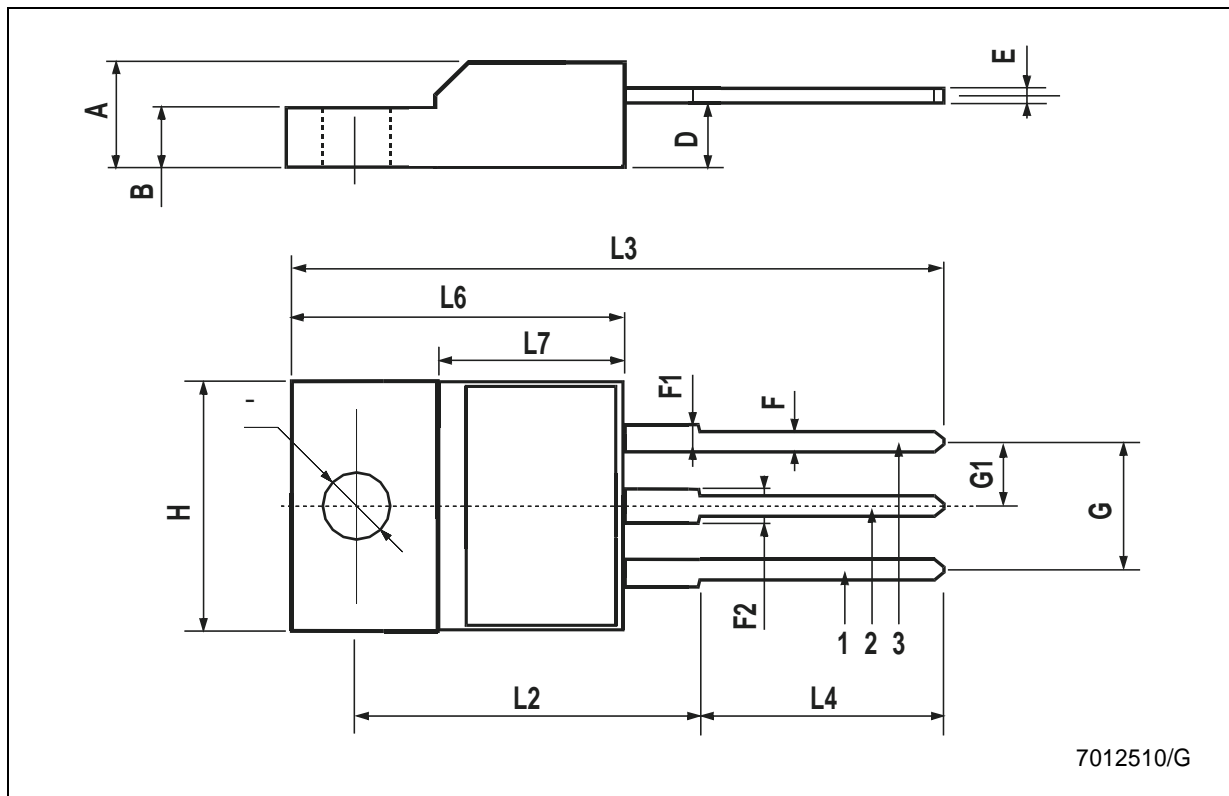
## TO-220 MECHANICAL DATA

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



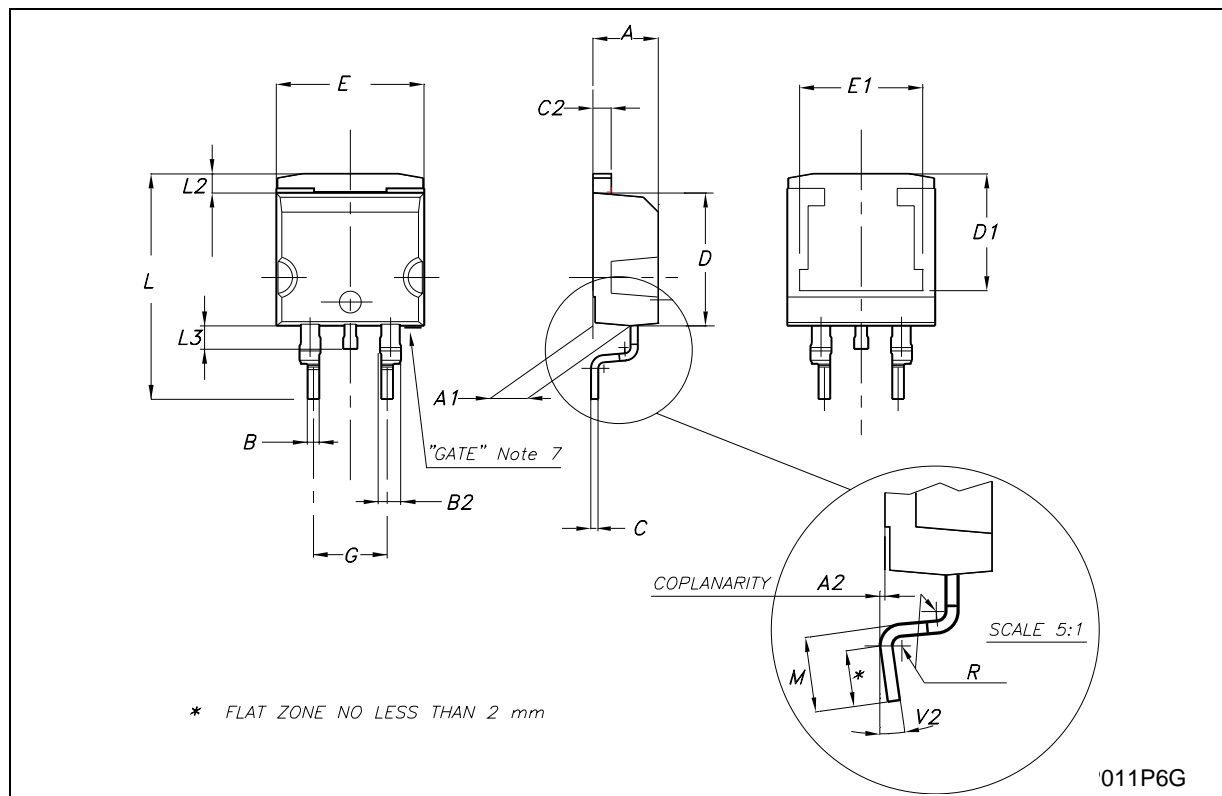
**TO-220FP MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.70	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.50	0.045		0.059
F2	1.15		1.50	0.045		0.059
G	4.95		5.2	0.194		0.204
G1	2.4		2.7	0.094		0.106
H	10.0		10.40	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
DIA.	3		3.2	0.118		0.126



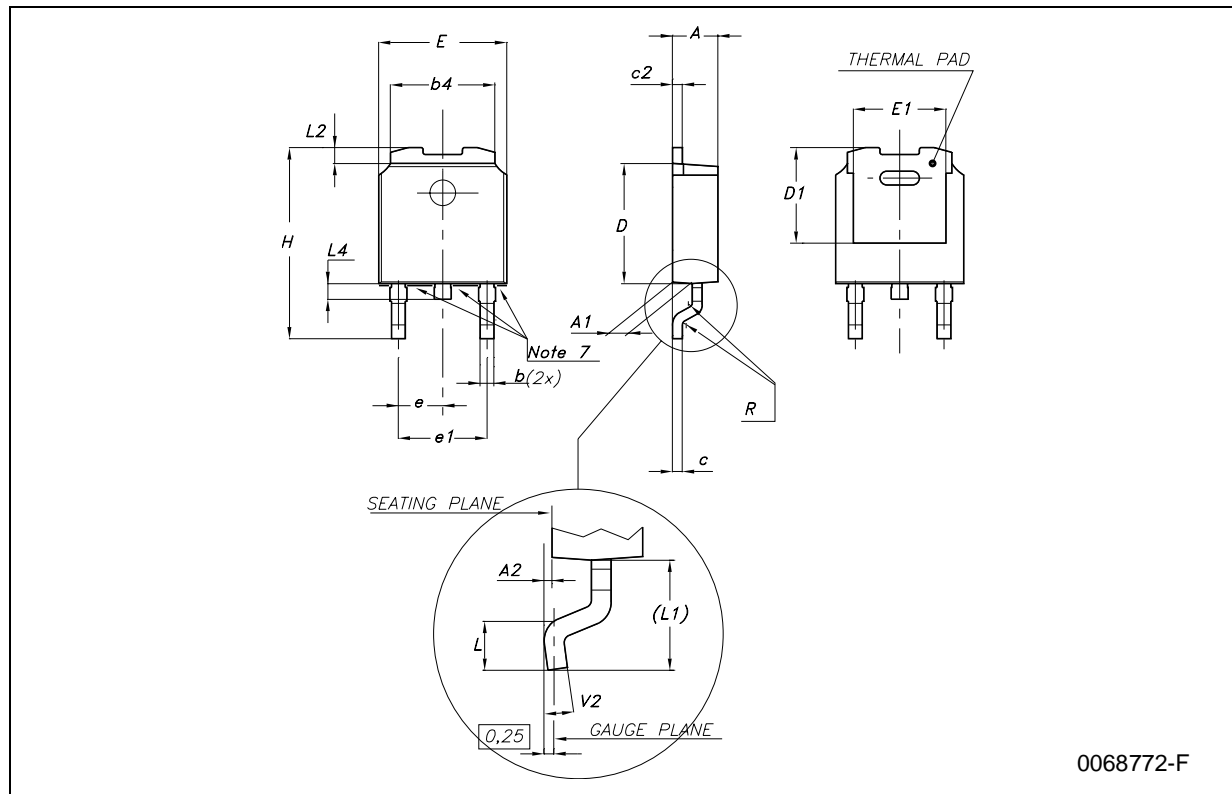
D<sup>2</sup>PAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		0.409
E1		8.5			0.335	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°



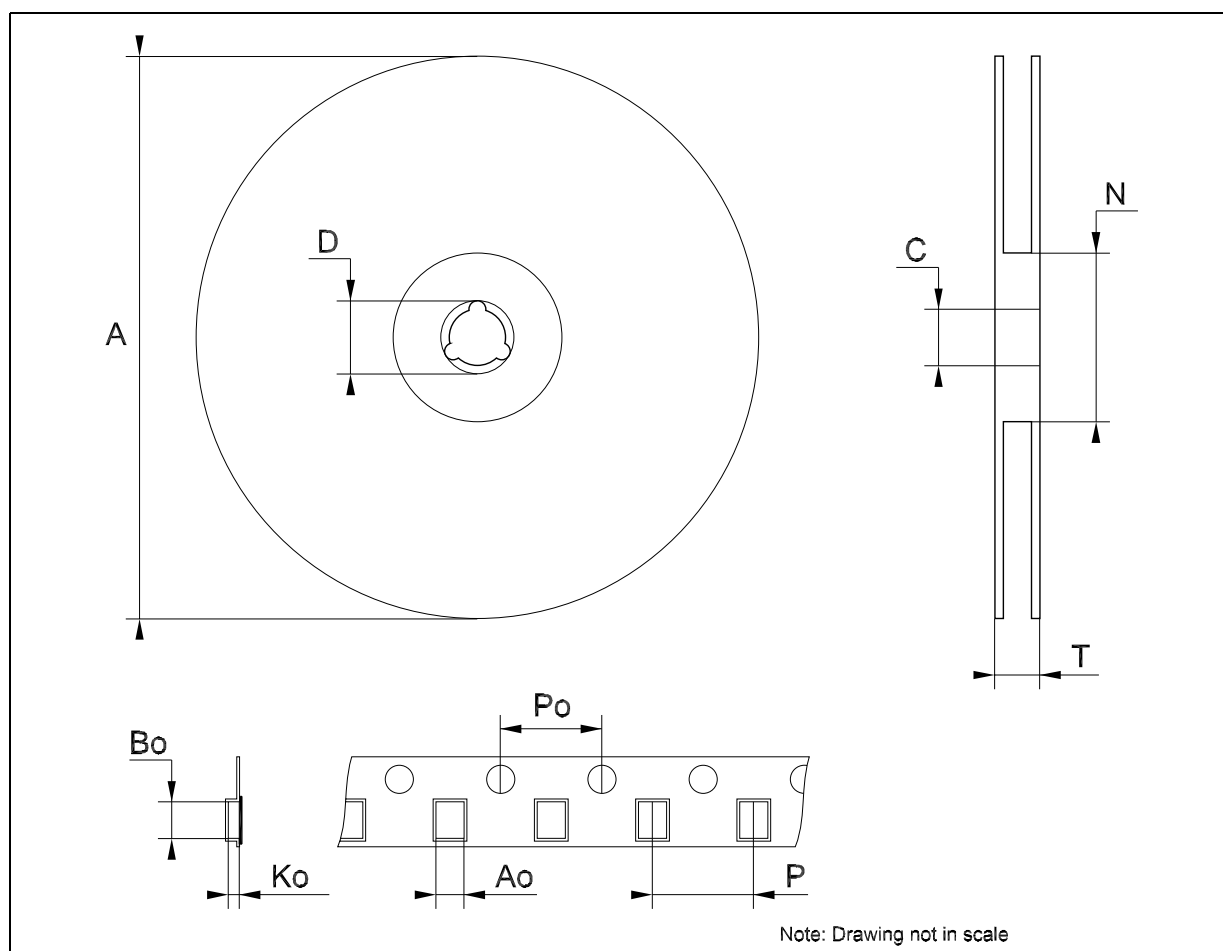
## DPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L		1			0.039	
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



### Tape & Reel DPAK-PPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.80	6.90	7.00	0.268	0.272	0.276
Bo	10.40	10.50	10.60	0.409	0.413	0.417
Ko	2.55	2.65	2.75	0.100	0.104	0.105
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	7.9	8.0	8.1	0.311	0.315	0.319



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics  
All other names are the property of their respective owners

© 2004 STMicroelectronics - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -  
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>