SGS-THOMSON MICROELECTRONICS

BU208D/508D/508DFI

HIGH VOLTAGE FASTSWITCHING NPN POWER TRANSISTOR

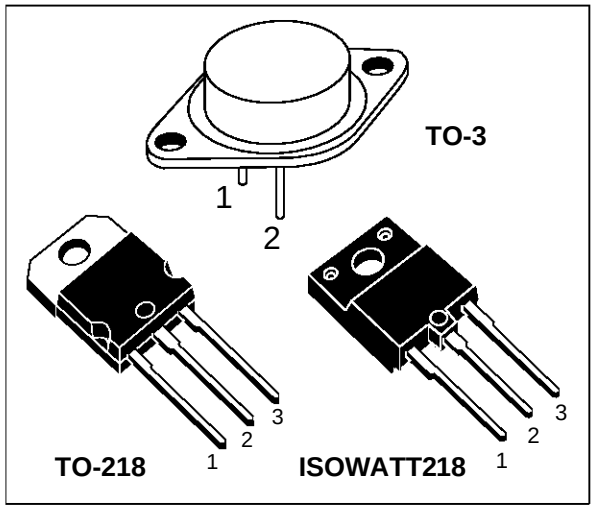
- SGS-THOMSON PREFERRED SALESTYPES
- HIGH VOLTAGE CAPABILITY
- U.L. RECOGNISED ISOWATT218 PACKAGE (U.L. FILE # E81734 (N)
- JEDEC TO-3 METAL CASE
- NPN TRANSISTOR WITH INTEGRATED FREEWHEELING DIODE

APPLICATIONS:

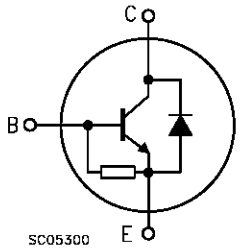
- HORIZONTAL DEFLECTION FOR COLOUR TV

DESCRIPTION

The BU208D, BU508D and BU508DFI are manufactured using Multiepitaxial Mesa technology for cost-effective high performance and uses a Hollow Emitter structure to enhance switching speeds.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	1500			V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	700			V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	10			V
I_C	Collector Current	8			A
I_{CM}	Collector Peak Current (t_p < 5 ms)	15			A
		TO - 3	**TO - 218**	**ISOWATT218**	
P_{tot}	Total Dissipation at T_c = 25 °C	150	125	50	W
T_{stg}	Storage Temperature	-65 to 150	-65 to 150	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	150	150	°C

THERMAL DATA

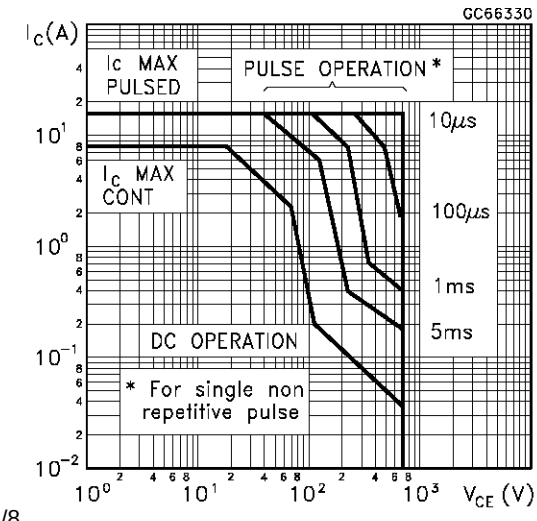
		TO-3	TO-218	ISOWATT218	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	1	1	2.5	°C/W

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

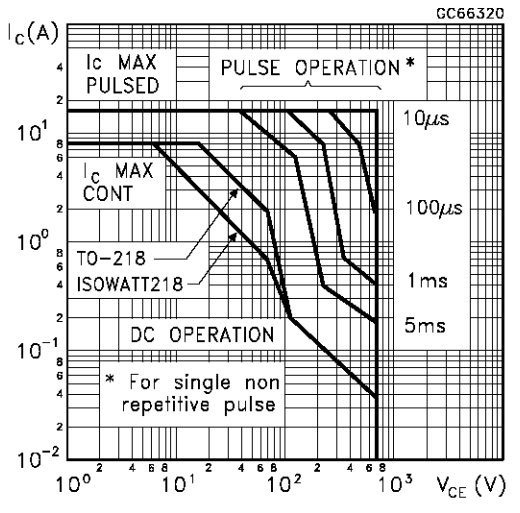
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 1500 V V_{CE} = 1500 V T_j = 125 °C			1 2	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			300	mA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 4.5 A I_B = 2 A			1	V
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	I_C = 100 m A	700			V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 4.5 A I_B = 2 A			1.3	V
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 4.5 A h_{FE} = 2.5 V_{CC} = 140 V L_C = 0.9 mH L_B = 3 µH		7 550		µs ns
V_F	Diode Forward Voltage	I_F = 4 A			2	V
f_T	Transition Frequency	I_C = 0.1 A V_{CE} = 5 V f = 5 MHz		7		MHz

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

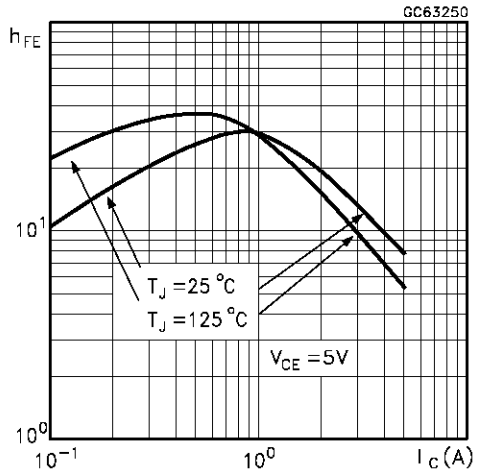
Safe Operating Area (TO-3)



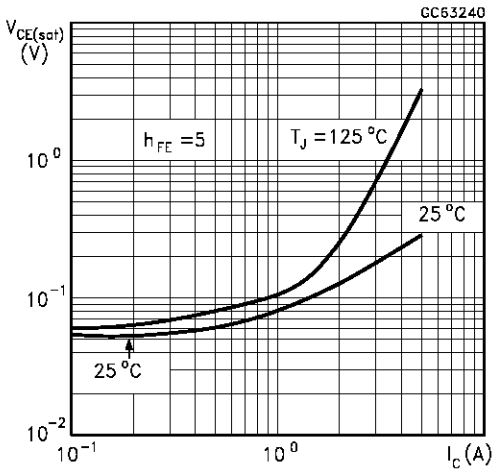
Safe Operating Area (TO-218/ISOWATT218)



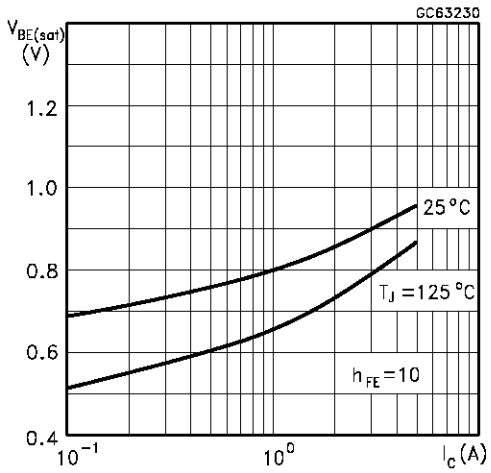
DC Current Gain



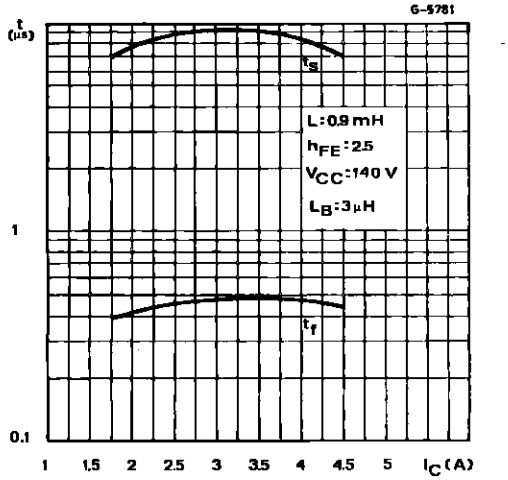
Collector Emitter Saturation Voltage



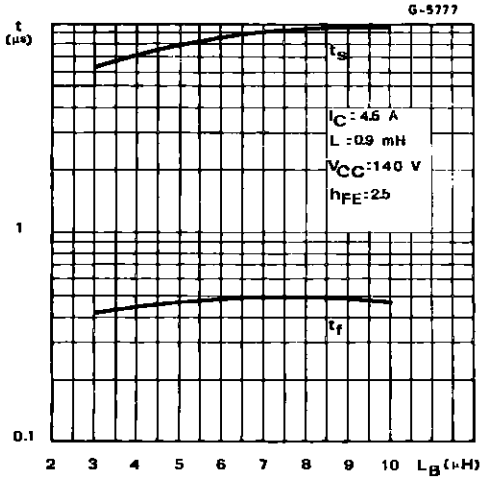
Base Emitter Saturation Voltage



Switching Time Inductive Load



Switching Time Inductive Load (see figure 1)



Switching Time Percentance vs. Case

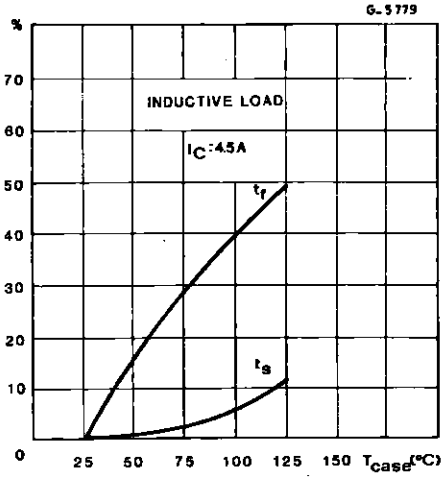
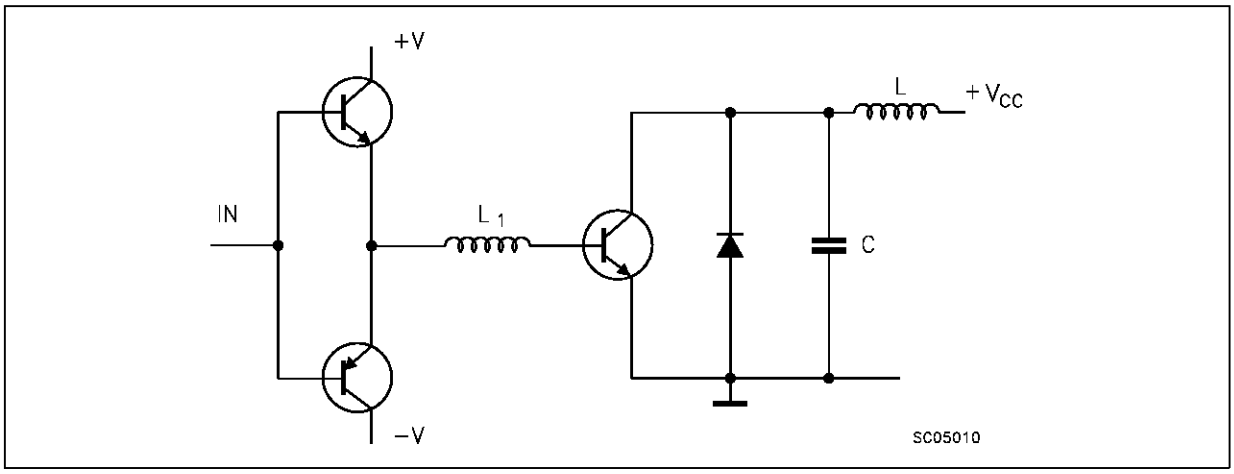
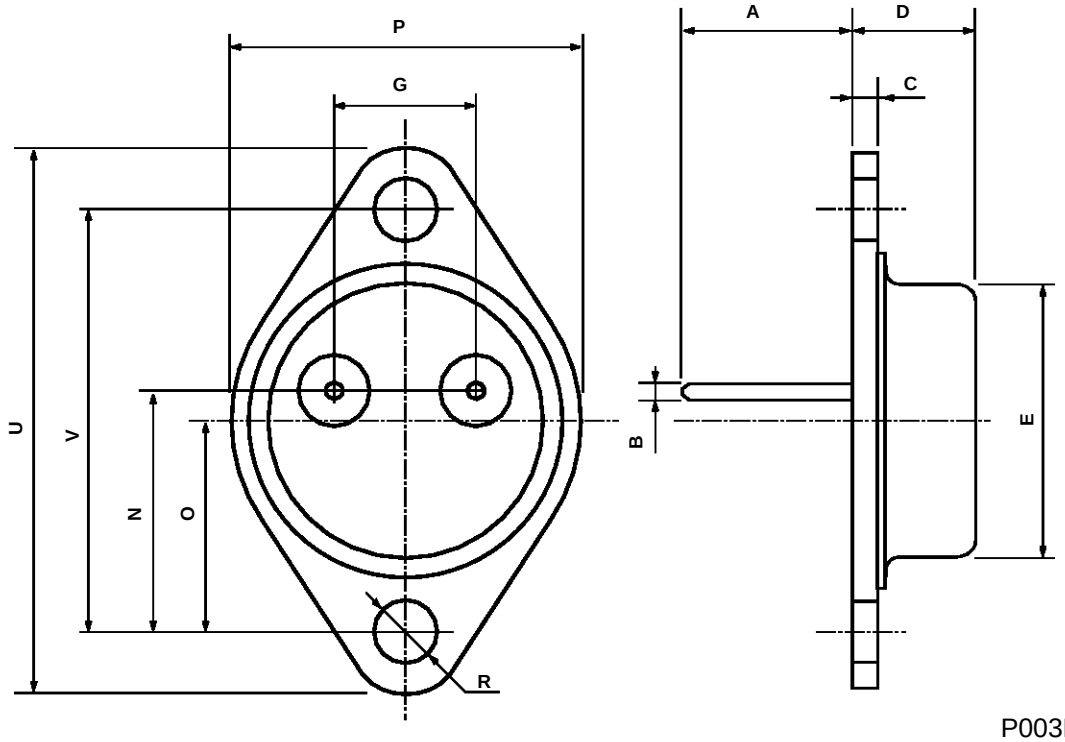


Figure 1: Inductive Load Switching Test Circuits



TO-3 (H) MECHANICAL DATA

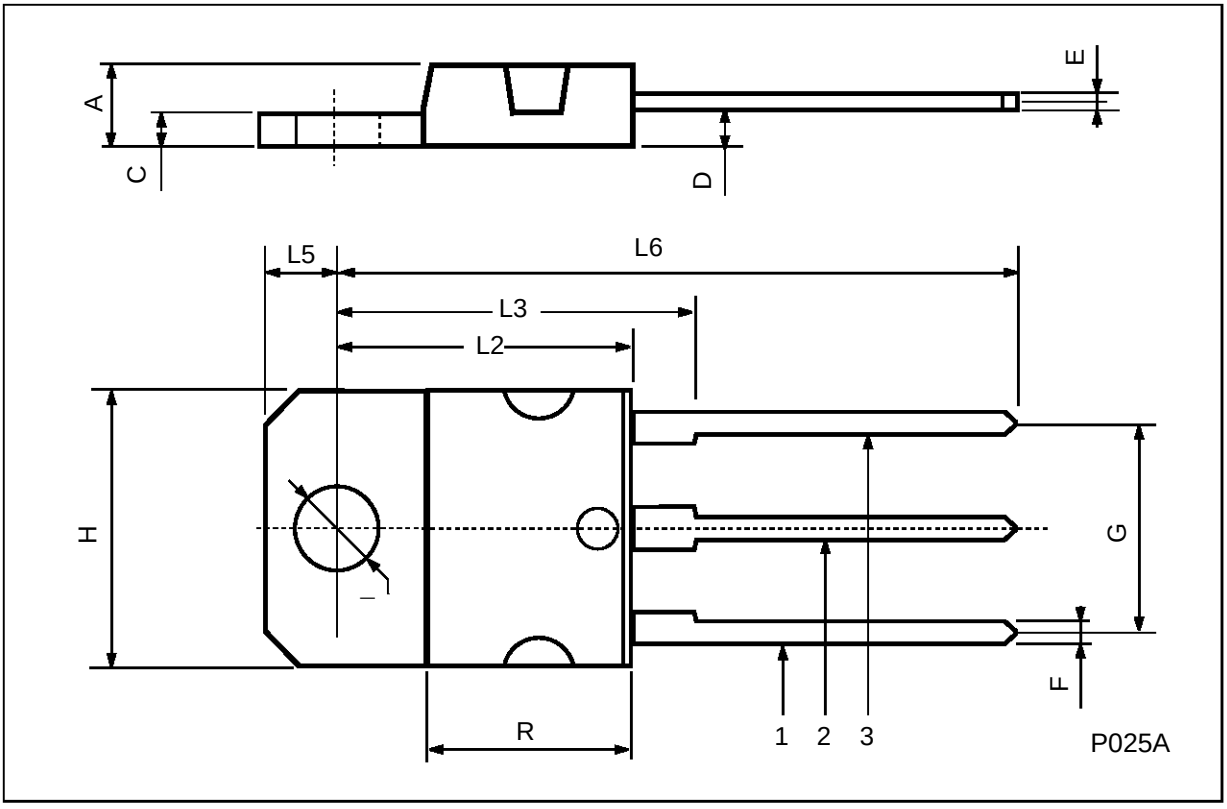
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		11.7			0.460	
B	0.96		1.10	0.037		0.043
C			1.70			0.066
D			8.7			0.342
E			20.0			0.787
G		10.9			0.429	
N		16.9			0.665	
P			26.2			1.031
R	3.88		4.09	0.152		0.161
U			39.50			1.555
V		30.10			1.185	



P003N

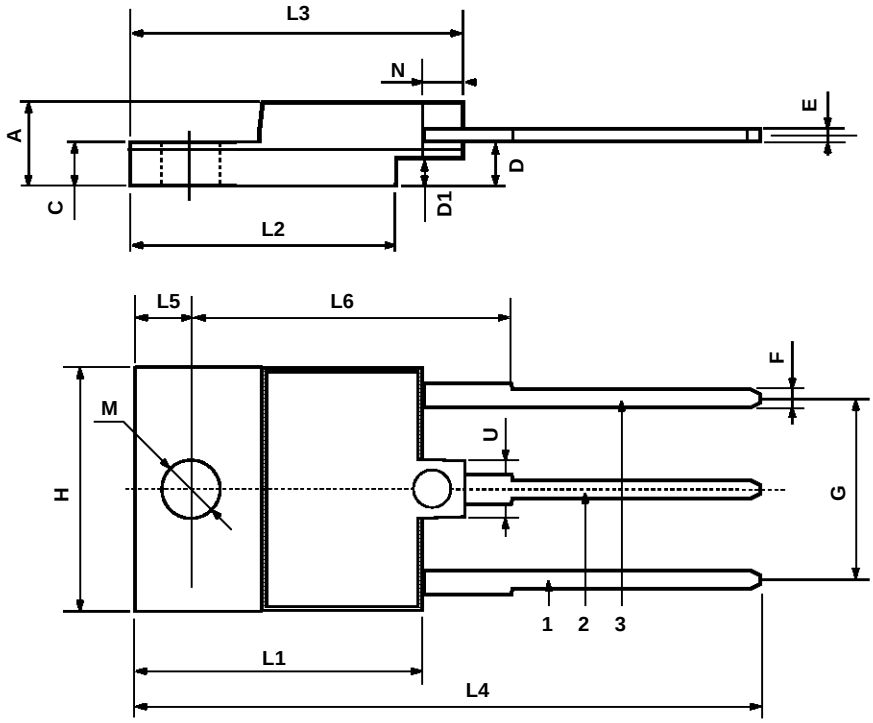
TO-218 (SOT-93) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		4.9	0.185		0.193
C	1.17		1.37	0.046		0.054
D		2.5			0.098	
E	0.5		0.78	0.019		0.030
F	1.1		1.3	0.043		0.051
G	10.8		11.1	0.425		0.437
H	14.7		15.2	0.578		0.598
L2	–		16.2	–		0.637
L3		18			0.708	
L5	3.95		4.15	0.155		0.163
L6		31			1.220	
R	–		12.2	–		0.480
Ø	4		4.1	0.157		0.161



ISOWATT218 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.35		5.65	0.210		0.222
C	3.3		3.8	0.130		0.149
D	2.9		3.1	0.114		0.122
D1	1.88		2.08	0.074		0.081
E	0.45		1	0.017		0.039
F	1.05		1.25	0.041		0.049
G	10.8		11.2	0.425		0.441
H	15.8		16.2	0.622		0.637
L1	20.8		21.2	0.818		0.834
L2	19.1		19.9	0.752		0.783
L3	22.8		23.6	0.897		0.929
L4	40.5		42.5	1.594		1.673
L5	4.85		5.25	0.190		0.206
L6	20.25		20.75	0.797		0.817
M	3.5		3.7	0.137		0.145
N	2.1		2.3	0.082		0.090
U		4.6			0.181	



P025C

Silicon Power Transistor
BU508D

Technical Data

Typical Applications : These devices are designed for horizontal deflection output stages of large screen colour deflection circuits.

Specification Fetaures :

- ***High Voltage*** NPN Silicon Power Transistor
- 8 Amp / 1500 V device in TO-218AC package
- 125 Watts device
- VCEO (sus) 700 V
- Collector Emitter Voltage VCE = 1500 V
- TO-218 Package for low cost mounting
- Available with internal Flyback Diode , “D” suffix

Symbol	Parameters / Conditions	Ratings
Maximum Ratings :		
$V_{CEO(SUS)}$	Collector- Emitter Voltage	700 Vdc
V_{CES}	Collector- Emitter Voltage	1500 Vdc
V_{EB}	Emitter Base Voltage	5 Vdc
I_C I_{CM}	Collector Current – Continuos Peak : Pulse width = 5 ms , Duty Cycle 10 %	8 Adc 15 Adc
I_B I_{BM}	Base Current – Continuos Peak : Pulse width = 5 ms , Duty Cycle 10 %	4 Adc 6 Adc

Thermal Characteristics :

R_{thjc}	Thermal resistance junction to case	1.0 °C/W
T_L	Maximum Lead Temperature for Soldering Purpose : 1/8" from Case for 5 sec	275 °C
P_D	Total Power Dissipation @ Tc = 25 °C Derate above 25 °C	125 Watta 1 W /°C
Tj & T_{Stg}	Operating and Storage Junction Temperature Range	-65 °C ….+ 150 °C

ELECTRICAL CHARACTERISTICS :

[Tc = 25 °C unless otherwise noted]

Characteristic	Symbol	Min	Typ	Max	Unit
Off Characteristics : [Pulse Test : Pulse width = 5 ms , Duty Cycle 10 %]					
Collector – Emitter Sustaining Voltage [Ic = 100 mA , I_B = 0]	$V_{CEO(sus)}$	700			Vdc
Collector Cutoff Current [V_{CE} = 1500 Vdc , V_{BE} = 0 , Tc = 25 °C] [V_{CE} = 1500 V, V_{BE} = 0 , Tc = 125 °C]	I_{CES}			0.1 2	mAdc
Emitter Base Leakage [V_{EB} = 6 Vdc , Ic = 0]	I_{EBO}			300	mAdc
On Characteristics : [Pulse Test : Pulse width = 5 ms , Duty Cycle 10 %]					
DC Current Gain [Ic = 4.5 Adc , V_{CE} = 5 Vdc]	h_{FE}	2.25			
Collector-Emitter Saturation Voltage [Ic = 4.5 Adc , I_B = 2 Adc]	$V_{CE(sat)}$			3	Vdc
Base-Emitter Saturation Voltage [Ic = 4.5 Adc , I_B = 2 Adc]	$V_{BE(sat)}$			1.3	Vdc
Dynamic Characteristics :					
Current Gain – Bandwidth Product	f_T		7		MHz

[Ic = 0.1 Adc , V_{CE}=5 Vdc , f=1 MHz]					
Output Capacitance [V_{CB}= 10 Vdc , I_E = 0 , f = 0.1 MHz]	C_{ob}		125		pF

Switching Characteristics :		
Fall Time :		Typ
t_S	(Ic= 4.5 Adc , I_B = 1.8 Adc , LB=10 µH)	8 µs
t_f		0.5 µs