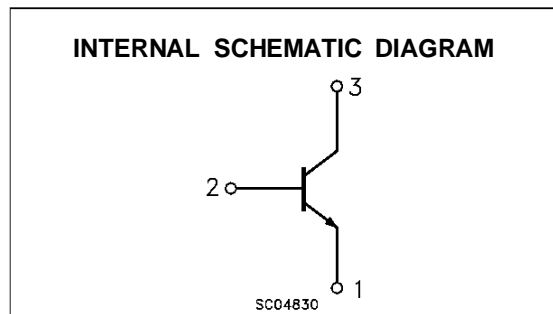
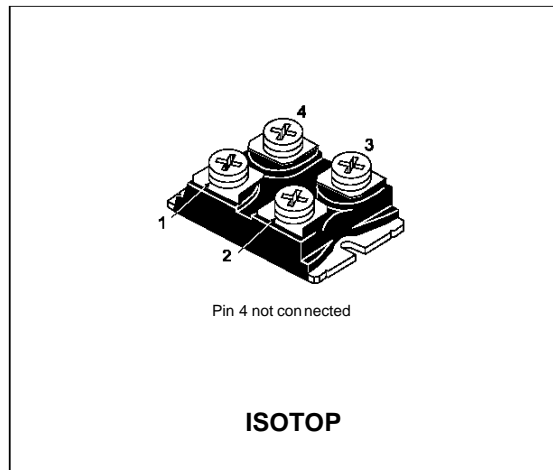


NPN TRANSISTOR POWER MODULE

- NPN TRANSISTOR
- HIGH CURRENT POWER BIPOLAR MODULE
- VERY LOW R_{th} JUNCTION CASE
- SPECIFIED ACCIDENTAL OVERLOAD AREAS
- ISOLATED CASE (2500V RMS)
- EASY TO MOUNT
- LOW INTERNAL PARASITIC INDUCTANCE

APPLICATIONS:

- MOTOR CONTROL
- SMPS & UPS
- WELDING EQUIPMENT


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 $T_c = 25$ °C	250	W
T_{stg}	Storage Temperature	-55 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C
V_{ISO}	Insulation Withstand Voltage (AC-RMS)	2500	V

BUT30V

THERMAL DATA

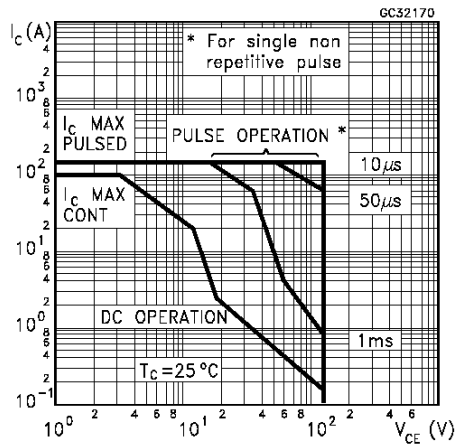
$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.5	$^{\circ}\text{C}/\text{W}$
R_{thc-h}	Thermal Resistance Case- heatsink With Conductive Grease Applied	Max	0.05	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

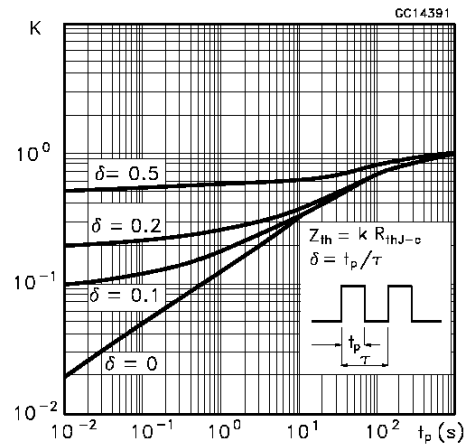
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current ($R_{BE} = 5 \Omega$)	$V_{CE} = V_{CEV}$			1	mA
		$V_{CE} = V_{CEV} \quad T_j = 100^{\circ}\text{C}$			5	mA
I_{CEV}	Collector Cut-off Current ($V_{BE} = -5\text{V}$)	$V_{CE} = V_{CEV}$			1	mA
		$V_{CE} = V_{CEV} \quad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

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

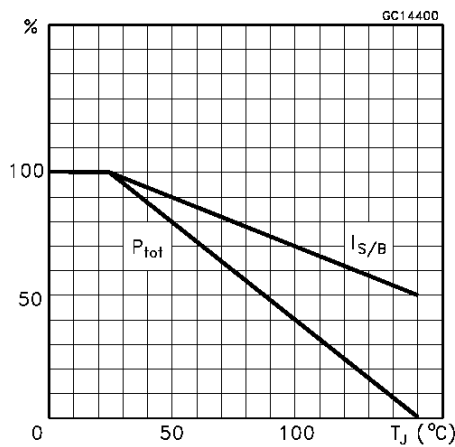
Safe Operating Areas



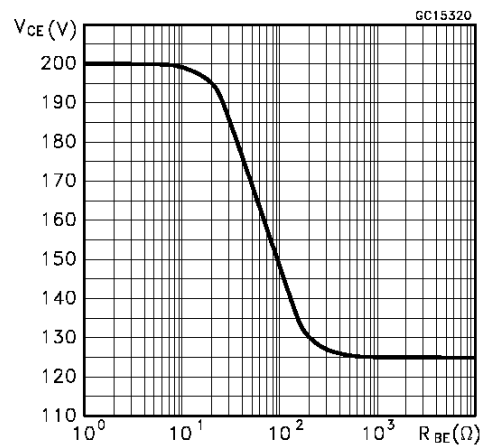
Thermal Impedance



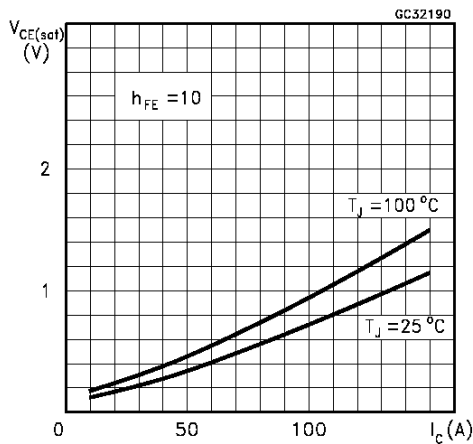
Derating Curve



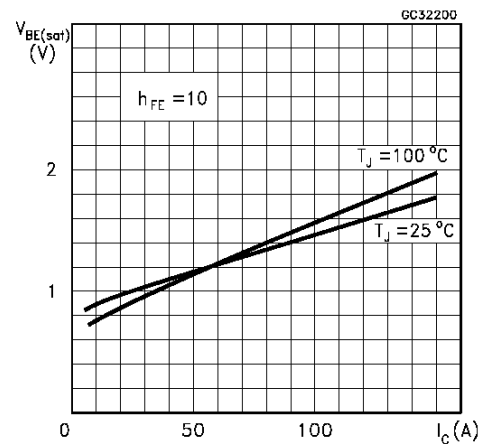
Collector-emitter Voltage Versus base-emitter Resistance



Collector Emitter Saturation Voltage

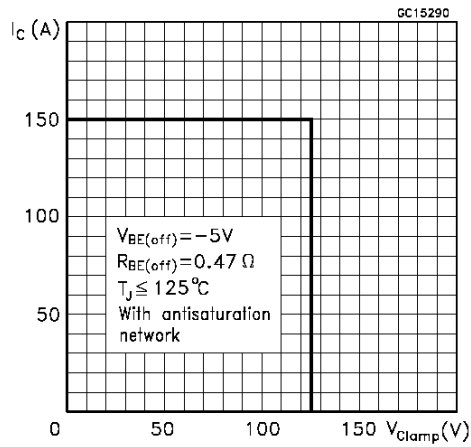


Base-Emitter Saturation Voltage

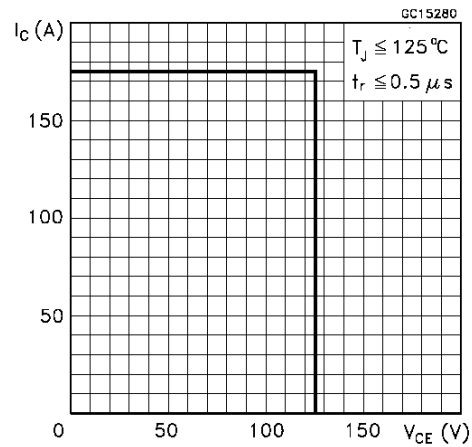


BUT30V

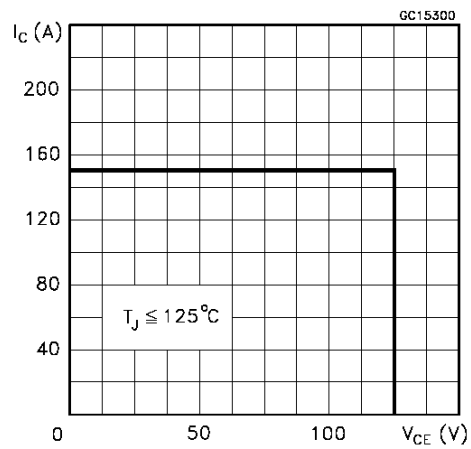
Reverse Biased SOA



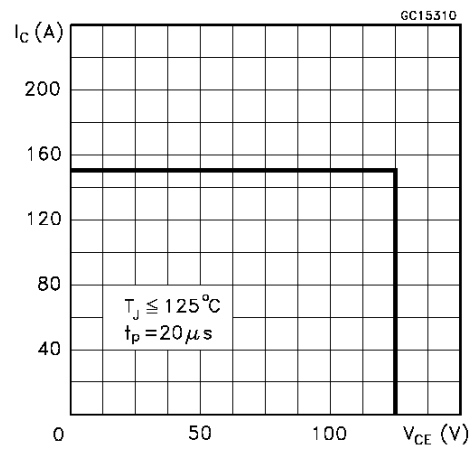
Forward Biased SOA



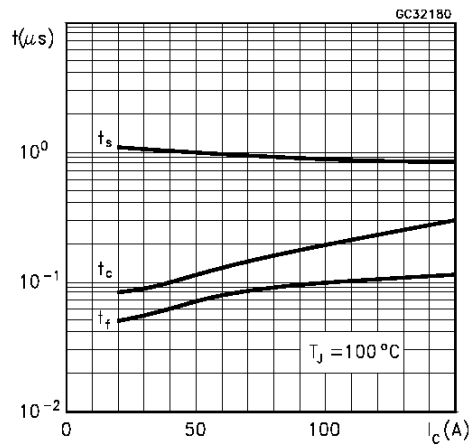
Reverse Biased AOA



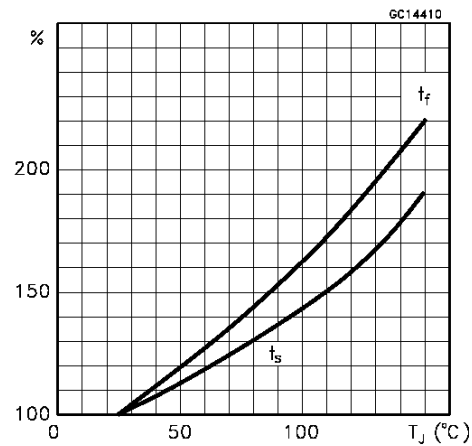
Forward Biased AOA



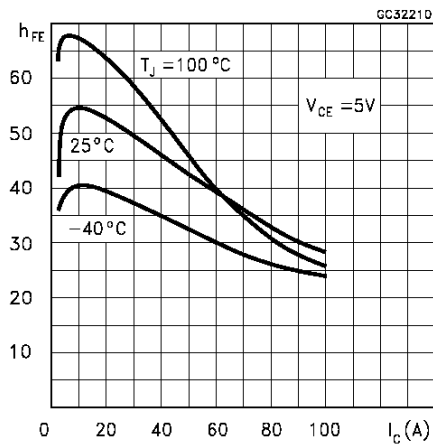
Switching Times Inductive Load



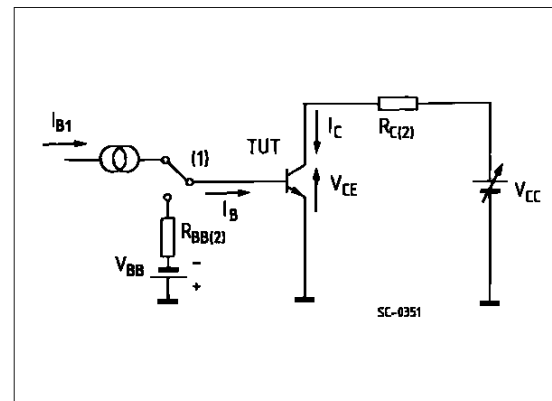
Switching Times Inductive Load Versus Temperature



Dc Current Gain

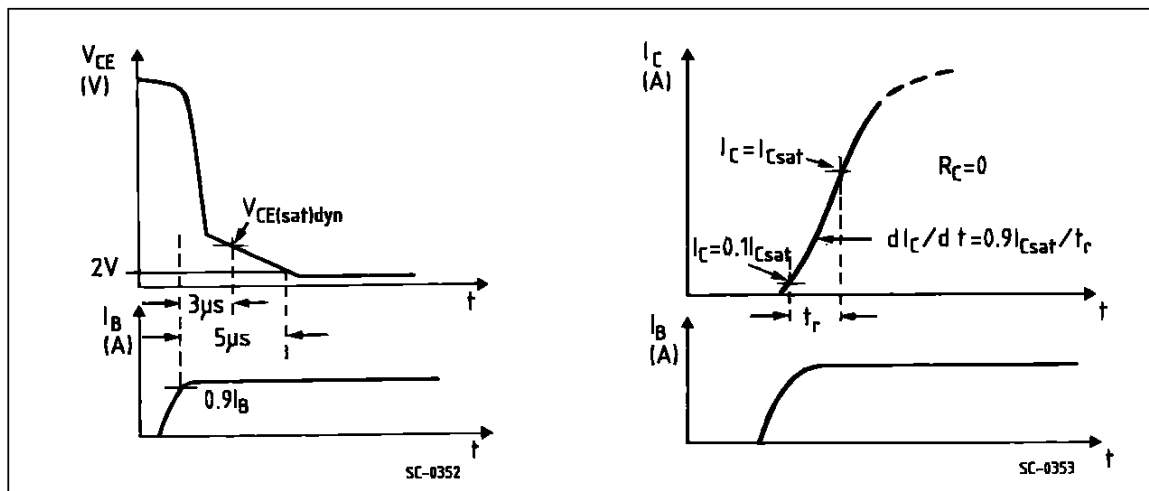


Turn-on Switching Test Circuit

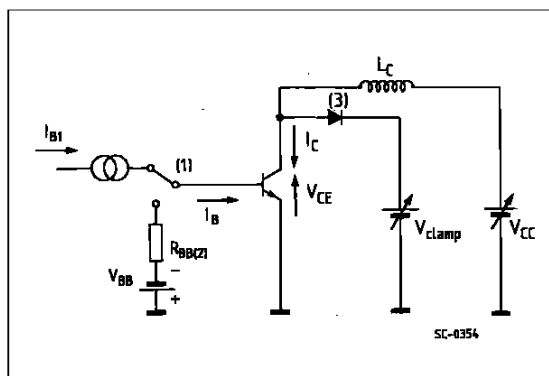


(1) Fast electronic switch (2) Non-inductive load

Turn-on Switching Waveforms

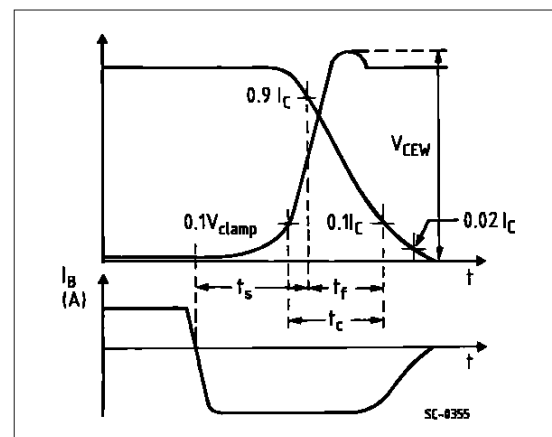


Turn-off Switching Test Circuit



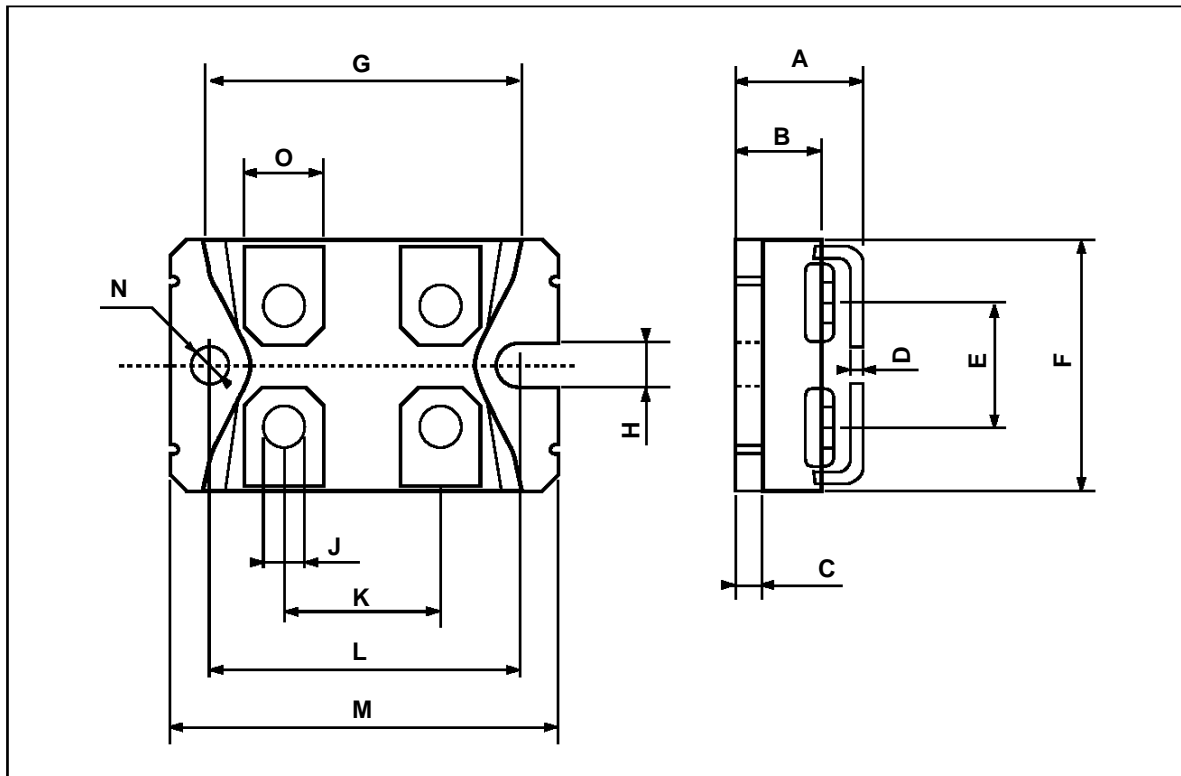
(1) Fast electronic switch (2) Non-inductive load (3) Fast recovery rectifier

Turn-off Switching Waveforms



ISOTOP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.8		12.2	0.466		0.480
B	8.9		9.1	0.350		0.358
C	1.95		2.05	0.076		0.080
D	0.75		0.85	0.029		0.033
E	12.6		12.8	0.496		0.503
F	25.15		25.5	0.990		1.003
G	31.5		31.7	1.240		1.248
H	4			0.157		
J	4.1		4.3	0.161		0.169
K	14.9		15.1	0.586		0.594
L	30.1		30.3	1.185		1.193
M	37.8		38.2	1.488		1.503
N	4			0.157		
O	7.8		8.2	0.307		0.322



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