

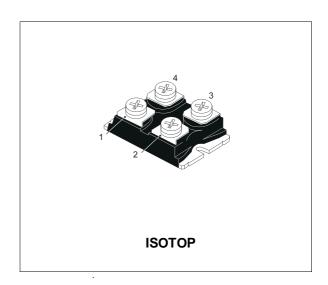


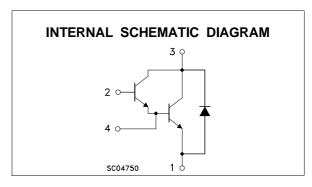
NPN DARLINGTON POWER MODULE

- HIGH CURRENT POWER BIPOLAR MODULE
- VERY LOW Rth JUNCTION CASE
- SPECIFIED ACCIDENTAL OVERLOAD AREAS
- ULTRAFAST FREEWHEELING DIODE
- FULLY INSULATED PACKAGE (UL COMPLIANT)
- EASY TO MOUNT
- LOW INTERNAL PARASITIC INDUCTANCE

INDUSTRIAL APPLICATIONS:

- MOTOR CONTROL
- SMPS & UPS
- WELDING EQUIPMENT





ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CEV}	Collector-Emitter Voltage (V _{BE} = -5 V)	600	V
V _{CEO(sus)}	Collector-Emitter Voltage (I _B = 0)	450	V
V_{EBO}	Emitter-Base Voltage (I _C = 0)	7	V
Ic	Collector Current	60	Α
I _{CM}	Collector Peak Current (t _p = 10 ms)	90	Α
I _B	Base Current	6	Α
I _{BM}	Base Peak Current (t _p = 10 ms)	12	Α
P _{tot}	Total Dissipation at T _c = 25 °C	175	W
V _{isol}	Insulation Withstand Voltage (RMS) from All Four Terminals to Exernal Heatsink	2500	V
T _{stg}	Storage Temperature	-55 to 150	°C
Tj	Max. Operating Junction Temperature	150	°C

September 2003

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case (transistor)	Max	0.71	°C/W	
R _{thj-case}	Thermal Resistance Junction-case (diode)	Max	1.2	°C/W	
R_{thc-h}	Thermal Resistance Case-heatsink With Conductive				
	Grease Applied	Max	0.05	°C/W	

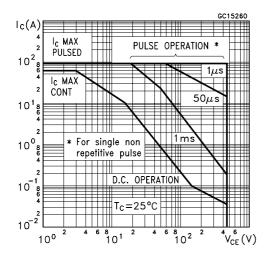
ELECTRICAL CHARACTERISTICS ($T_{case} = 25$ $^{\circ}C$ unless otherwise specified)

Symbol Parameter		Test Conditions	Min.	Тур.	Max.	Unit	
I _{CER} #	Collector Cut-off Current ($R_{BE} = 5 \Omega$)	V _{CE} = V _{CEV} V _{CE} = V _{CEV} T _j = 100 °C			1.5 20	mA mA	
I _{CEV} #	Collector Cut-off Current (V _{BE} = -5)	V _{CE} = V _{CEV} V _{CE} = V _{CEV} T _j = 100 °C			1 13	mA mA	
I _{EBO} #	Emitter Cut-off Current (I _C = 0)	V _{EB} = 5 V			1	mA	
VCEO(SUS)*	Collector-Emitter Sustaining Voltage (I _B = 0)	$I_C = 0.2 \text{ A}$ L = 25 mH $V_{clamp} = 450 \text{ V}$	450			V	
$h_{FE}*$	DC Current Gain	I _C = 50 A V _{CE} = 5 V		150			
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		1.2 1.4 1.4 1.6	2	V V V	
V _{BE(sat)} *	Base-Emitter Saturation Voltage	$I_C = 50 \text{ A}$ $I_B = 2.8 \text{ A}$ $I_C = 50 \text{ A}$ $I_B = 2.8 \text{ A}$ $I_j = 100 ^{\circ}\text{C}$		2.3 2.3	3	V V	
di _C /dt	Rate of Rise of On-state Collector	$V_{CC} = 300 \text{ V}$ $R_C = 0$ $t_p = 3 \mu s$ $I_{B1} = 1.05 \text{ A}$ $T_j = 100 ^{\circ}\text{C}$	300	400		A/μs	
V _{CE} (3 μs)••	Collector-Emitter Dynamic Voltage	$V_{CC} = 300 \text{ V}$ $R_C = 8.5 \Omega$ $I_{B1} = 1.05 \text{ A}$ $T_j = 100 ^{\circ}\text{C}$		4.5	8	V	
V _{CE} (5 μs)••	Collector-Emitter Dynamic Voltage	$V_{CC} = 300 \text{ V}$ $R_C = 8.5 \Omega$ $I_{B1} = 1.05 \text{ A}$ $T_j = 100 ^{\circ}\text{C}$		2.5	4.5	V	
t _s t _f t _c	Storage Time Fall Time Cross-over Time	$I_{C} = 35A$ $V_{CC} = 50 \text{ V}$ $V_{BB} = -5 \text{ V}$ $R_{BB} = 0.6 \Omega$ $V_{clamp} = 450 \text{ V}$ $I_{B1} = 0.7 \text{ A}$ $L = 0.07 \text{ mH}$ $T_{j} = 100 ^{\circ}\text{C}$		3.2 0.25 0.75	5 0.5 1.5	μs μs μs	
V _{CEW}	Maximum Collector Emitter Voltage Without Snubber	$I_{CWoff} = 60$ A $I_{B1} = 2.8$ A $V_{BB} = -5$ V $V_{CC} = 50$ V $L = 42$ μH $R_{BB} = 0.6$ Ω $T_j = 125$ °C	450			V	
V _F *	Diode Forward Voltage	I _F = 50 A T _j = 100 °C		1.5	1.8	V	
I _{RM}	Reverse Recovery Current	$V_{CC} = 200 \text{ V}$ $I_F = 50 \text{ A}$ $di_F/dt = -300 \text{ A}/\mu\text{s}$ $L < 0.05 \mu\text{H}$ $T_j = 100 ^{\circ}\text{C}$		32	38	А	

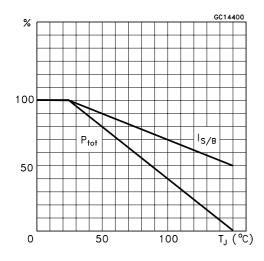
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^{*} Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 % To evaluate the conduction losses of the diode use the following equations: $V_F = 1.5 + 0.0055 \ I_F \qquad P = 1.5 \ I_{F(AV)} + 0.0055 \ I_{F(RMS)}^2$ # See test circuits in databook introduction

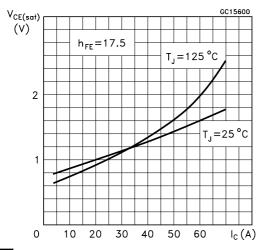
Safe Operating Areas



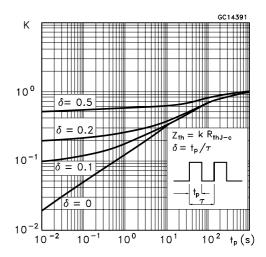
Derating Curve



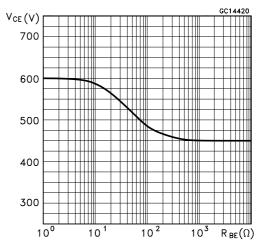
Collector Emitter Saturation Voltage



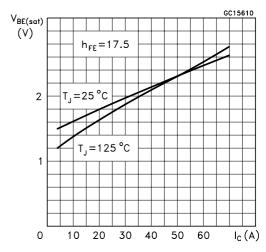
Thermal Impedance



Collector-emitter Voltage Versus base-emitter Resistance

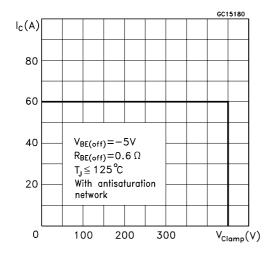


Base-Emitter Saturation Voltage

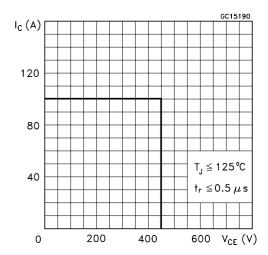


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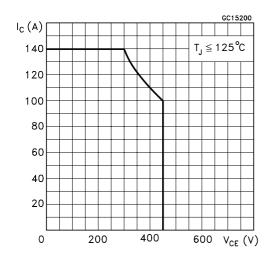
Reverse Biased SOA



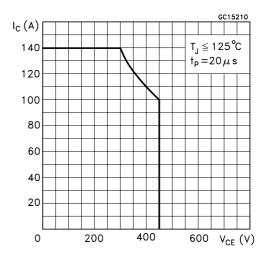
Foward Biased SOA



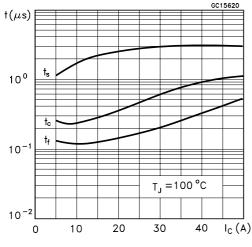
Reverse Biased AOA



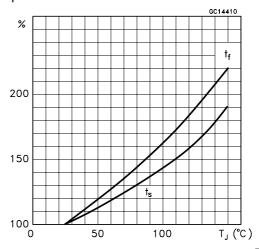
Forward Biased AOA



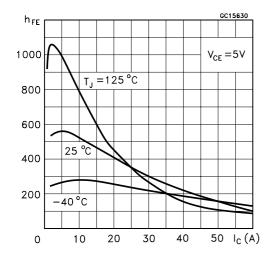
Switching Times Inductive Load



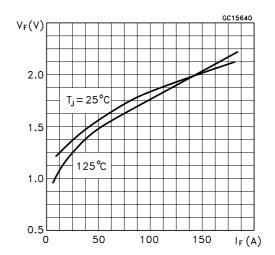
Switching Times Inductive Load Versus Temperature



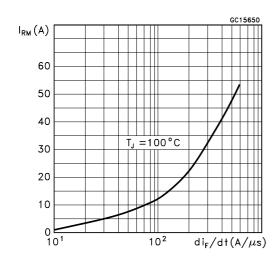
Dc Current Gain



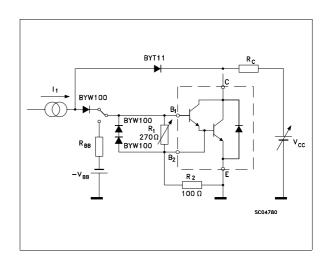
Typical V_F Versus I_F



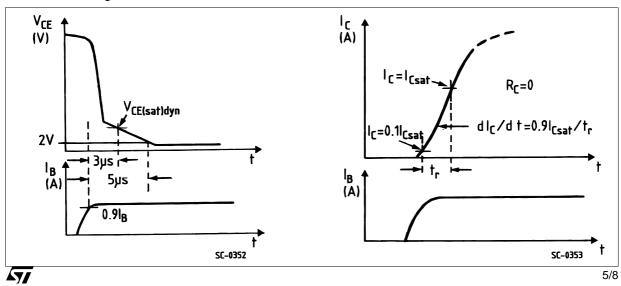
Peak Reverse Current Versus diF/dt



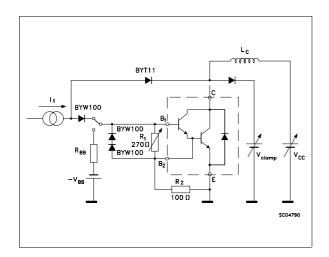
Turn-on Switching Test Circuit



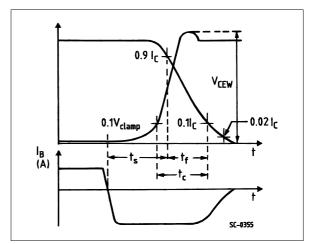
Turn-on Switching Waveforms



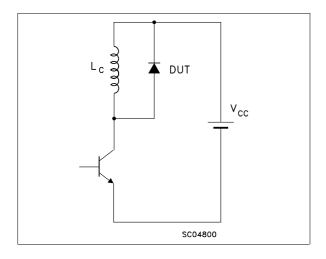
Turn-on Switching Test Circuit



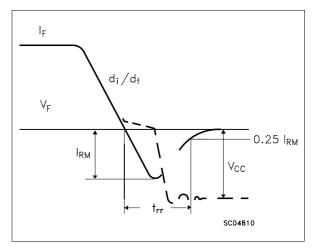
Turn-off Switching Waveforms



Turn-off Switching Test Circuit of Diode

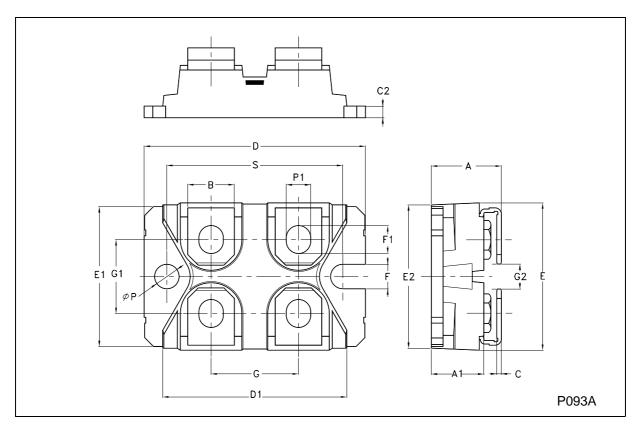


Turn-off Switching Waveform of Diode



ISOTOP MECHANICAL DATA

DIM.		mm			inch	
DIN.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	11.8		12.2	0.465		0.480
A1	8.9		9.1	0.350		0.358
В	7.8		8.2	0.307		0.322
С	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
Е	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
Р	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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