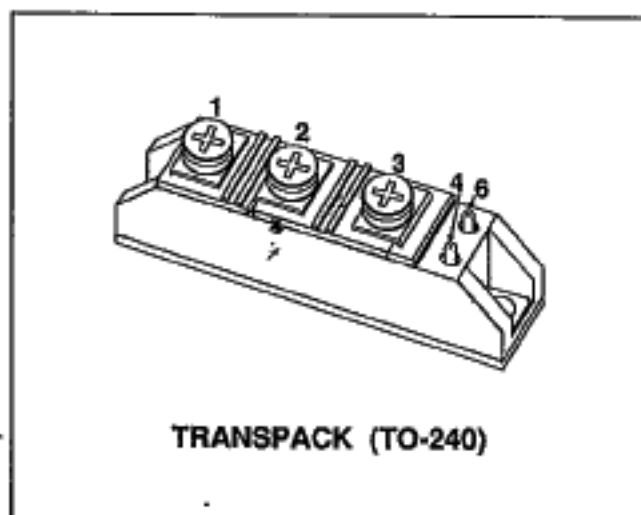
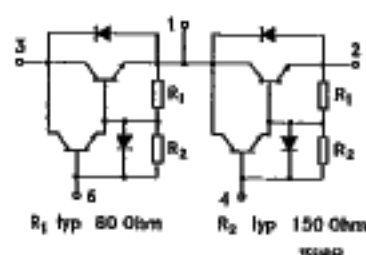


- POWER MODULE WITH INTERNAL ISOLATION (2500V RMS)
- LOW  $R_{th}$  JUNCTION TO CASE
- FREEWHEELING DIODE
- ADAPTED FOR HIGH POWER SWITCHING APPLICATIONS

**INDUSTRIAL APPLICATIONS:**

- MOTOR CONTROL
- HIGH POWER SMPS AND UPS
- HIGH POWER DC/DC AND DC/AC CONVERTERS


**TRANSPACK (TO-240)**
**INTERNAL SCHEMATIC DIAGRAM**

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	700	V
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	1000	V
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -2V$ )	1000	V
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	1000	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	35	A
$-I_C$	Reverse Collector Current	35	A
$I_B$	Base Current	10	A
$-I_{CSM}$	Collector Surge Current	350	A
$P_{tot}$	Total Dissipation at $T_C = 25^\circ C$	400	W
$T_{stg}$	Storage Temperature	-55 to 150	$^\circ C$
$T_J$	Max. Operating Junction Temperature	150	$^\circ C$
$V_{ISO}$	Insulation Withstand Voltage (AC-RMS)	2500	V

## THERMAL DATA

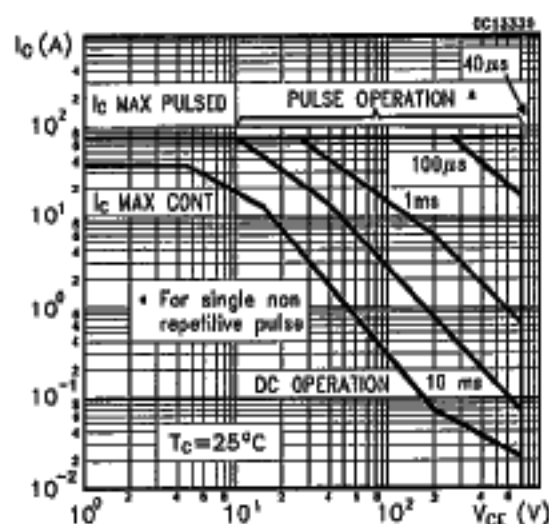
$R_{th(j-case)}$	Thermal Resistance Junction-case (quarter bridge)	Max	0.62	$^{\circ}\text{C}/\text{W}$
$R_{th(j-case)}$	Thermal Resistance Junction-case (diode)	Max	1.1	$^{\circ}\text{C}/\text{W}$
$R_{th(c-h)}$	Thermal Resistance Case-heatsink With Conductive Grease Applied	Max	0.05	$^{\circ}\text{C}/\text{W}$

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

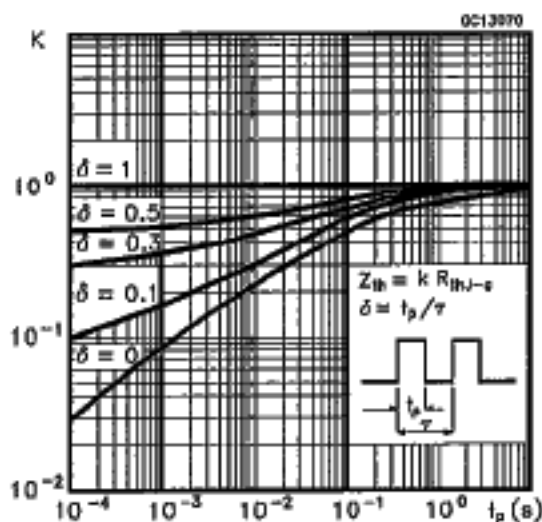
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 1000\text{ V}$ $V_{CE} = 700\text{ V } T_j = 125^{\circ}\text{C}$			2 10	mA mA
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -2\text{ V}$ )	$V_{CE} = 1000\text{ V}$ $V_{CE} = 700\text{ V } T_j = 125^{\circ}\text{C}$			2 10	mA mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 2\text{ V}$			150	mA
$V_{CE(sat)^*}$	Collector-Emitter Saturation Voltage	$I_C = 35\text{ A } I_B = 3.5\text{ A}$		1.7	3	V
$V_{BE(sat)^*}$	Base-Emitter Saturation Voltage	$I_C = 35\text{ A } I_B = 3.5\text{ A}$		2.1	3.5	V
$h_{FE}^*$	DC Current Gain	$I_C = 35\text{ A } V_{CE} = 3\text{ V}$ $I_C = 35\text{ A } V_{CE} = 5\text{ V}$	10 15	35		
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 300\text{ V } I_C = 35\text{ A}$ $I_{B1} = 3.5\text{ A } V_{BE(off)} = -5\text{ V}$ $T_j \leq 125^{\circ}\text{C}$ (see test circuits)		3.2 0.9	5 1.5	$\mu\text{s}$ $\mu\text{s}$
$V_F$	Diode Forward Voltage	$I_F = 35\text{ A}$		1.4	2	V
$t_{rr}$	Diode Reverse Recovery Time	$I_F = 35\text{ A } di/dt = 100\text{ A}/\mu\text{s}$		0.3	0.6	$\mu\text{s}$

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

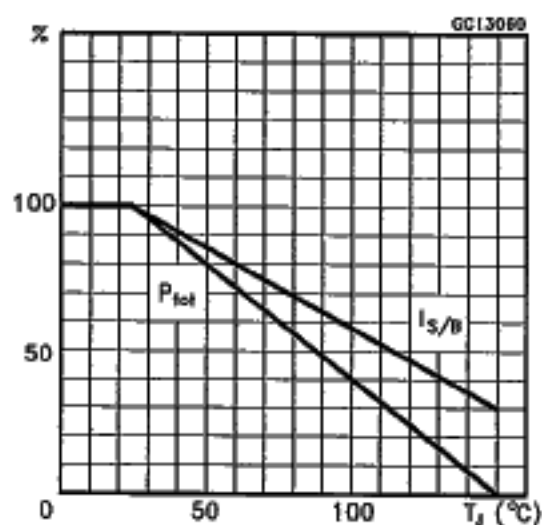
## Safe Operating Areas



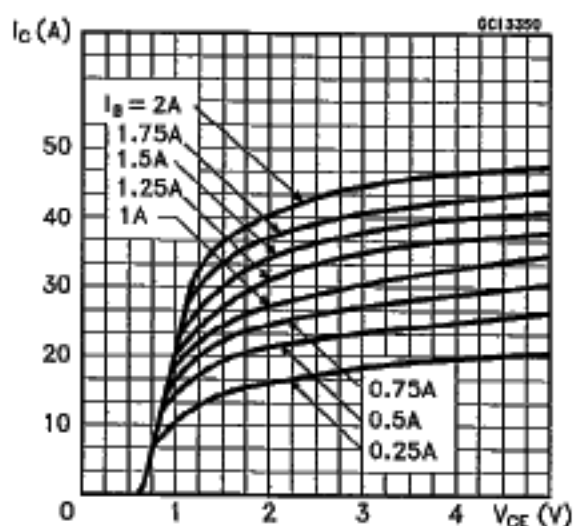
## Thermal Impedance



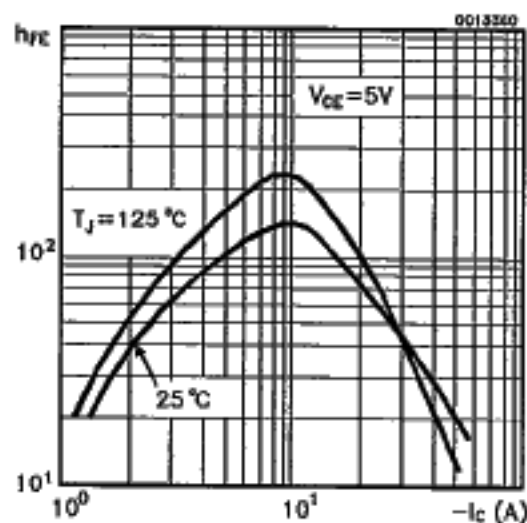
### Derating Curves



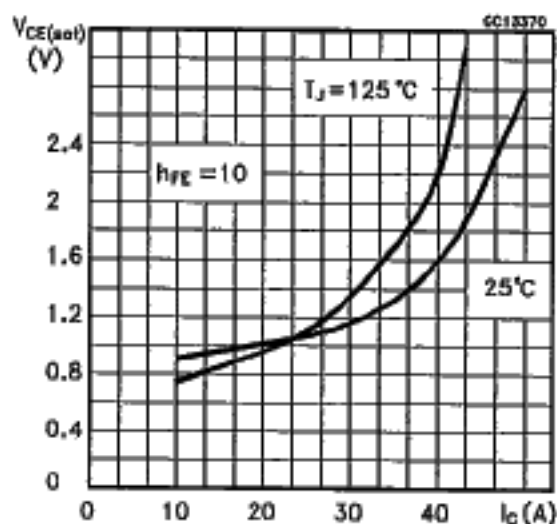
### Output Characteristics



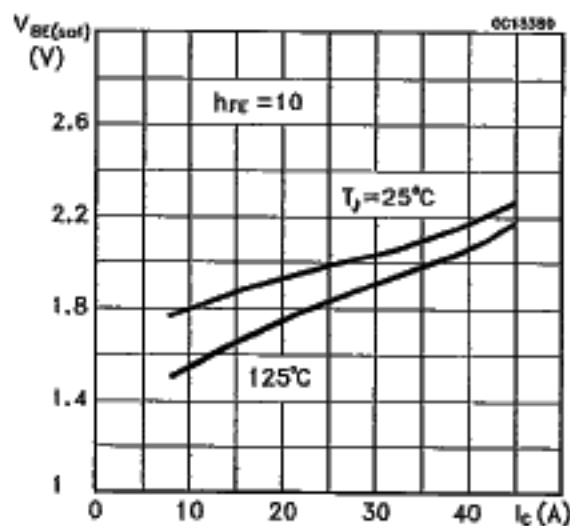
### DC Current Gain



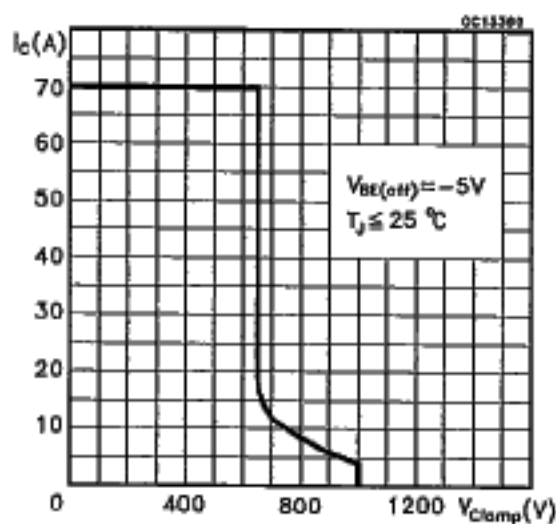
### Collector-Emitter Saturation Voltage



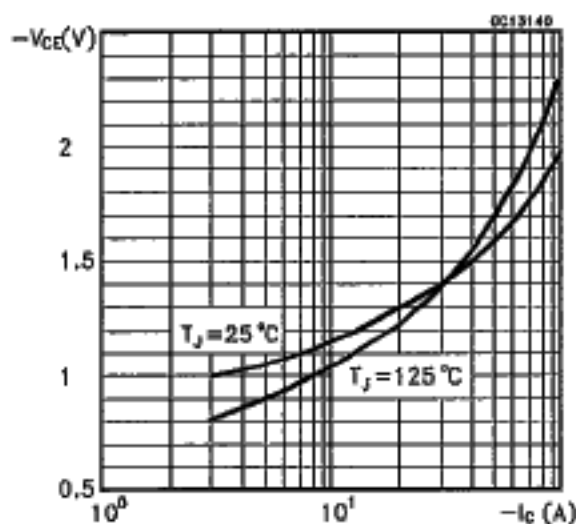
### Base-Emitter Saturation Voltage



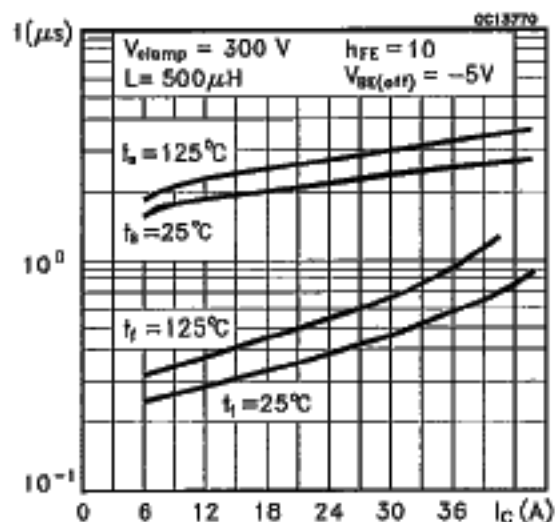
### Reverse Biased SOA



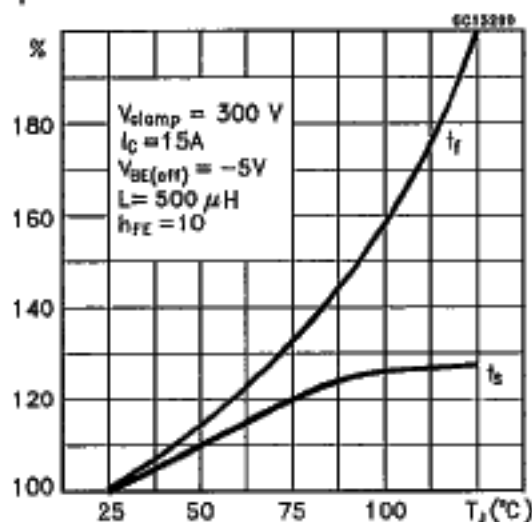
### Typical $V_F$ Versus $I_F$



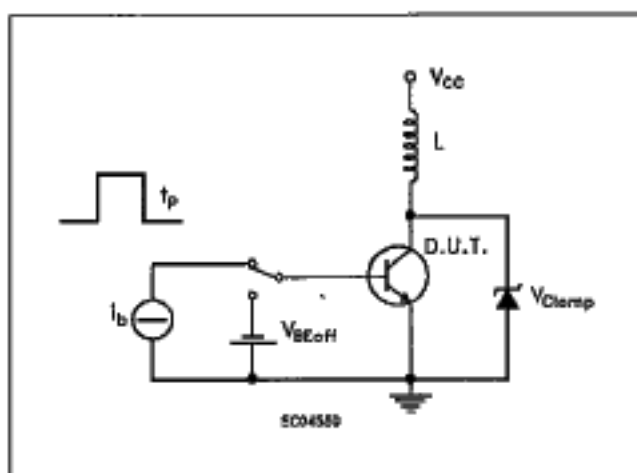
### Switching Times Inductive Load



### Switching Times Inductive Load Versus Temperature

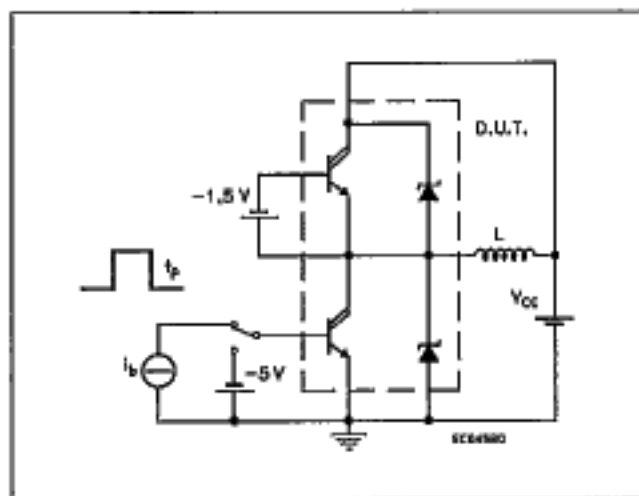


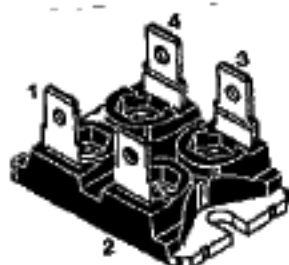
### RBSOA Test Circuit



$t_p$  adjusted for nominal  $I_C$ ;  $I_C/I_B = 10$

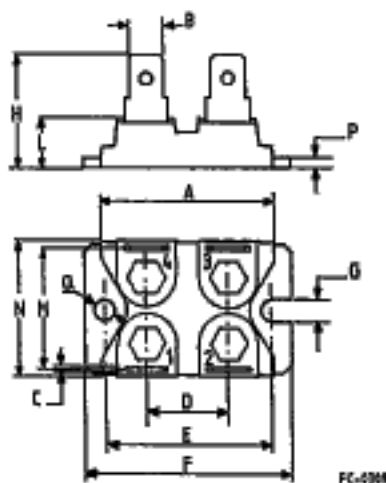
### Switching Times Test Circuit





**ISOTOP**  
Fast-on version  
sales types with the suffix F

### MECHANICAL DATA



FC-098

	DIMENSIONS			
	mm		Inches	
	min.	max	min.	max
A	31.5	31.7	1.240	1.248
B	6.2	6.4	0.244	0.252
C	0.75	0.85	0.029	0.033
D	14.9	15.1	0.588	0.590
E	30.1	30.3	1.185	1.193
F	38	38.2	1.496	1.503
G	4	—	0.157	—
H	20.3	20.7	0.799	0.815
L	8.9	9.1	0.350	0.358
M	22.4	23	0.881	0.905
N	25.2	25.4	0.992	1.000
P	1.95	2.05	0.076	0.080
Q	4	—	0.157	—

### PIN CONNECTIONS

#### MOSFET

pin 1: Source      pin 2: Gate  
pin 3: Drain      pin 4: Source sensings

#### DARLINGTON

pin 1: Emitter      pin 2: Base1  
pin 3: Collector    pin 4: Base 2

#### TRANSISTOR

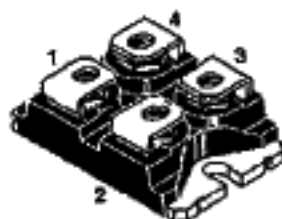
pin 1: Emitter      pin 2: Base  
pin 3: Collector    pin 4: Emitter sensing

Torque: Mounting  $1.3 \pm 0.2$  N · m (max)

Weight: Package 25.5 g

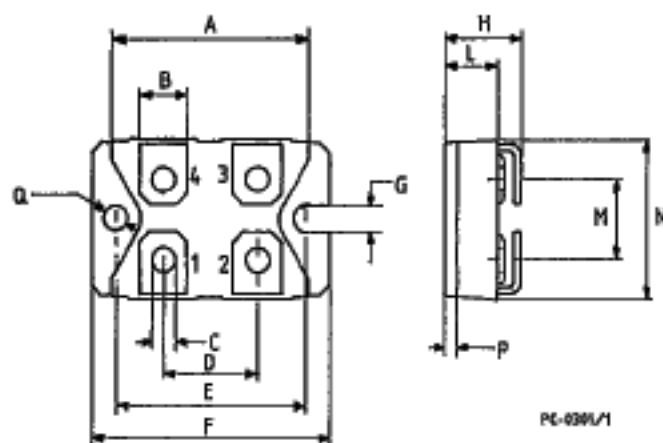
Note: The mechanical data are the same for the 3 pin version  
(4th pin missing)

T-91-20



**ISOTOP**  
Screw version  
sales types with the suffix V

**MECHANICAL DATA**



PC-0281/L1

	DIMENSIONS			
	mm		Inches	
	min.	max	min.	max
A	31.5	31.7	1.240	1.248
B	7.8	8.2	0.307	0.322
C	4.1	4.3	0.161	0.169
D	14.9	15.1	0.586	0.590
E	30.1	30.3	1.185	1.193
F	38	38.2	1.496	1.503
G	4	-	0.157	-
H	11.8	12.2	0.464	0.480
L	8.9	9.1	0.350	0.358
M	12.6	12.8	0.496	0.503
N	25.2	25.4	0.992	1.000
P	1.95	2.05	0.076	0.080
Q	4	-	0.157	-

**PIN CONNECTIONS**

**MOSFET**

pin 1: Source      pin 2: Gate  
pin 3: Drain      pin 4: Source sensing

**DARLINGTON**

pin 1: Emitter      pin 2: Base1  
pin 3: Collector    pin 4: Base 2

**TRANSISTOR**

pin 1: Emitter      pin 2: Base  
pin 3: Collector    pin 4: Emitter sensing

Torque: Terminal  $1.3 \pm 0.2 \text{ N} \cdot \text{m}$  (max)  
Mounting  $1.3 \pm 0.2 \text{ N} \cdot \text{m}$  (max)

Weight: Package 29 g  
4 Screws: 7.5 g

Note: The mechanical data are the same for the 3 pin version  
(4th pin missing)

