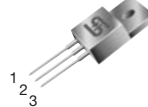
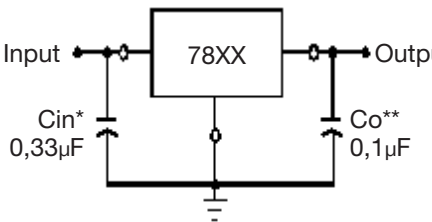


TSC		TS7800 3-Terminal Fixed Positive Voltage Regulators									
TO-220 ITO-220  Pin: 1. Input 2. Ground 3. Output (Heatsink surface connected to Pin 2.)		Voltage Range 5 to 24 Volts Current 1 Ampere									
Features ✧ Output Current up to 1 Ampere ✧ No External Components Required ✧ Internal Thermal Overload Protection ✧ Internal Short-Circuit Current Limiting ✧ Output Transistor Safe-Area Compensation ✧ Output Voltage Offered in 4% Tolerance		Ordering Informations <table><tr><td>Device</td><td>Operating Temperature (Ambient)</td><td>Package</td></tr><tr><td>TS78xxCZ</td><td rowspan="2">-20°C to +85°C</td><td>TO-220</td></tr><tr><td>TS78xxCI</td><td>TO-220F</td></tr></table>		Device	Operating Temperature (Ambient)	Package	TS78xxCZ	-20°C to +85°C	TO-220	TS78xxCI	TO-220F
Device	Operating Temperature (Ambient)	Package									
TS78xxCZ	-20°C to +85°C	TO-220									
TS78xxCI		TO-220F									
Absolute Maximum Ratings (Ta=25°C)											
Ratings	Symbol	TS7800 Series	Unit								
Input Voltage	Vin *	35	V								
Input Voltage	Vin **	40	V								
Power Dissipation	TO-220 Without heatsink	2	°C/W								
	TO-220 Pt ***	15									
	TO-220F With heatsink	10									
Operating Ambient Temperature	Topr	-20 to +85	°C								
Operating Junction Temperature	Tj	0 to +125	°C								
Storage Temperature	Tstg	-25 to +150	°C								
Note: * TS7805 to TS7818 ** TS7824 *** Follow the derating curve											
Standard Application A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the Input ripple voltage.		 XX = these two digits of the type number indicate voltage. * = Cin is required if regulator is located an appreciable distance from power supply filter. ** = Co is not needed for stability; however, it does improve transient response.									

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TS7805 Electrical Characteristics

($V_{in}=10V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	$T_j=25^{\circ}C$	4.80	5	5.20	V
		$7V \leq V_{in} \leq 20V$, $5mA \leq I_{out} \leq 1.5A$, PDA15W	4.75	5	5.25	V
Line Regulation	REGline	$T_j=25^{\circ}C$ $7.5V \leq V_{in} \leq 25V$	--	3	100	mV
		$8V \leq V_{in} \leq 12V$	--	1	50	mV
Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$	--	15	100	mV
		$250mA \leq I_{out} \leq 750mA$	--	5	50	mV
Quiescent Current	Iq	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.2	8	mA
Quiescent Current Change	ΔIq	$7V \leq V_{in} \leq 25V$	--	--	1.3	mA
		$5mA \leq I_{out} \leq 1.5A$	--	--	0.5	mA
Output Noise Voltage	Vn	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	40	--	μV
Ripple Rejection Ratio	RR	$f=120Hz$, $8V \leq V_{in} \leq 18V$	62	78	--	dB
Voltage Drop	Vdrop	$I_{out}=1.0A$, $T_j=25^{\circ}C$	--	2	--	V
Output Resistance	Rout	$f=1KHz$	--	17	--	mK
Output Short Circuit Current	Ios	$T_j=25^{\circ}C$	--	750	--	mA
Peak Output Current	I _{o peak}	$T_j=25^{\circ}C$	--	2.2	--	A
Temperature Coefficient Output Voltage	OV_{out}/OT_j	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.6	--	mV/ $^{\circ}C$

TS7806 Electrical Characteristics

($V_{in}=11V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	$T_j=25^{\circ}C$	5.75	6	6.25	V
		$8V \leq V_{in} \leq 21V$, $5mA \leq I_{out} \leq 1.5A$, PDA15W	6.3	6	6.3	V
Line Regulation	REGline	$T_j=25^{\circ}C$ $8V \leq V_{in} \leq 25V$	--	5	120	mV
		$9V \leq V_{in} \leq 13V$	--	1.5	60	mV
Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$	--	14	120	mV
		$250mA \leq I_{out} \leq 750mA$	--	4	60	mV
Quiescent Current	Iq	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.3	8	mA
Quiescent Current Change	ΔIq	$8V \leq V_{in} \leq 25V$	--	--	1.3	mA
		$5mA \leq I_{out} \leq 1.5A$	--	--	0.5	mA
Output Noise Voltage	Vn	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	45	--	μV
Ripple Rejection Ratio	RR	$f=120Hz$, $9V \leq V_{in} \leq 19V$	59	75	--	dB
Voltage Drop	Vdrop	$I_{out}=1.0A$, $T_j=25^{\circ}C$	--	2	--	V
Output Resistance	Rout	$f=1KHz$	--	19	--	mK
Output Short Circuit Current	Ios	$T_j=25^{\circ}C$	--	550	--	mA
Peak Output Current	I _{o peak}	$T_j=25^{\circ}C$	--	2.2	--	A
Temperature Coefficient of Output Voltage	OV_{out}/OT_j	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.7	--	mV/ $^{\circ}C$

Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

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TS7808 Electrical Characteristics

(Vin=14V, Iout=500mA, 0°CATjA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	7.69	8	8.32	V
		10.5VAVinA23V, 5mAAloutA1.5A, PD A15W	7.61	8	8.40	V
Line Regulation	REGline	Tj=25°C				
		10.5VAVinA25V	--	6	160	mV
		11VAVinA17V	--	2	80	mV
Load Regulation	REGload	Tj=25°C				
		10mAAloutA1.5A	--	12	160	mV
		250mAAloutA750mA	--	4	80	mV
Quiescent Current	Iq	Iout=0, Tj=25°C	--	4.3	8	mA
Quiescent Current Change	ΔIq	10.5VAVinA25V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	52	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 11VAVinA21V	56	72	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	2	--	V
Output Resistance	Rout	f=1KHz	--	16	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	450	--	mA
Peak Output Current	Io peak	Tj=25°C	--	2.2	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATjA125°C	--	-0.8	--	mV/°C

TS7809 Electrical Characteristics

(Vin=15V, Iout=500mA, 0°CATjA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	8.65	9	9.36	V
		11.5VAVinA24V, 5mAAloutA1.5A, PD A15W	8.57	9	9.45	V
Line Regulation	REGline	Tj=25°C				
		11.5VAVinA26V	--	6	180	mV
		11.5VAVinA17V	--	2	90	mV
Load Regulation	REGload	Tj=25°C				
		5mAAloutA1.5A	--	12	180	mV
		250mAAloutA750mA	--	4	90	mV
Quiescent Current	Iq	Iout=0, Tj=25°C	--	4.3	8	mA
Quiescent Current Change	ΔIq	11.5VAVinA26V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	52	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 11.5VAVinA21.5V	55	72	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	2	--	V
Output Resistance	Rout	f=1KHz	--	16	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	450	--	mA
Peak Output Current	Io peak	Tj=25°C	--	2.2	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATjA125°C	--	-1	--	mV/°C

Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

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TS7810 Electrical Characteristics

(Vin=16V, Iout=500mA, 0°CATjA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	9.6	10	10.4	V
		12.5VAVinA25V, 5mAAloutA1.5A, PD A15W	9.5	10	10.5	V
Line Regulation	REGline	12.5VAVinA28V	--	7	200	mV
		Tj=25°C 13VAVinA17V	--	2	100	mV
Load Regulation	REGload	10mAAloutA1.5A	--	12	200	mV
		Tj=25°C 250mAAloutA750mA	--	4	100	mV
Quiescent Current	Iq	Iout=0, Tj=25°C	--	4.3	8	mA
Quiescent Current Change	ΔIq	12.5VAVinA28V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	70	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 13VAVinA23V	55	71	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	2	--	V
Output Resistance	Rout	f=1KHz	--	18	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	400	--	mA
Peak Output Current	Io peak	Tj=25°C	--	2.2	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATjA125°C	--	-1	--	mV/°C

TS7812 Electrical Characteristics

(Vin=19V, Iout=500mA, 0°CATjA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	11.53	12	12.48	V
		14.5VAVinA27V, 5mAAloutA1.5A, PD A15W	11.42	12	12.60	V
Line Regulation	REGline	14VAVinA30V	--	10	240	mV
		Tj=25°C 15VAVinA19V	--	3	120	mV
Load Regulation	REGload	10mAAloutA1.5A	--	12	240	mV
		Tj=25°C 250mAAloutA750mA	--	4	120	mV
Quiescent Current	Iq	Tj=25°C, Iout=0	--	4.3	8	mA
Quiescent Current Change	ΔIq	14.5VAVinA30V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	75	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 15VAVinA25V	55	71	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	20	--	V
Output Resistance	Rout	f=1KHz	--	18	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	350	--	mA
Peak Output Current	Io peak	Tj=25°C	--	2.2	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATjA125°C	--	-1	--	mV/°C

Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

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TS7815 Electrical Characteristics

(Vin=23V, Iout=500mA, 0°CATJA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	14.42	15	15.60	V
		17.5VAVinA30V, 5mAAloutA1.5A, PD A15W	14.28	15	15.75	V
Line Regulation	REGline	17.5VAVinA30V	--	12	300	mV
		Tj=25°C 18VAVinA22V	--	3	150	mV
Load Regulation	REGload	10mAAloutA1.5A	--	12	300	mV
		Tj=25°C 250mAAloutA750mA	--	4	150	mV
Quiescent Current	Iq	Tj=25°C, Iout=0	--	4.3	8	mA
Quiescent Current Change	ΔIq	17.5VAVinA30V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	90	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 18VAVinA28V	54	70	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	2	--	V
Output Resistance	Rout	f=1KHz	--	19	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	230	--	mA
Peak Output Current	I _{o peak}	Tj=25°C	--	2.1	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATJA125°C	--	-1	--	mV/°C

TS7818 Electrical Characteristics

(Vin=27V, Iout=500mA, 0°CATJA125°C, Cin=0.33μF, Cout=0.1μF; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Vout	Tj=25°C	17.30	18	18.72	V
		21VAVinA33V, 5mAAloutA1.5A, PD A15W	17.14	18	18.90	V
Line Regulation	REGline	21VAVinA33V	--	15	360	mV
		Tj=25°C 22VAVinA26V	--	5	180	mV
Load Regulation	REGload	10mAAloutA1.5A	--	12	360	mV
		Tj=25°C 250mAAloutA750mA	--	4	180	mV
Quiescent Current	Iq	Tj=25°C, Iout=0	--	4.5	8	mA
Quiescent Current Change	ΔIq	21VAVinA33V	--	--	1	mA
		5mAAloutA1.5A	--	--	0.5	mA
Output Noise Voltage	Vn	10HzAfA100KHz, Tj=25°C	--	110	--	μV
Ripple Rejection Ratio	RR	f=120Hz, 21VAVinA31V	54	70	--	dB
Voltage Drop	Vdrop	Iout=1.0A, Tj=25°C	--	2	--	V
Output Resistance	Rout	f=1KHz	--	22	--	mK
Output Short Circuit Current	Ios	Tj=25°C	--	200	--	mA
Peak Output Current	I _{o peak}	Tj=25°C	--	2.1	--	A
Temperature Coefficient of Output Voltage	OVout/OTj	Iout=5mA, 0°CATJA125°C	--	-1	--	mV/°C

Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

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TS7824 Electrical Characteristics

($V_{in}=33V$, $I_{out}=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_{out}	$T_J=25^{\circ}C$	23.07	24	24.96	V
		26V V_{in} A38V, 5mA I_{out} A1.5A, PD A15W	22.85	24	25.20	V
Line Regulation	REGline	26V V_{in} A38V	--	18	480	mV
		$T_J=25^{\circ}C$ 27V V_{in} A32V	--	6	240	mV
Load Regulation	REGload	10mA I_{out} A1.5A	--	12	480	mV
		$T_J=25^{\circ}C$ 250mA I_{out} A750mA	--	4	240	mV
Quiescent Current	I_q	$I_{out}=0$, $T_J=25^{\circ}C$	--	4.6	8	mA
Quiescent Current Change	ΔI_q	26V V_{in} A38V	--	--	1	mA
		5mA I_{out} A1.5A	--	--	0.5	mA
Output Noise Voltage	V_n	10Hz Δf A100KHz, $T_J=25^{\circ}C$	--	170	--	μV
Ripple Rejection Ratio	RR	$f=120Hz$, 26V V_{in} A36V	54	70	--	dB
Voltage Drop	V_{drop}	$I_{out}=1.0A$, $T_J=25^{\circ}C$	--	2	--	V
Output Resistance	R_{out}	$f=1KHz$	--	28	--	mK
Output Short Circuit Current	I_{os}	$T_J=25^{\circ}C$	--	150	--	mA
Peak Output Current	$I_{o\ peak}$	$T_J=25^{\circ}C$	--	2.1	--	A
Temperature Coefficient of Output Voltage	$\Delta V_{out}/\Delta T_J$	$I_{out}=5mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$	--	-1.5	--	mV/ $^{\circ}C$

Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
This specification applies only for DC power dissipation permitted by absolute maximum ratings.

FIG. 1 - WORST CASE POWER DISSIPATION
versus AMBIENT TEMPERATURE

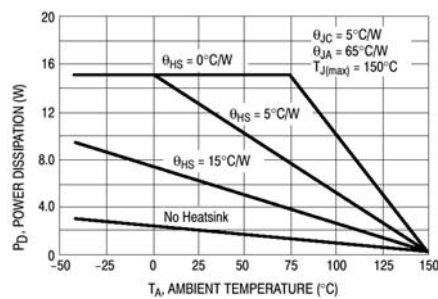
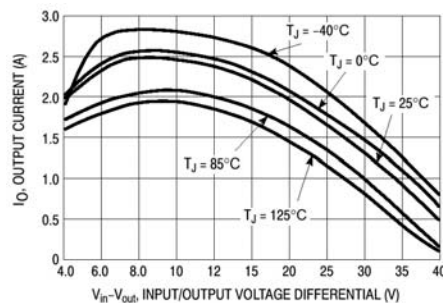


FIG. 2 - PEAK OUTPUT CURRENT AS A FUNCTION OF
INPUT-OUTPUT DIFFERENTIAL VOLTAGE



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FIG. 3 - QUIESCENT CURRENT AS A FUNCTION OF TEMPERATURE

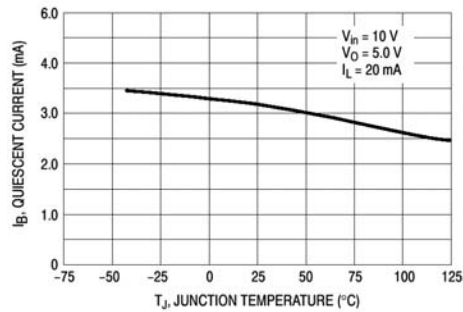


FIG. 4 - INPUT OUTPUT DIFFERENTIAL AS A FUNCTION OF JUNCTION TEMPERATURE

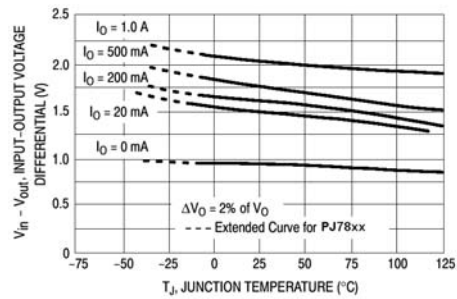


FIG. 5 - OUTPUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE

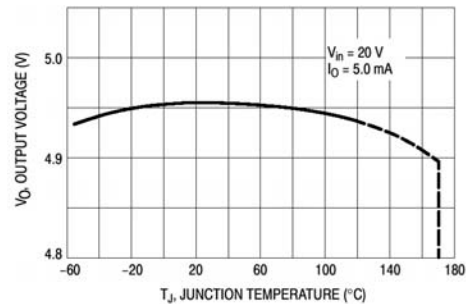


FIG. 6 - OUTPUT IMPEDANCE AS A FUNCTION OF OUTPUT VOLTAGE

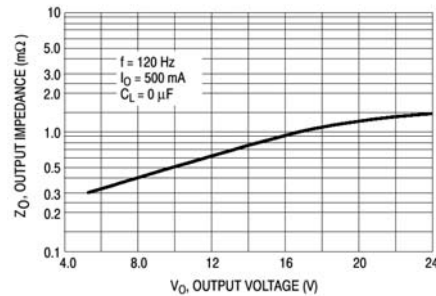


FIG. 7 - RIPPLE REJECTION AS A FUNCTION OF OUTPUT VOLTAGE

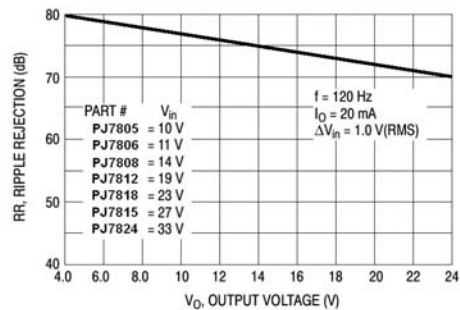
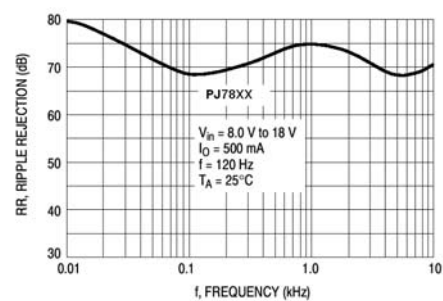


FIG. 8 - RIPPLE REJECTION AS A FUNCTION OF FREQUENCY





TO-220 Mechanical drawing		TO-220 DIMENSION			
DIM		MILLIMETERS		INCHES	
		MIN	MAX	MIN	MAX
A		10.00	10.50	0.394	0.413
B		3.24	4.44	0.128	0.175
C		2.44	2.94	0.096	0.116
D		3.565	4.315	0.140	0.170
E		0.68	0.92	0.027	0.036
F		1.115	1.485	0.044	0.058
G		2.345	2.715	0.092	0.107
H		13.49	14.31	0.531	0.563
I		4.475	5.225	0.176	0.206
J		1.15	1.39	0.045	0.055
K		27.78	29.62	1.094	1.166
L		2.175	2.925	0.086	0.115
M		0.297	0.477	0.012	0.019
N		8.28	8.80	0.326	0.346
O		14.29	15.31	0.563	0.603
P		6.01	6.51	0.237	0.256

TO-220F Mechanical drawing		TO-220F DIMENSION			
DIM		MILLIMETERS		INCHES	
		MIN	MAX	MIN	MAX
A		9.9	10.1	0.390	0.398
B		6.2	6.2	0.244	0.244
C		2.2	2.2	0.087	0.087
D		...1.4	...1.4	...0.055	...0.055
E		15.0	15.2	0.591	0.598
F		0.48	0.72	0.019	0.028
G		2.355	2.725	0.093	0.107
H		13.49	14.31	0.531	0.563
I		1.115	1.485	0.044	0.058
J		2.6	2.8	0.102	0.110
K		4.4	4.6	0.173	0.181
L		1.115	1.15	0.045	0.045
M		2.95	3.15	0.116	0.124
N		2.6	2.8	0.102	0.110
O		6.55	6.65	0.258	0.262

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