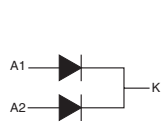
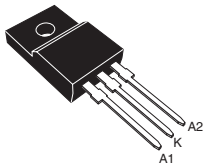
STPS10150C

High voltage power Schottky rectifier

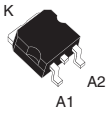
Main product characteristics

$I_{F(AV)}$	2 x 5 A
V_{RRM}	150 V
T_j	175° C
V_F(max)	0.75 V

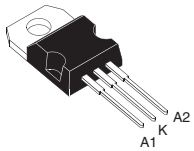




TO-220FPAB
STPS10150CFP



D²PAK
STPS10150CG



TO-220AB
STPS10150CT

Features and benefits

- HIgh junction temperature capability
- Good trade off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- Insulated package
  - TO-220FPAB
    Insulating voltage = 2000 V
    Typical package capacitance 12 pF

Description

Dual center tap schottky rectifier designed for high frequency Switched Mode Power Supplies.

Order Codes

Part Number	Marking
STPS10150CT	STPS10150CT
STPS10150CG	STPS10150CG
STPS10150CG-TR	STPS10150CG
STPS10150CFP	STPS10150CFP

Table 1. Absolute ratings (limiting values)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				150	V
$I_{F(RMS)}$	RMS forward voltage				10	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB D^2PAK	T_C = 155° C	Per diode	5	A
		TO-220FPAB	T_C = 145° C	Per device	10	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		120	A
P_{ARM}	Repetitive peak avalanche power		t_p = 1 µs T_j = 25° C		3100	W
T_{stg}	Storage temperature range				-65 to + 175	° C
T_j	Maximum operating junction temperature(1)				175	° C
dV/dt	Critical rate of rise of reverse voltage				10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, D^2PAK	Per diode	4	° C/W
		TO-220FPAB		7	
		TO-220AB, D^2PAK	Total	2.4	
		TO-220FPAB		5.3	
$R_{th(c)}$	Coupling	TO-220AB, D^2PAK		0.7	
		TO-220FPAB		3.7	

When the diodes 1 and 2 are used simultaneously:
ΔT_j(diode 1) = P(diode 1) x $R_{th(j-l)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			2.0	µA
		T_j = 125° C			0.40	2.0	mA
V_F (2)	Forward voltage drop	T_j = 25° C	I_F = 5 A			0.92	V
		T_j = 125° C			0.69	0.75	
		T_j = 25° C	I_F = 10 A			1	
		T_j = 125° C			0.79	0.85	

1. t_p = 5 ms, δ < 2%
2. t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.65 \times I_{F(AV)} + 0.02\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current (per diode)

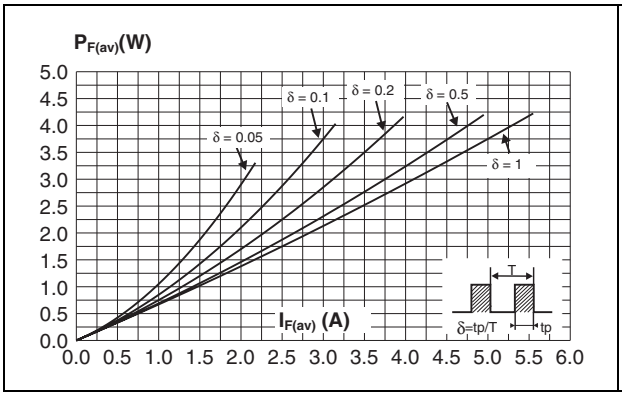


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

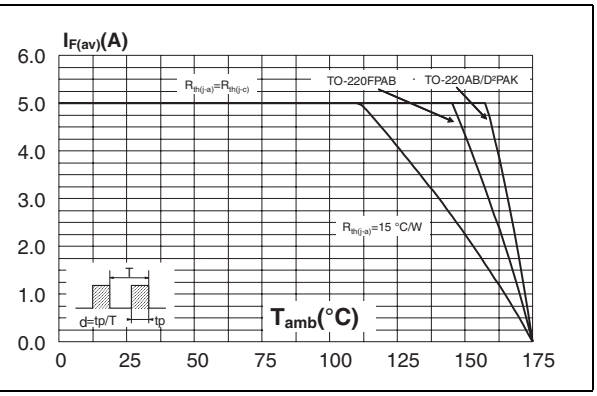


Figure 3. Normalized avalanche power derating versus pulse duration

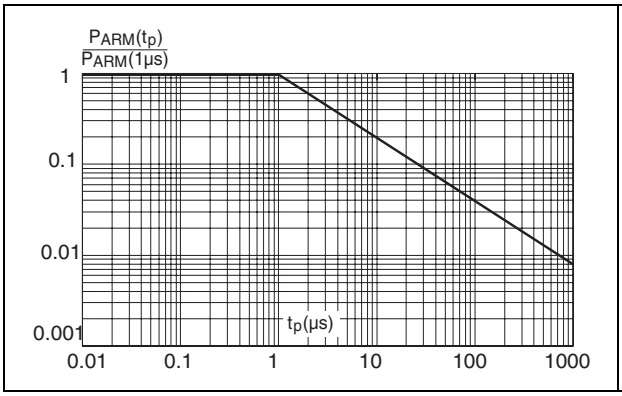


Figure 4. Normalized avalanche power derating versus junction temperature

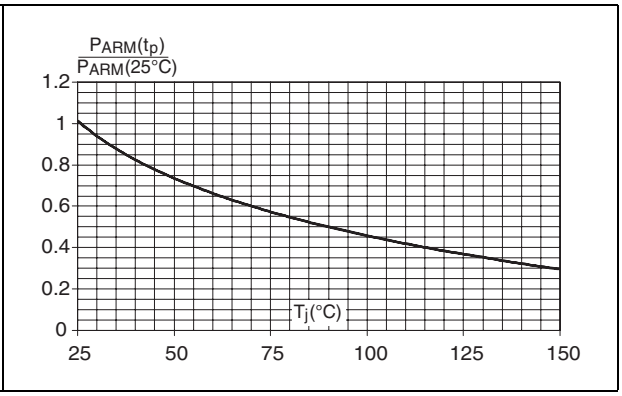


Figure 5. Non repetitive surge peak forward current versus overload duration - maximum values, per diode (TO-220AB, D²PAK)

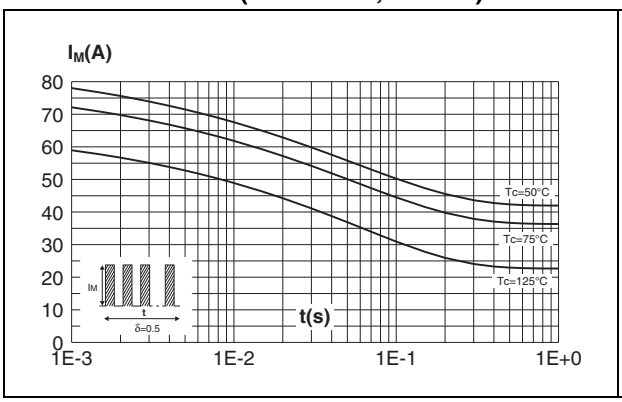


Figure 6. Non repetitive surge peak forward current versus overload duration - maximum values, per diode (TO-220FPAB)

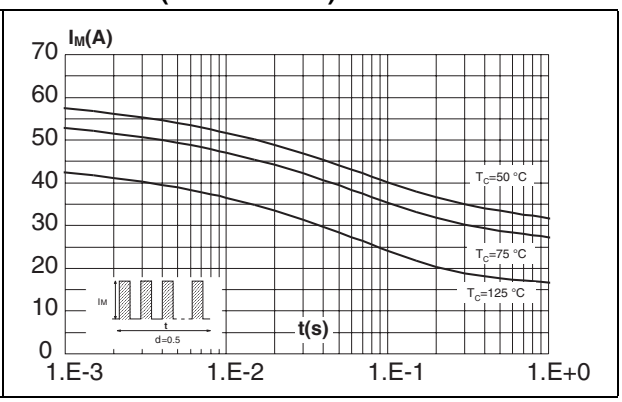


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

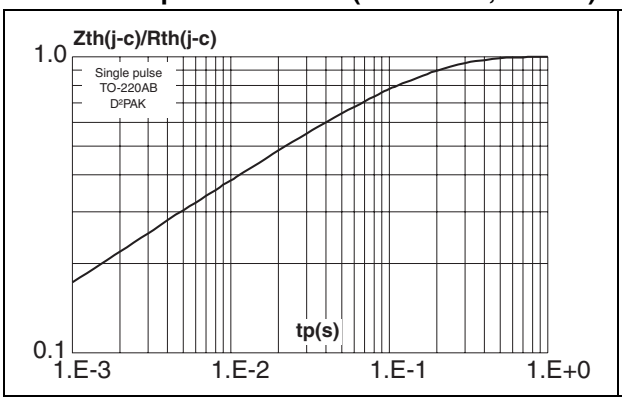


Figure 8. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

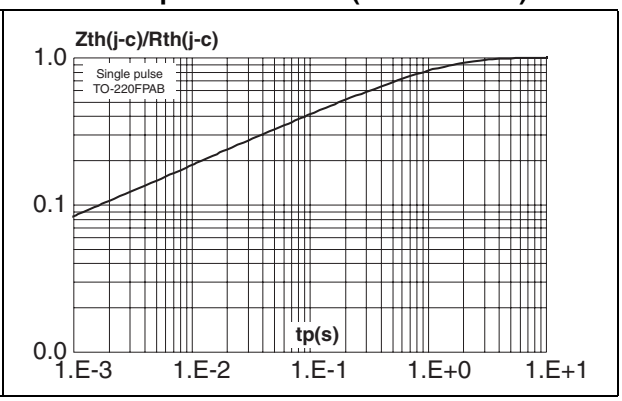


Figure 9. Reverse leakage current versus reverse voltage applied (typical values, per diode)

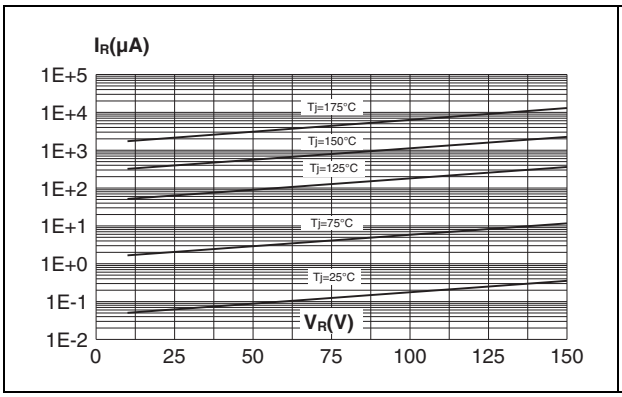


Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)

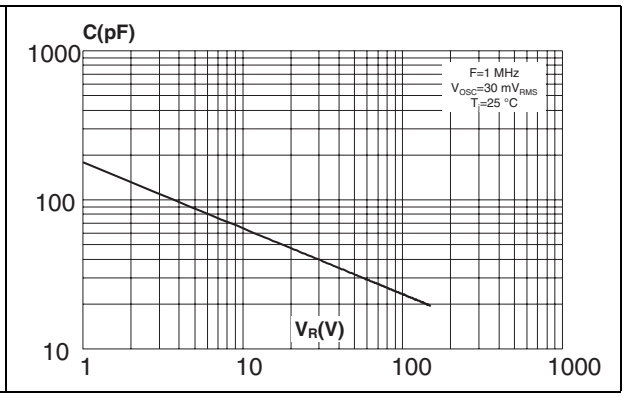


Figure 11. Forward voltage drop versus forward current (per diode)

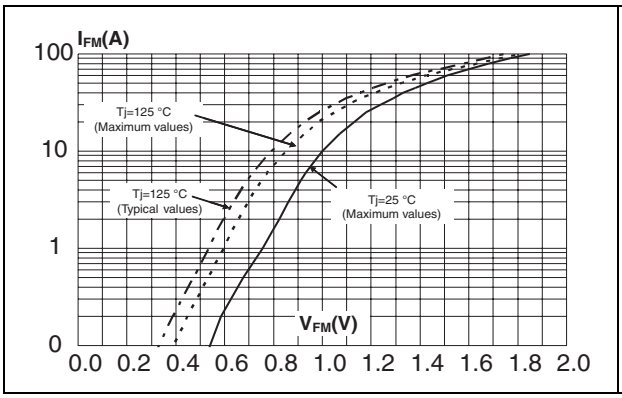


Figure 12. Thermal resistance, junction to ambient, versus copper surface under tab - Epoxy printed circuit board, e_{cu} 35 µm (D^2PAK only)

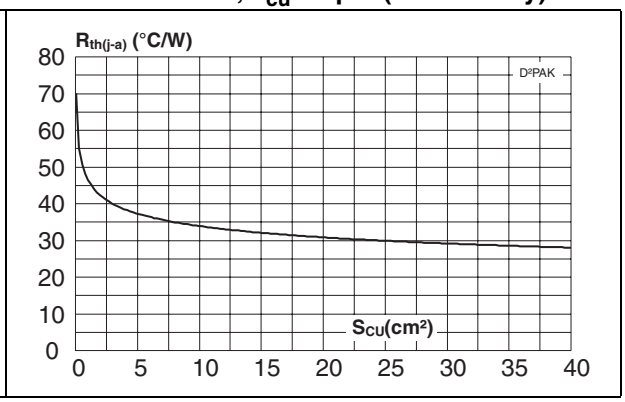
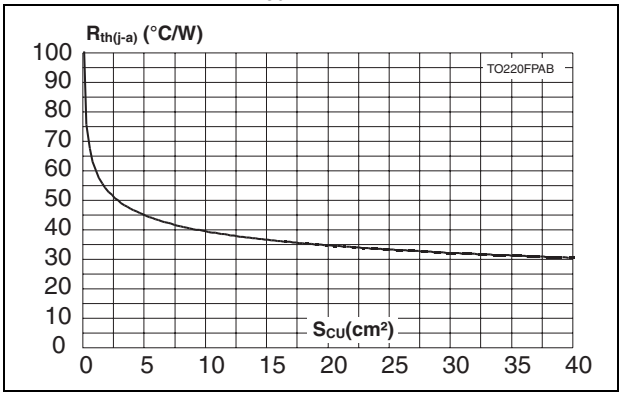


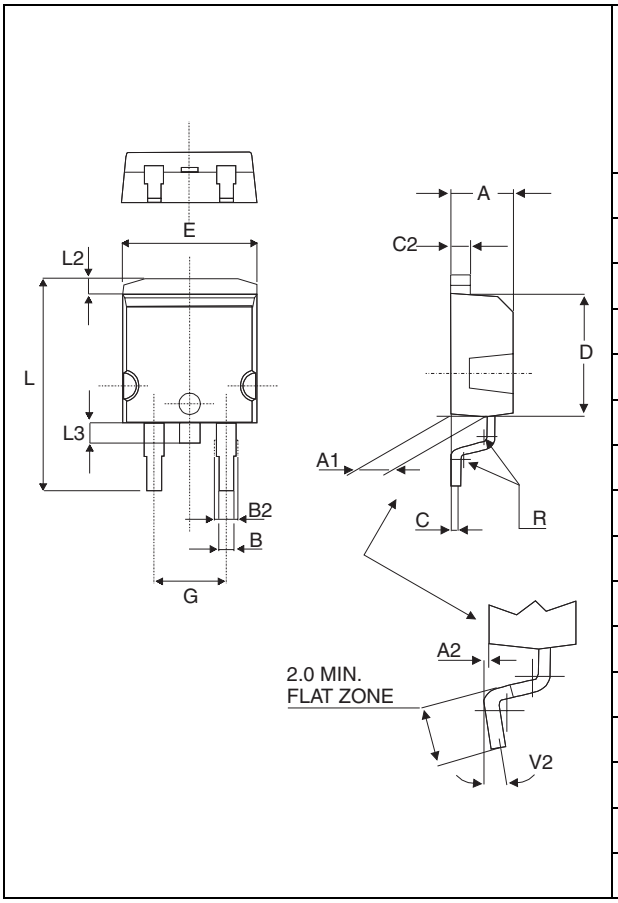
Figure 13. Thermal resistance, junction to ambient, versus copper surface under tab - Epoxy printed circuit board, e_{cu} 35 µm (TO220FPAB only)



2 Package information

Epoxy meets UL94, V0.

Table 4. D²PAK Dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 14. D²PAK footprint dimensions (in mm)

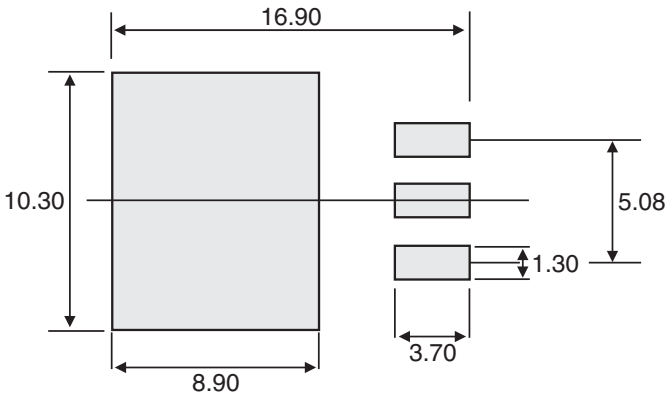
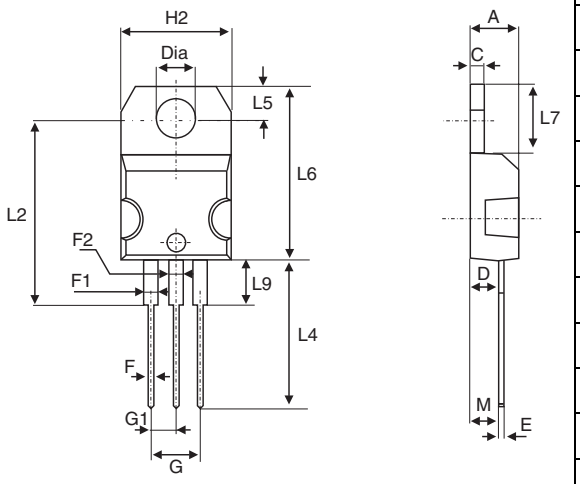
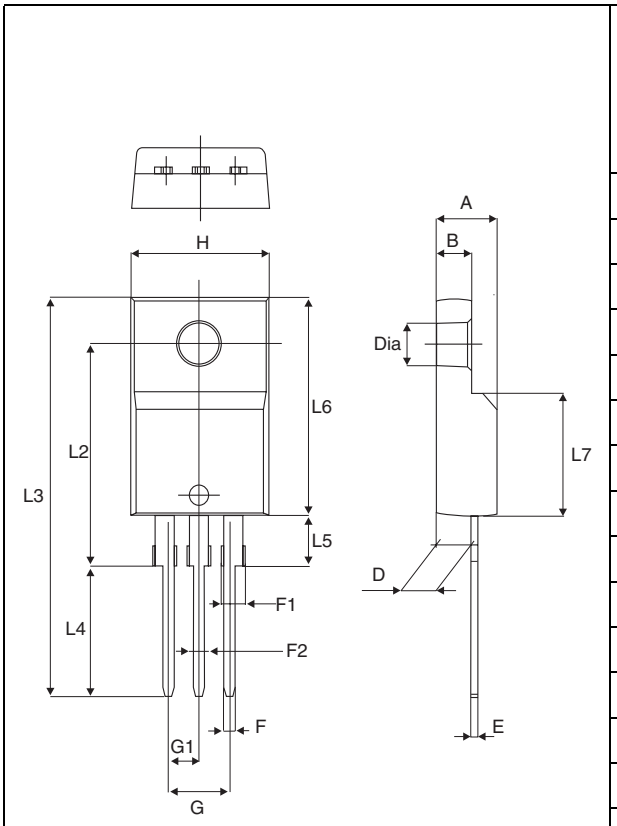


Table 5. TO-220AB Dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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
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	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

Table 6. TO-220FPAB Dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	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	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS10150CT	STPS10150CT	TO-220AB	2.20 g	50	Tube
STPS10150CG	STPS10150CG	D^2PAK	1.48 g	50	Tube
STPS10150CG-TR	STPS10150CG	D^2PAK	1.48 g	1000	Tape and reel
STPS10150CFP	STPS10150CFP	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
Jul-2003	5B	Last update.
19-Jun-2006	6	Reformatted to current standard. Added ECOPACK statement. Added TO220FPAB.

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