



STD83003

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

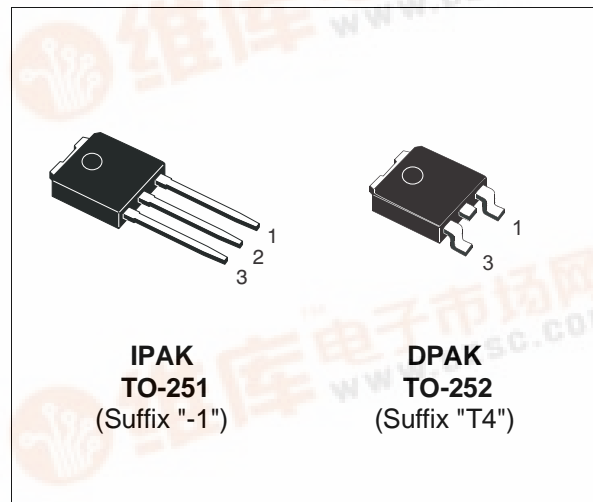
- REVERSE PINS OUT Vs STANDARD IPAK (TO-251) / DPAK (TO-252) PACKAGES
- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- SURFACE-MOUNTING DPAK (TO-252) POWER PACKAGE IN TAPE & REEL (Suffix "T4")
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (Suffix "-1")

APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

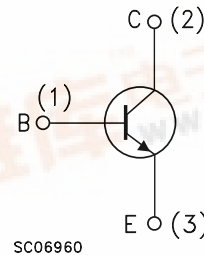
The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA. The STD83003 is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the STD93003, its complementary PNP transistor.



IPAK TO-251
(Suffix "-1")

DPAK TO-252
(Suffix "T4")

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	700	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	400	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0, I_B = 0.75 \text{ A}, t_p < 10 \mu\text{s}, T_j < 150^\circ\text{C}$)	$V_{(BR)EBO}$	V
I_C	Collector Current	1.5	A
I_{CM}	Collector Peak Current ($t_p < 5 \text{ ms}$)	3	A
I_B	Base Current	0.75	A
I_{BM}	Base Peak Current ($t_p < 5 \text{ ms}$)	1.5	A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	20	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

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THERMAL DATA

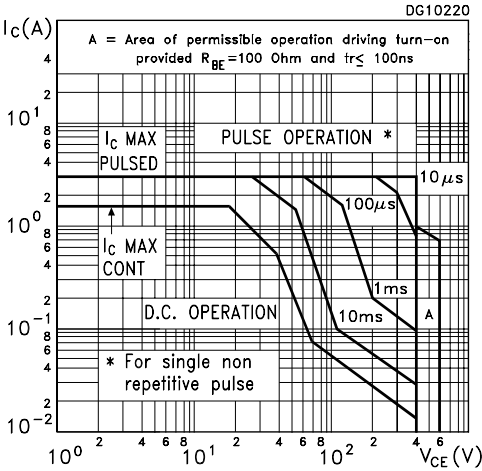
R _{thj-case}	Thermal Resistance Junction-case	Max	6.25	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	100	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

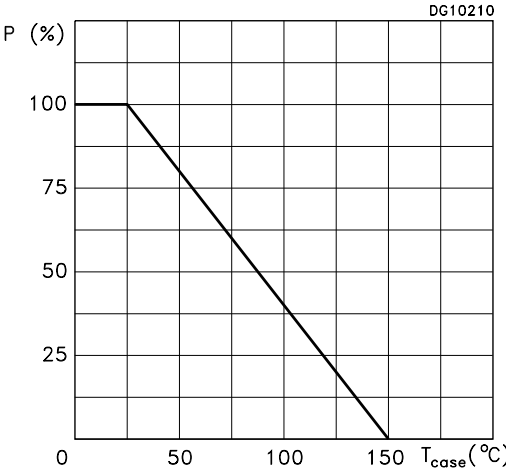
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I _{CEV}	Collector Cut-off Current (V _{BE} = -1.5V)	V _{CE} = 700V V _{CE} = 700V	T _j = 125°C			1 5	mA mA
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA		12		18	V
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 10 mA L = 25 mH		400			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 0.5 A I _C = 0.35 A	I _B = 0.1 A I _B = 50 mA			0.5 1	V V
V _{BE(sat)*}	Base-Emitter Saturation Voltage	I _C = 0.5 A	I _B = 0.1 A			1	V
h _{FE*}	DC Current Gain	I _C = 10 mA I _C = 0.35 A I _C = 1 A	V _{CE} = 5 V V _{CE} = 5 V V _{CE} = 5 V	10 16 4	25	32	
t _r t _s t _f	RESISTIVE LOAD Rise Time Storage Time Fall Time	I _C = 0.35 A I _{B1} = 70 mA T _p ≥ 25 μs	V _{CC} = 125 V I _{B2} = -70 mA (see figure 2)	1.5	100 2.2 0.2	2.9	ns μs μs
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 0.5 A V _{BE(off)} = -5 V V _{clamp} = 300 V	I _{B1} = 0.1 A L = 10 mH (see figure 1)		450 90		ns ns

* Pulsed: Pulse duration = 300μs, duty cycle = 1.5 %

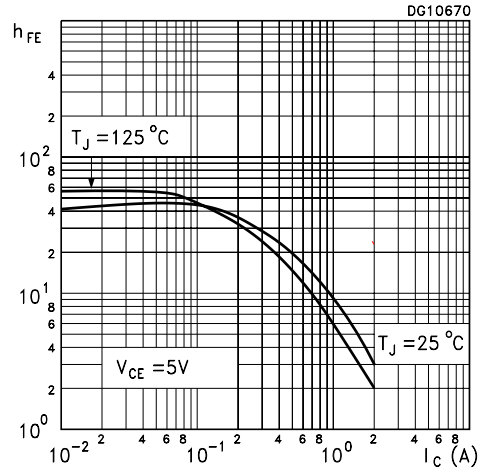
Safe Operating Areas



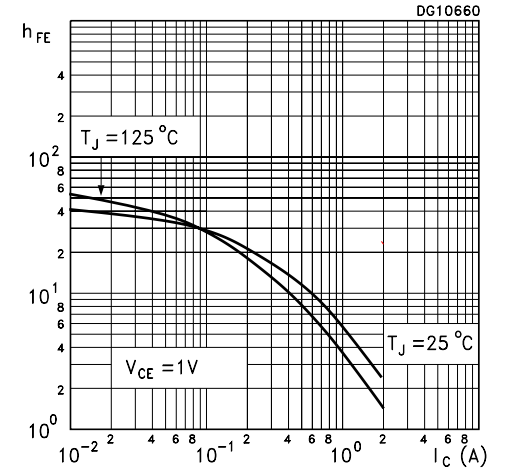
Derating Curve



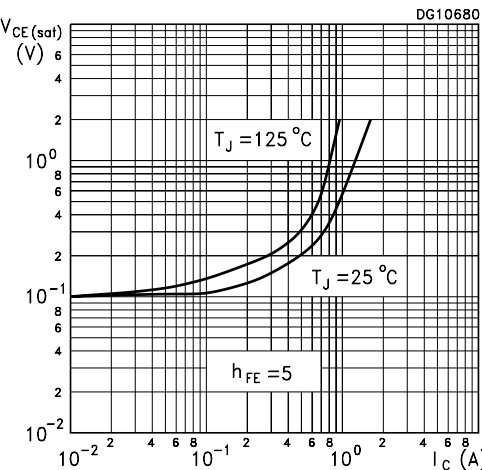
DC Current Gain



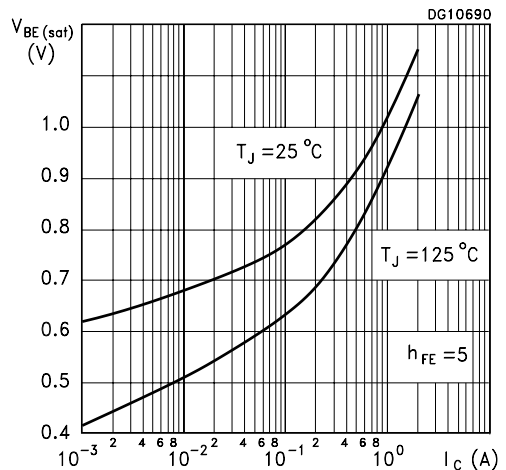
DC Current Gain



Collector Emitter Saturation Voltage

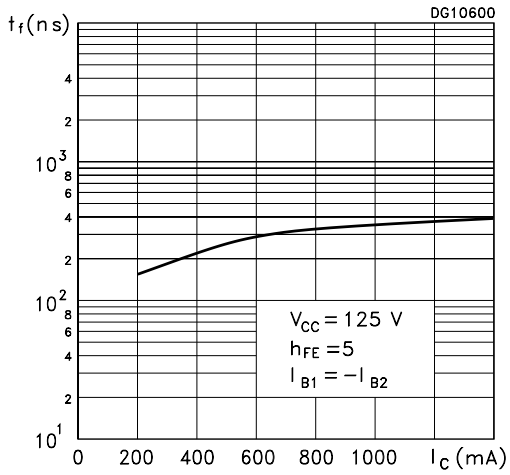


Base Emitter Saturation Voltage

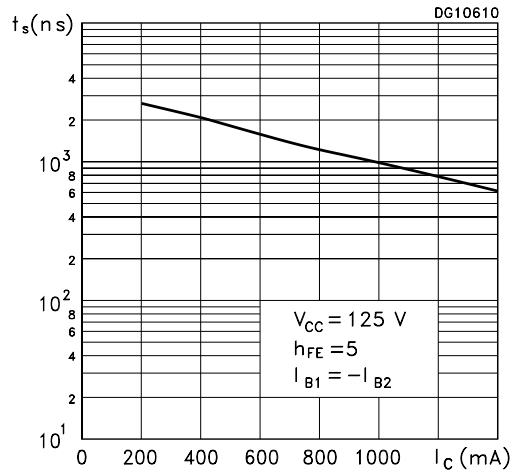


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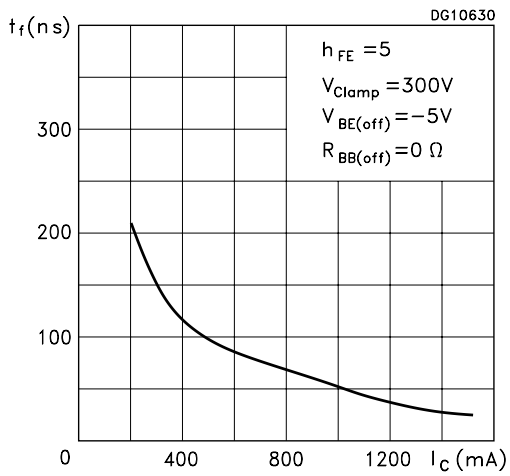
Resistive Load Fall Time



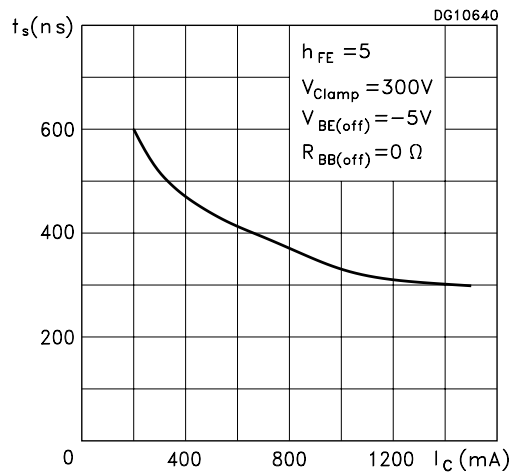
Resistive Load Storage Time



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

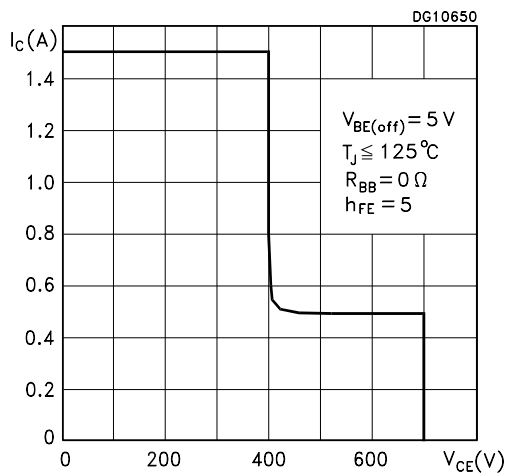


Figure 1: Inductive Load Switching Test Circuit.

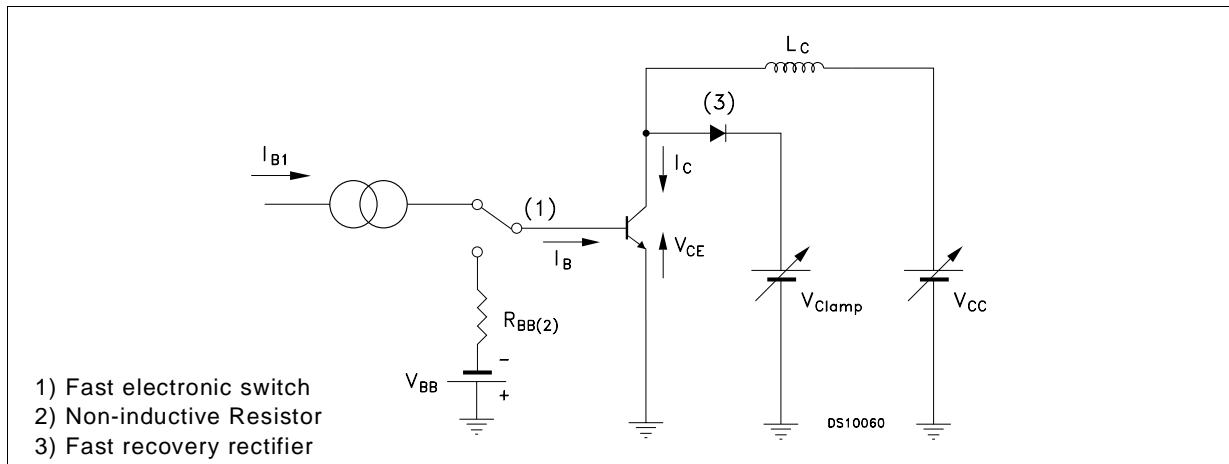
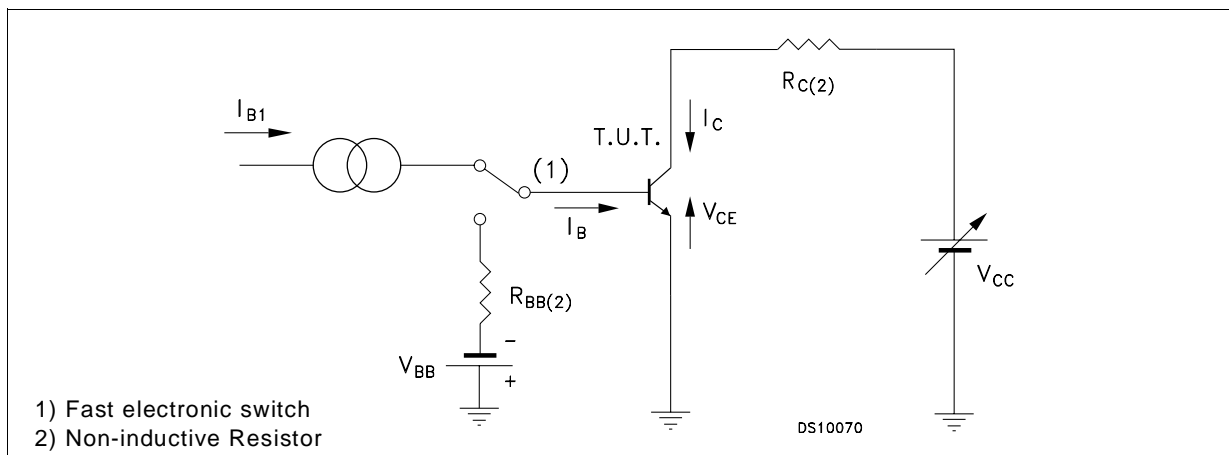
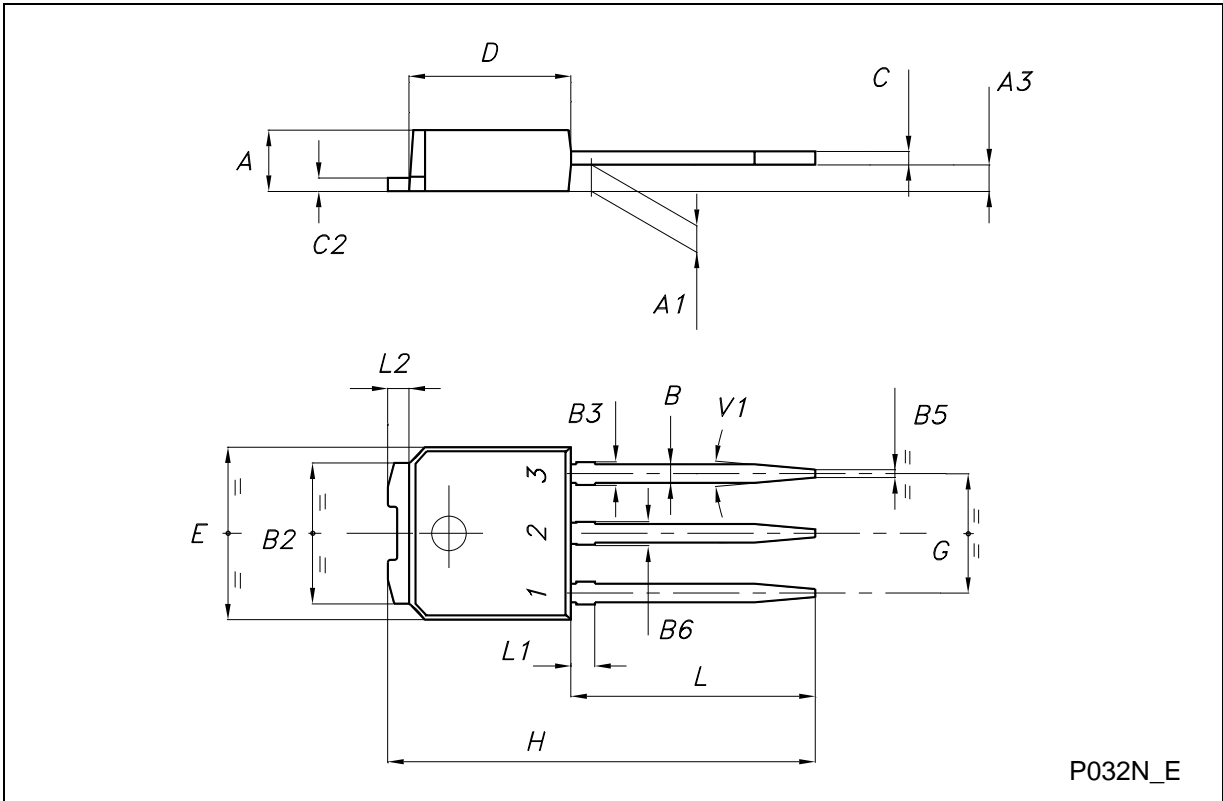


Figure 2: Resistive Load Switching Test Circuit.



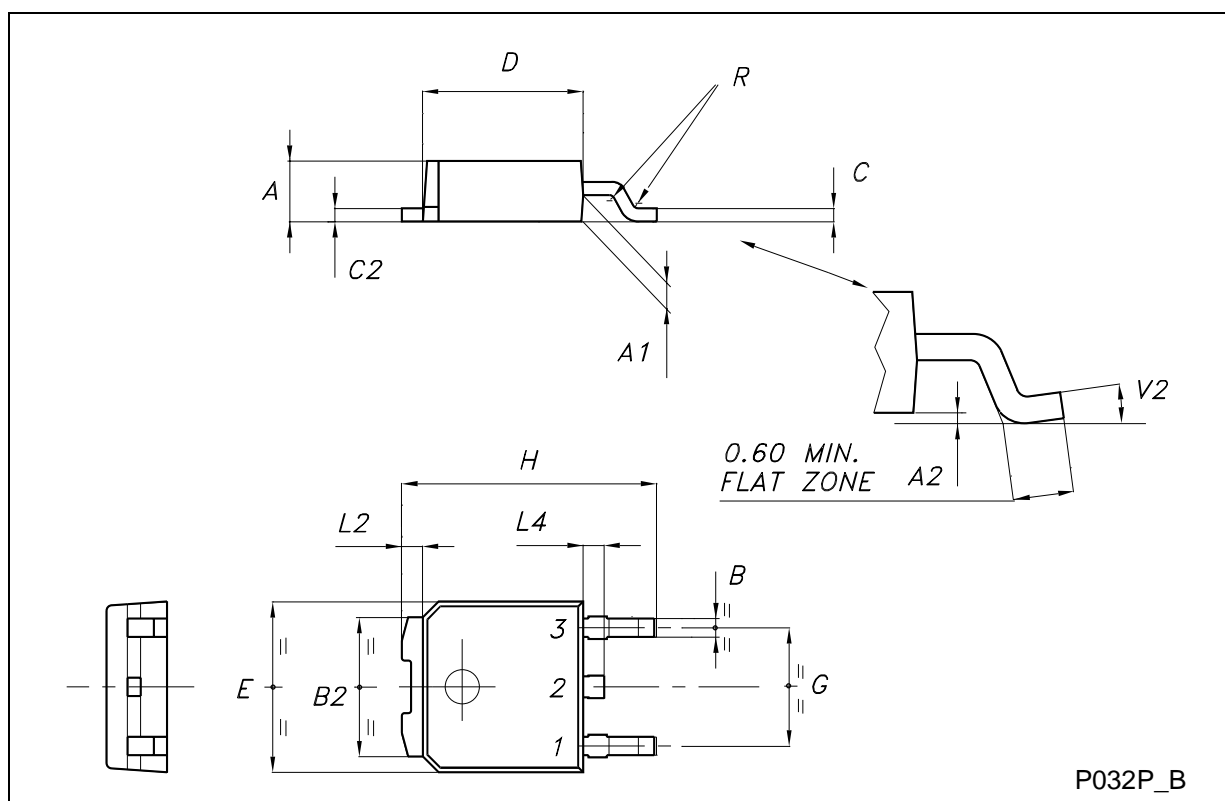
TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A3	0.70		1.30	0.028		0.051
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
B3			0.85			0.033
B5		0.30			0.012	
B6			0.95			0.037
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.237		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	15.90		16.30	0.626		0.642
L	9.00		9.40	0.354		0.370
L1	0.80		1.20	0.031		0.047
L2		0.80	1.00		0.031	0.039
V1		10°			10°	



TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



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