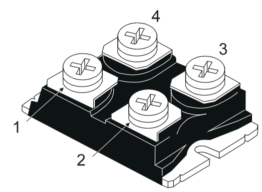
BUT30V

NPN TRANSISTOR POWER MODULE

- NPN TRANSISTOR
- HIGH CURRENT POWER BIPOLAR MODULE
- VERY LOW R_{th} JUNCTION CASE
- SPECIFIED ACCIDENTAL OVERLOAD AREAS
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- LOW INTERNAL PARASITIC INDUCTANCE

APPLICATIONS:

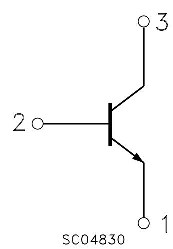
- MOTOR CONTROL
- SMPS & UPS
- WELDING EQUIPMENT



Pin 4 not connected

ISOTOP

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-Emitter Voltage (V_{BE} = -5 V)	200	V
$V_{CEO(sus)}$	Collector-Emitter Voltage (I_B = 0)	125	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	7	V
I_C	Collector Current	100	A
I_{CM}	Collector Peak Current (t_p = 10 ms)	150	A
I_B	Base Current	20	A
I_{BM}	Base Peak Current (t_p = 10 ms)	30	A
P_{tot}	Total Dissipation at T_c = 25 ^{o}C	250	W
V_{isol}	Insulation Withstand Voltage (RMS) from All Four Terminals to External Heatsink	2500	
T_{stg}	Storage Temperature	-55 to 150	^{o}C
T_j	Max. Operating Junction Temperature	150	^{o}C

THERMAL DATA

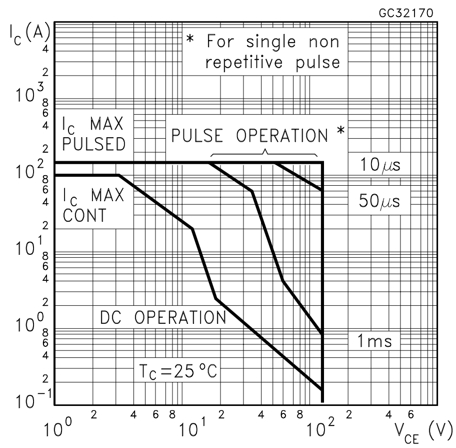
$R_{thj\text{-}case}$ $R_{thc\text{-}h}$	Thermal Resistance Junction-case Max Thermal Resistance Case-heatsink With Conductive Grease Applied Max	0.5 0.05	$^oC/W$ $^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

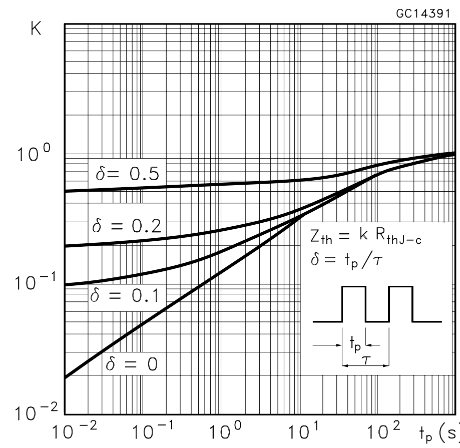
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current (R_{BE} = 5 Ω)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ T_c = 100 ^oC			1 5	mA mA
I_{CEV}	Collector Cut-off Current (V_{BE} = -5V)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ T_c = 100 ^oC			1 4	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			1	mA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 0.2 A L = 25 mH V_{clamp} = 125 V	125			V
h_{FE}*	DC Current Gain	I_C = 100 A V_{CE} = 5		27		
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 50 A I_B = 2.5 A I_C = 50 A I_B = 2.5 A T_c = 100 ^oC I_C = 100 A I_B = 10 A I_C = 100 A I_B = 10 A T_c = 100 ^oC		0.45 0.55 0.7 0.9	0.9 1.2 0.9 1.5	V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 50 A I_B = 2.5 A I_C = 50 A I_B = 2.5 A T_c = 100 ^oC I_C = 100 A I_B = 10 A I_C = 100 A I_B = 10 A T_c = 100 ^oC		1.15 1.1 1.45 1.55	1.4 1.4 1.8 1.9	V V V V
di_C/dt	Rate of Rise of On-state Collector	V_{CC} = 300 V R_C = 0 t_p = 3 μs I_{B1} = 15 A T_c = 100 ^oC	270	350		A/μs
V_{CE}(3 μs)	Collector-Emitter Dynamic Voltage	V_{CC} = 300 V R_C = 1 Ω I_{B1} = 15 A T_c = 100 ^oC		2.7	3.5	V
V_{CE}(5 μs)	Collector-Emitter Dynamic Voltage	V_{CC} = 300 V R_C = 1 Ω I_{B1} = 15 A T_c = 100 ^oC		2	2.5	V
t_s t_f t_c	Storage Time Fall Time Cross-over Time	I_C = 100 A V_{CC} = 90 V V_{BB} = -5 V R_{BB} = 0.47 Ω V_{clamp} = 125 V I_{B1} = 10 A L = 45 μH T_c = 100 ^oC		1 0.1 0.2	2 0.2 0.35	μs μs μs
V_{CEW}	Maximum Collector Emitter Voltage Without Snubber	I_{CWoff} = 150 A I_{B1} = 10 A V_{BB} = -5 V V_{CC} = 90 V L = 30 μH R_{BB} = 0.5 Ω T_c = 125 ^oC	125			V

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

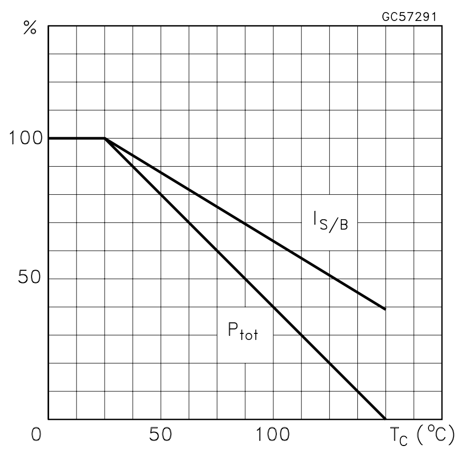
Safe Operating Areas



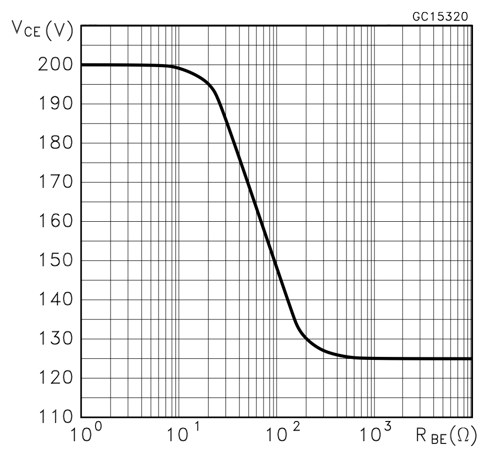
Thermal Impedance



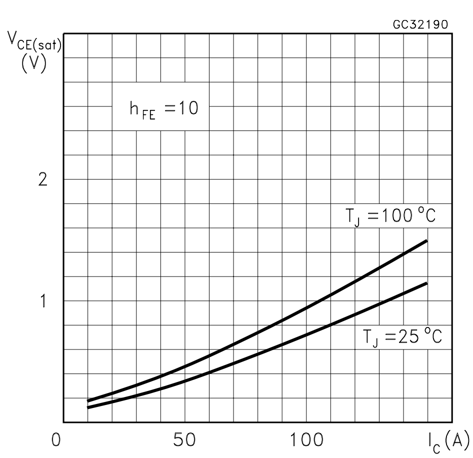
Derating Curve



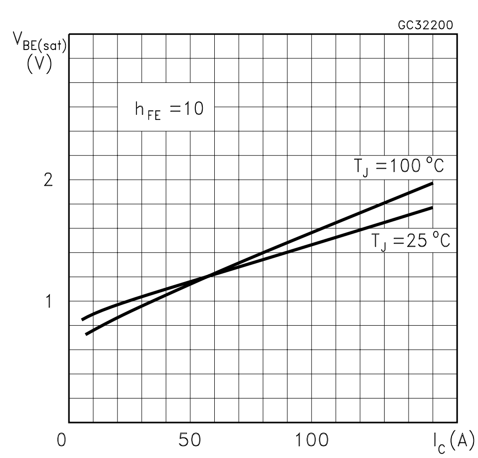
Collector-emitter Voltage Versus
Base Emitter Resistance



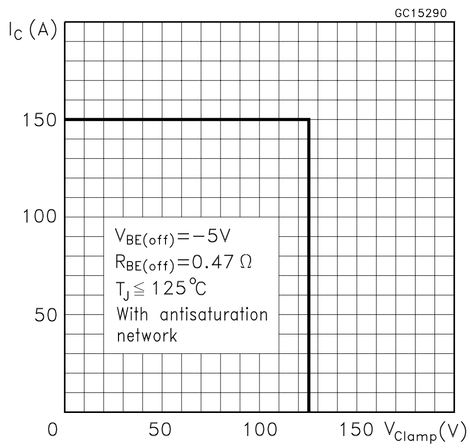
Collector Emitter Saturation Voltage



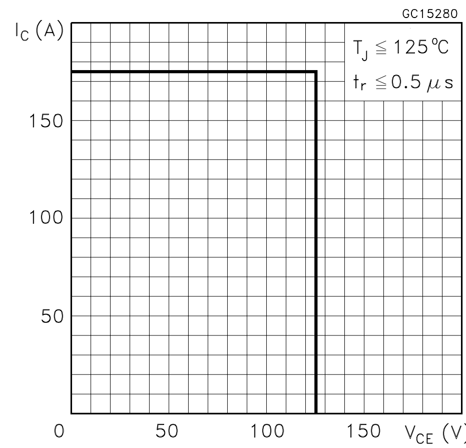
Base-Emitter Saturation Voltage



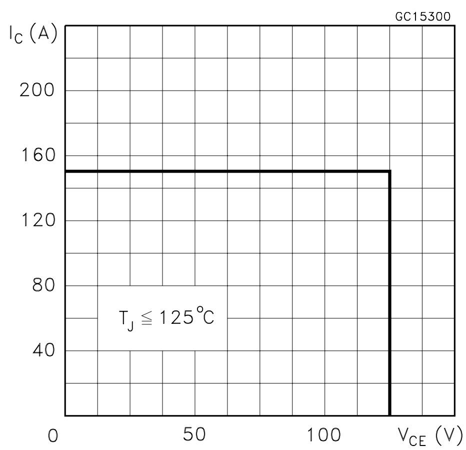
Reverse Biased SOA



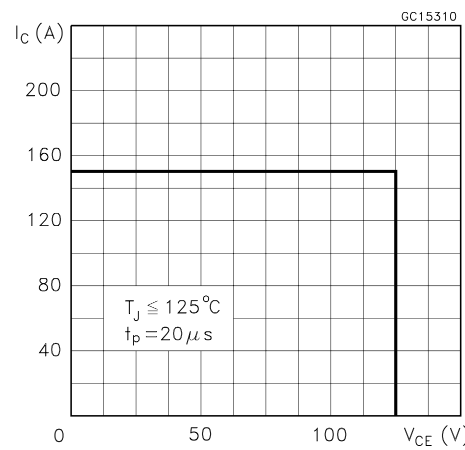
Foward Biased SOA



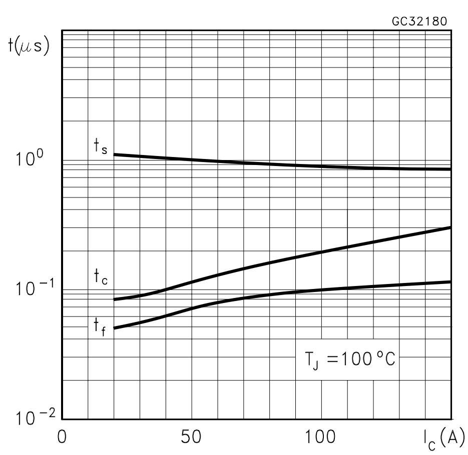
Reverse Biased AOA



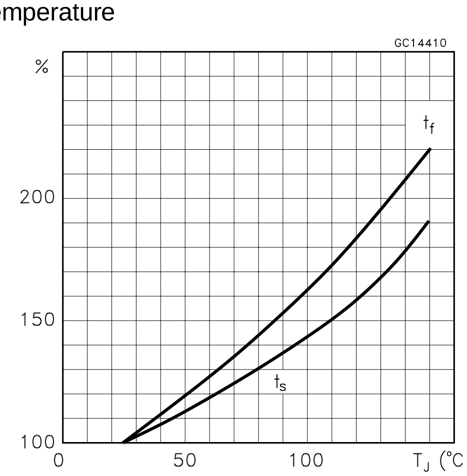
Forward Biased AOA



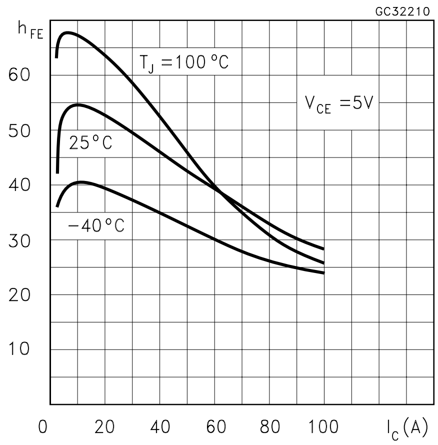
Switching Times Inductive Load



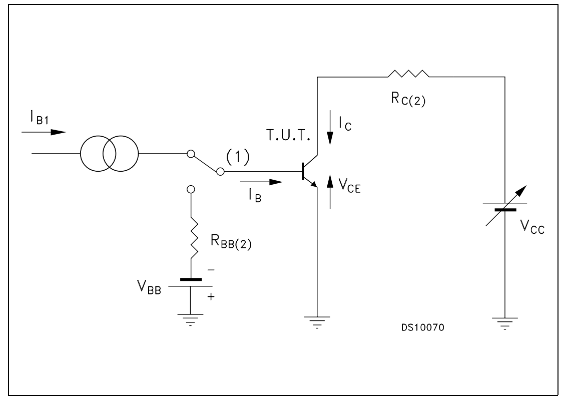
Switching Times Inductive Load Versus Temperature



Dc Current Gain

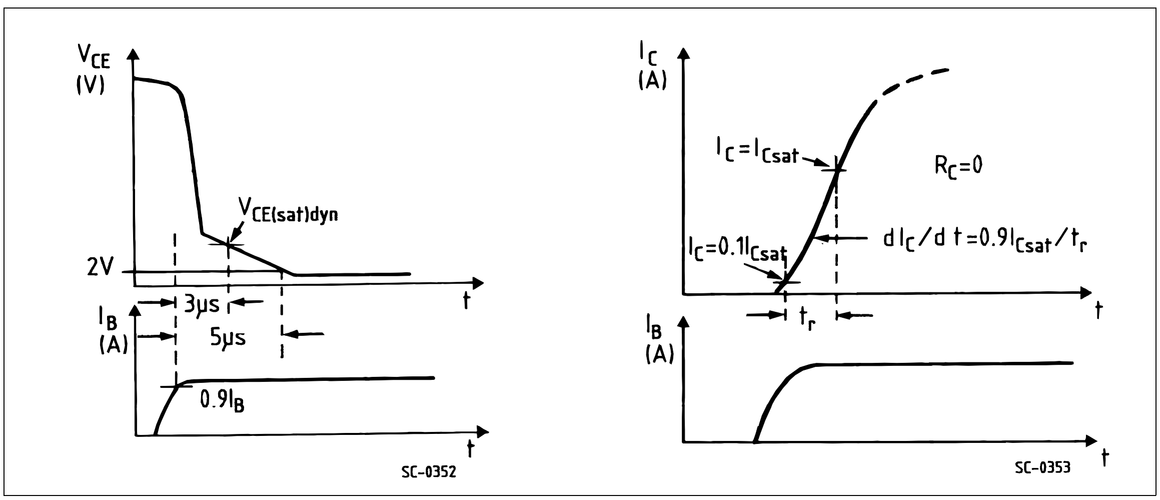


Turn-on Switching Test Circuit

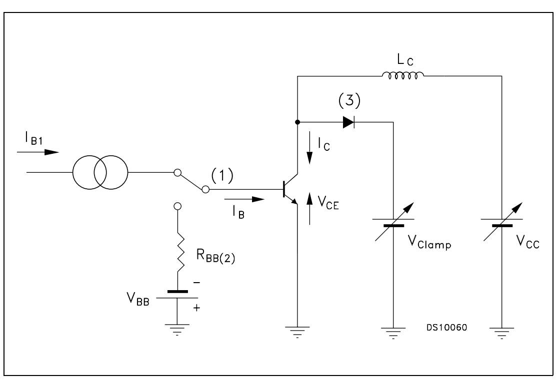


(1) Fast electronic switch (2) Non-inductive load

Turn-on Switching Waveforms

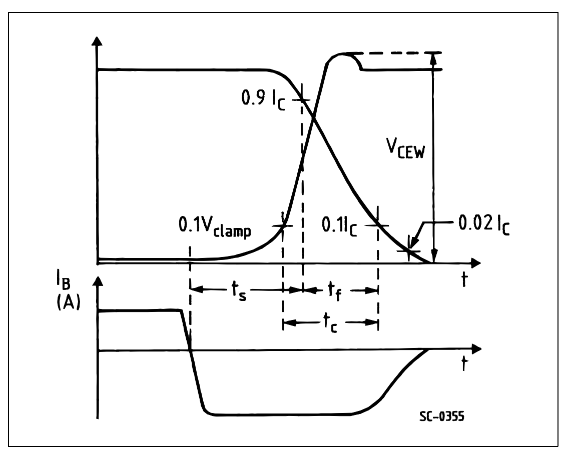


Turn-off Switching Test Circuit



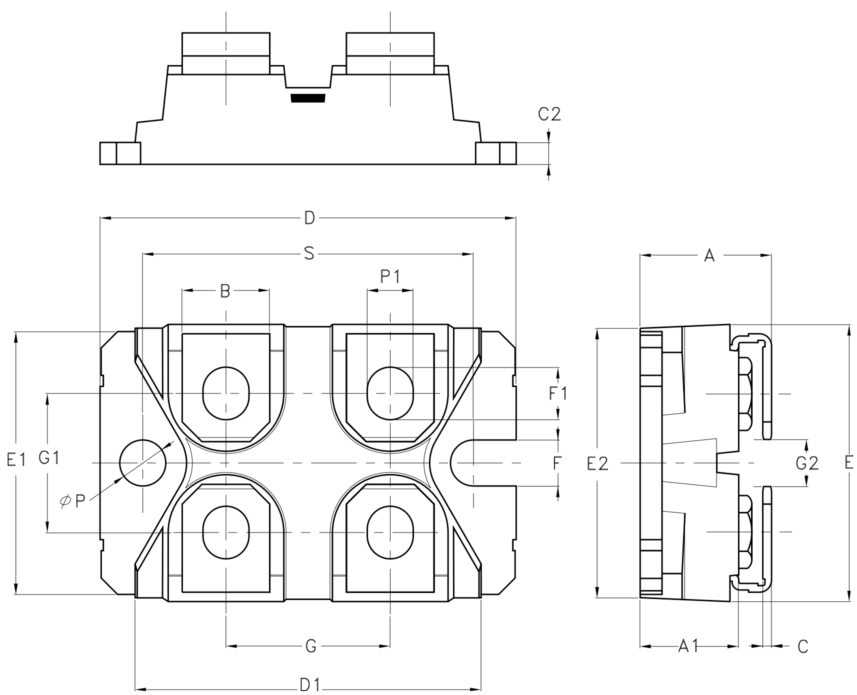
(1) Fast electronic switch (2) Non-inductive load
(3) Fast recovery rectifier

Turn-off Switching Waveforms



ISOTOP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.8		12.2	0.465		0.480
A1	8.9		9.1	0.350		0.358
B	7.8		8.2	0.307		0.322
C	0.75		0.85	0.029		0.033
C2	1.95		2.05	0.076		0.080
D	37.8		38.2	1.488		1.503
D1	31.5		31.7	1.240		1.248
E	25.15		25.5	0.990		1.003
E1	23.85		24.15	0.938		0.950
E2		24.8			0.976	
G	14.9		15.1	0.586		0.594
G1	12.6		12.8	0.496		0.503
G2	3.5		4.3	0.137		1.169
F	4.1		4.3	0.161		0.169
F1	4.6		5	0.181		0.196
P	4		4.3	0.157		0.169
P1	4		4.4	0.157		0.173
S	30.1		30.3	1.185		1.193



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