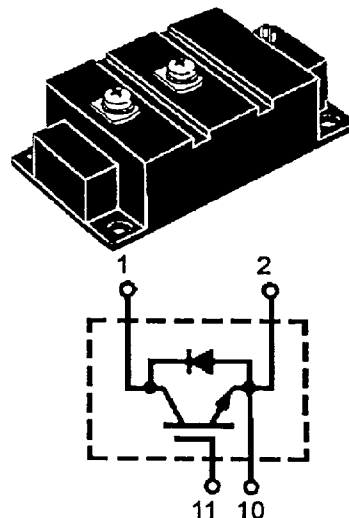
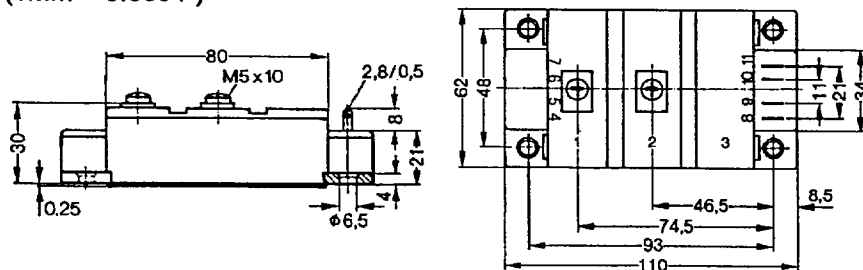


Hybrid IGBT Power Modules

$$\begin{aligned} V_{CE} &= 1200V \\ I_{C25} &= 475A \end{aligned}$$


Symbol	Condition	Max. Rating	
V_{CES}	$T_s = 25^\circ\text{C}$	1200	V
V_{GES}		± 30	V
I_{C25}	$T_s = 25^\circ\text{C}$	475	A
I_{C65}	$T_s = 65^\circ\text{C}$	375	A
I_{CM}	$T_s = 25^\circ\text{C}, 1\text{ ms}$	950	A
I_F	$T_s = 25^\circ\text{C}$	324	A
I_{FM}	$T_s = 25^\circ\text{C}, 1\text{ms}$	650	A
P_C	$T_s = 25^\circ\text{C}; \text{IGBT}$	1650	W
	Diode	500	
T_J		-40 ... +150	$^\circ\text{C}$
T_{stg}		-40 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60Hz, RMS $t = 1\text{ minute}$	3000	V~
	$I_{ISOL} = 1\text{mA}$ $t = 1\text{s}$	3600	V~
R_{thJS}	IGBT	0.076	K/W
R_{thJS}	Diode	0.25	K/W
Md	Tightening torque for mounting	2.25 ... 2.75 20 ... 25	Nm lb.-in.
	Terminal connection torque	2.50 ... 3.70 22 ... 33	Nm lb.-in.
Weight		0.25 8.85	kg oz.

Dimensions are in mm
(1mm = 0.0394")



Features:

- MOS - input (voltage controlled)
- Low saturation voltage
- High short circuit capability
- No latch-up
- Ultra fast free wheeling diode
- Low conduction and commutation losses
- Pulse frequency up to 20kHz
- Package with DCB metal-ceramic base plate

Applications:

- AC motor speed control
- DC servo and robot drives
- Uninterruptible power supplies
- Switched mode and resonant mode power supplies
- Induction heating
- DC Choppers

Advantages:

- Space and weight savings
- Simple mounting, same torque for mounting and terminals
- Reduced protection circuits
- High $V_{GE(th)}$ for good noise immunity

94502 (2/94)

IXYS Corporation
3540 Bassett Street, Santa Clara, CA 9505-2704
Phone: 408-982-0700 • Fax: 08-496-0670

IXYS Semiconductor GmbH
POB 1180, D-68619 Lampertheim, Germany
Phone: +49-6206-5030 • Fax: +49-6206-503627

IGBT Characteristics

($T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Condition	min.	Rating typ.	max.
V_{CES}	$I_C = 35\text{mA}$, $V_{GE} = 0\text{V}$	1200		V
$V_{GE(th)}$	$I_C = 100\text{mA}$, $V_{GE} = 0\text{V}$	5		V
I_{CES}	$V_{CE} = 960\text{V}$, $V_{GE} = 0\text{V}$			14 mA
I_{CES}	$V_{CE} = 960\text{V}$, $V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$		56	
I_{CES}	$V_{CE} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 1 mA
$V_{CE(sat)}$	$V_{GE} = 15$, $I_C = 375\text{A}$			4 V
C_{ies}	$V_{CE} = 25\text{V}$,		54	nF
C_{res}	$f = 1\text{MHz}$		4	nF
C_{oss}				nF
$t_{d(off)}$	Inductive load (Fig. 1)		450	ns
t_f	$I_C = 400\text{A}$		975	ns
t_{rv}	$V_{CE} = 600\text{V}$		150	ns
E_{off}	$T_J = 120^\circ\text{C}$		135	mJ
$t_{d(on)}$	$R_G = 0.47 \Omega$		400	ns
SCSOA	$V_{CE} = 600\text{V}$, $V_{GE} = 15\text{V}$ $t_p = 10\mu\text{s}$, $T_J = 125^\circ\text{C}$ dynamic conditions: see Fig. 3	10		μs

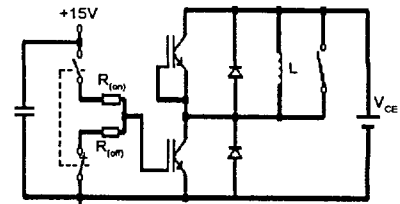


Fig. 1: Test circuit for $E_{(on)}$, $E_{(off)}$, SCSOA, and SSOA (RBSOA)
 $R_{(on)} = 1.2 \text{ Ohm}$ $L > 100\mu\text{H}$
 $R_{(off)} = 3.3 \text{ Ohm}$ for SSOA (RBSOA), $E_{(off)}$

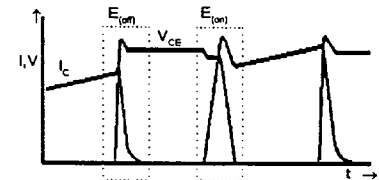


Fig. 2: Typical V/I waveforms for inductive load

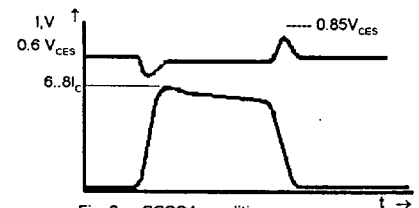


Fig. 3: SCSOA conditions
 $V_{CE} = 0.6V_{CES}$, $V_{CES} = 0.85V_{CES}$, $T_J = 125^\circ\text{C}$

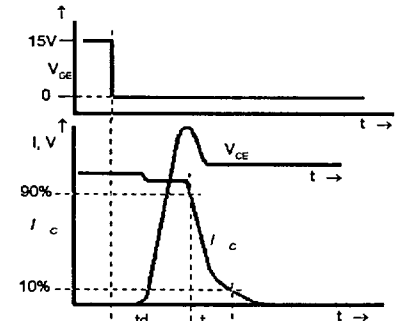


Fig. 4: Turn-off waveforms ($E_{(off)}$, SCSOA (RBSOA))

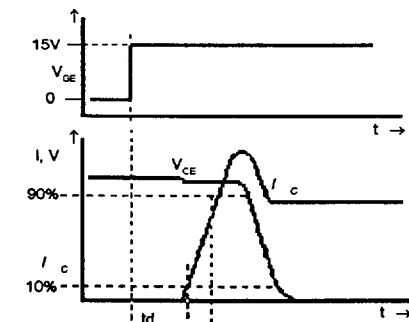


Fig. 5: Turn-on waveforms ($E_{(on)}$)

Diode Characteristics

($T_J = 25^\circ\text{C}$, unless otherwise specified)

V_F	$I_F = 325\text{A}$, $V_{GE} = 0\text{V}$		2.10	V
I_{RM}	$I_F = 325\text{A}$, $V_{CE} = 600\text{V}$ $T_J = 125^\circ\text{C}$	TBD		A
t_{rr}	$-di_F / dt = 2400\text{A}/\mu\text{s}$	TBD		ns

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Phone: +49-6206-5030 • Fax: +49-6206-503627