IGBT with Reverse Blocking capability

$V_{CES} = \pm1200$ V
$I_{C25} = 55$ A
$V_{CE(sat)} = 2.3$ V typ.

TO-247 AD

G = Gate,   C = Collector,
E = Emitter,   TAB = Collector

IGBT		
Symbol	**Conditions**	**Maximum Ratings**
V_{CES}	T_{VJ} = 25°C to 150°C	$\pm$1200 V
V_{GES}		$\pm$ 20 V
I_{C25}	T_C = 25°C	55 A
I_{C90}	T_C = 90°C	35 A
I_{CM}	V_{GE} = 0/15 V; R_G = 22 Ω; T_{VJ} = 125°C	80 A
V_{CEK}	RBSOA, Clamped inductive load; L = 100 µH	600 V
P_{tot}	T_C = 25°C	300 W

Symbol	Conditions	min.	typ.	max.	
		Characteristic Values			
		(T_{VJ} = 25°C, unless otherwise specified)			
$V_{CE(sat)}$	I_C = 30 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.3	2.7	V
	T_{VJ} = 125°C		2.8		V
$V_{GE(th)}$	I_C = 2 mA; V_{GE} = V_{CE}	4		8	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			50	µA
	T_{VJ} = 125°C		3.0		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = $\pm$ 20 V			500	nA
Q_{Gon}	V_{CE} = 120V; V_{GE} = 15 V; I_C = 35 A		90		nC

Features

- IGBT with NPT (non punch through) structure
- reverse blocking capability
  - function of series diode monolithically integrated, no external series diode required
  - soft reverse recovery
- positive temperature coefficient of saturation voltage
- Epoxy of TO-247 package meets UL 94V-0

Applications

converters requiring reverse blocking capability:
  - current source inverters
  - matrix converters
  - bi-directional switches
  - resonant converters
  - induction heating
  - auxiliary switches for soft switching in the main current path

IXYS reserves the right to change limits, test conditions and dimensions.

IGBT

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) typ.	
External diode DSEP30-12 - diagram see Fig. 17			
$t_{d(on)}$		31	ns
t_r	Inductive load, T_{VJ} = 125°C	54	ns
$t_{d(off)}$	V_{CE} = 600 V; I_C = 35 A	184	ns
t_f	V_{GE} = ±15 V; R_G = 15 Ω	24	ns
E_{on}		3.0	mJ
E_{off}		0.7	mJ
Internal diode - diagram see Fig. 18			
$t_{d(on)}$		29.5	ns
t_r		47	ns
$t_{d(off)}$	Inductive load, T_{VJ} = 125°C	183	ns
t_f	V_{CE} = 600 V; I_C = 35 A	46	ns
E_{on}	V_{GE} = ±15 V; R_G = 15 Ω	19.2	mJ
E_{off}		1.0	mJ
$E_{rec\ int}$		7	mJ
I_{RM}	I_F = 35 A; di_C/dt = -50 A/μs; T_{VJ} = 125°C	28.5	A
t_{rr}	V_{CE} = -600 V; V_{GE} = 15 V	2.1	μs
R_{thJC}		0.42	K/W

Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-55...+150	°C
T_{stg}		-55...+125	°C
M_d	mounting torque	0.8 - 1.2	Nm
F_C	mounting force with clip	20...120	N

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
R_{thCH}	with heatsink compound		0.25		K/W
Weight			6		g

TO-247 AD Outline

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

IXYS reserves the right to change limits, test conditions and dimensions.
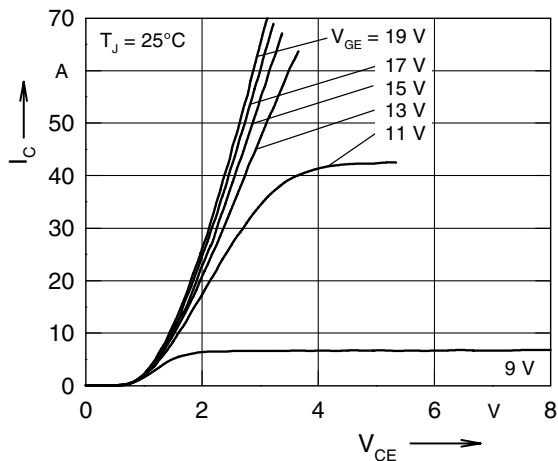
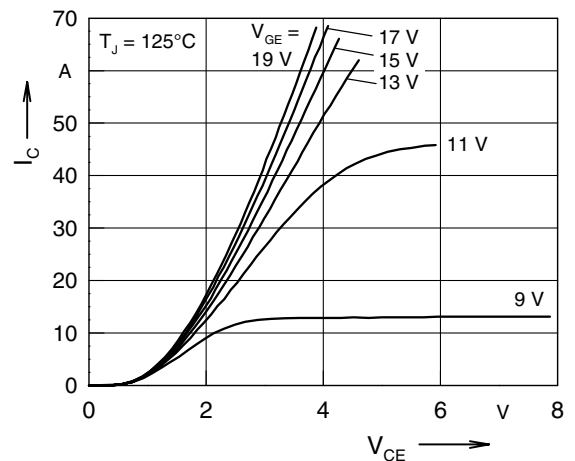Fig. 1 Typical output characteristics
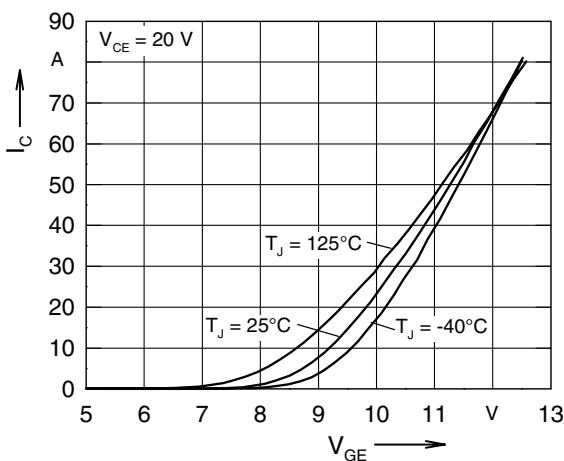

Fig. 2 Typical output characteristics

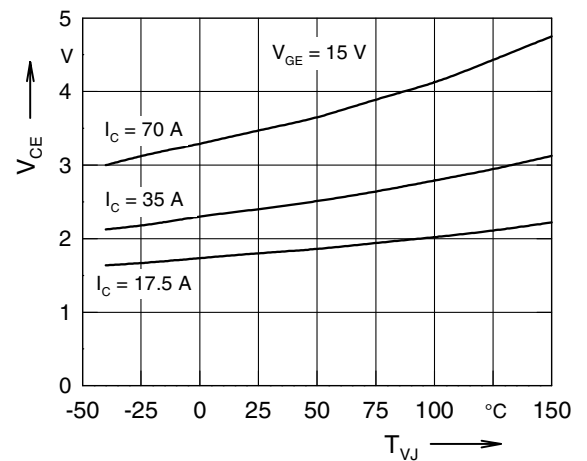Fig. 3 Typical transfer characteristics

Fig. 4 Typ. collector emitter saturation
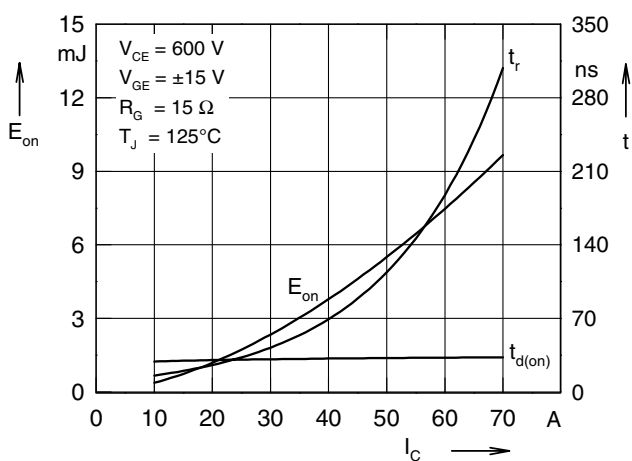as a function of case temperature

Fig. 5 Typ. turn on energy and switching times
vs. collector current, inductive switching
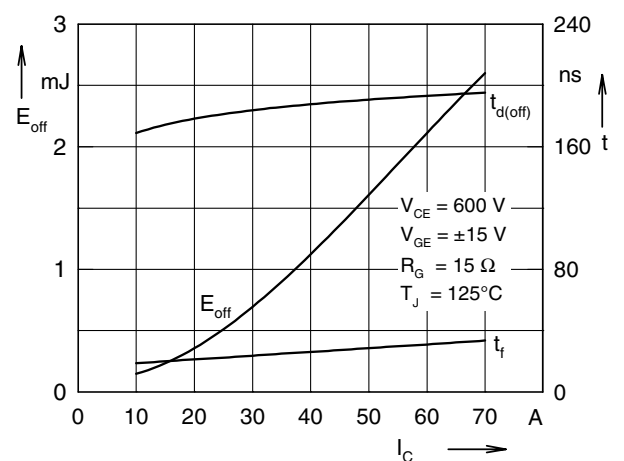with ext. free wheeling diode (Fig. 17)

Fig. 6 Typ. turn off energy and switching times vs.
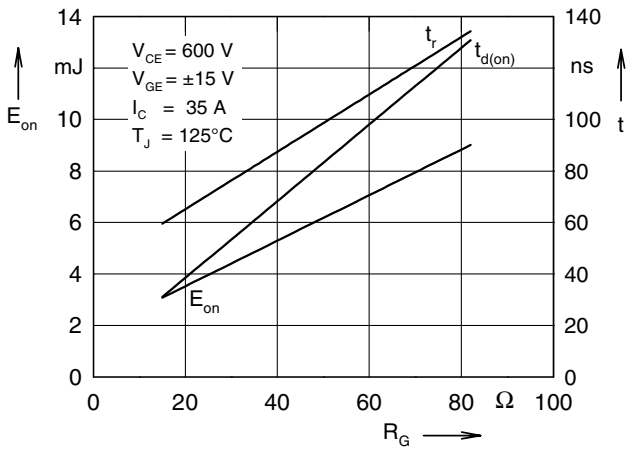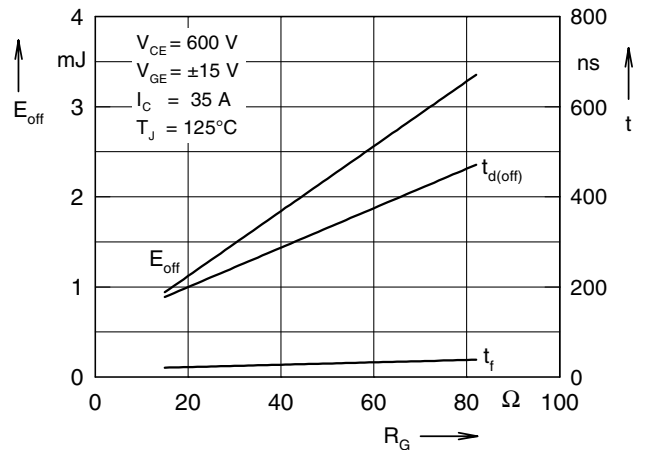collector current, inductive switching
with ext. free wheeling diode (Fig. 17)

IXYS reserves the right to change limits, test conditions and dimensions.

Fig. 7 Typ. turn on energy and switching times
vs. gate resistor, inductive switching
with ext. free wheeling diode (Fig. 17)

Fig. 8 Typ. turn off energy and switching times
vs. gate resistor, inductive switching
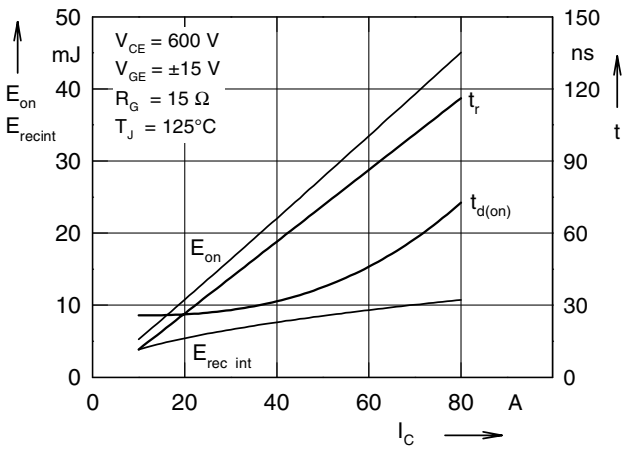with ext. free wheeling diode (Fig. 17)

Fig. 9 Typ. turn on energy and switching times
vs. collector current, inductive switching
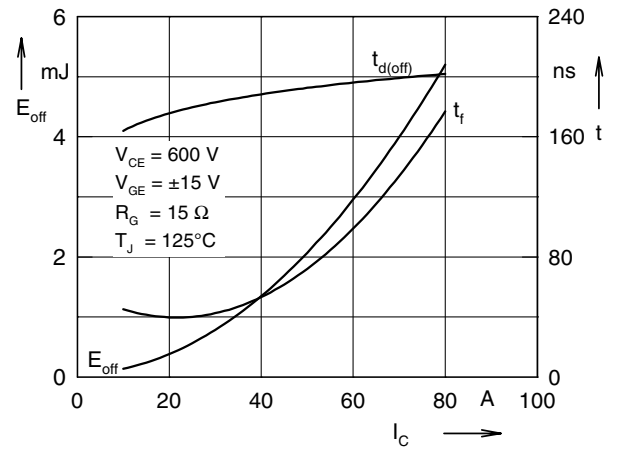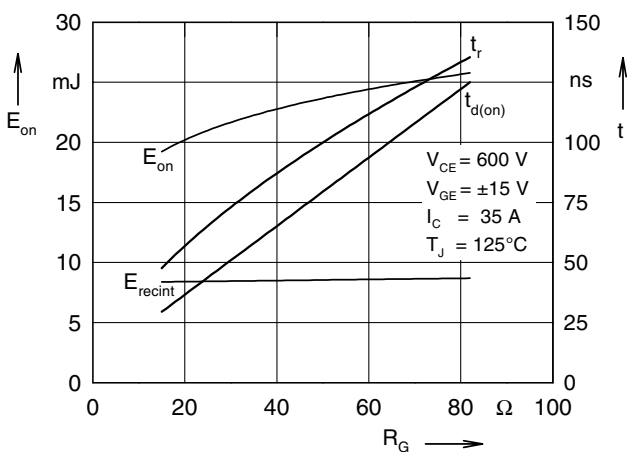with internal diode (Fig. 18)

Fig. 10 Typ. turn off energy and switching times
vs. collector current, inductive switching
with internal diode (Fig. 18)

Fig. 11 Typ. turn on energy and switching times
vs. gate resistor, inductive switching
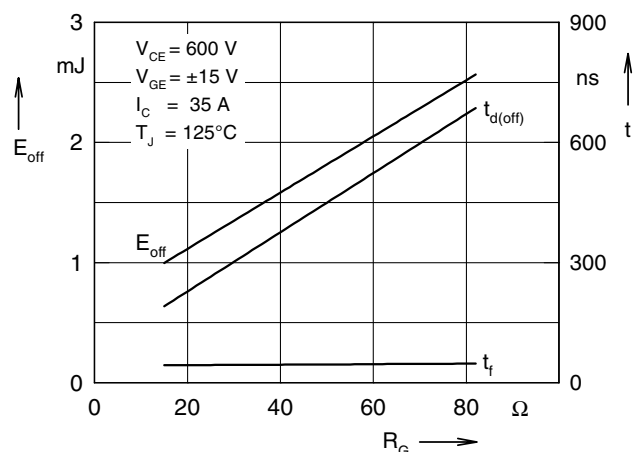with internal diode (Fig. 18)

Fig. 12 Typ. turn off energy and switching times
vs. gate resistor, inductive switching
with internal diode (Fig. 18)

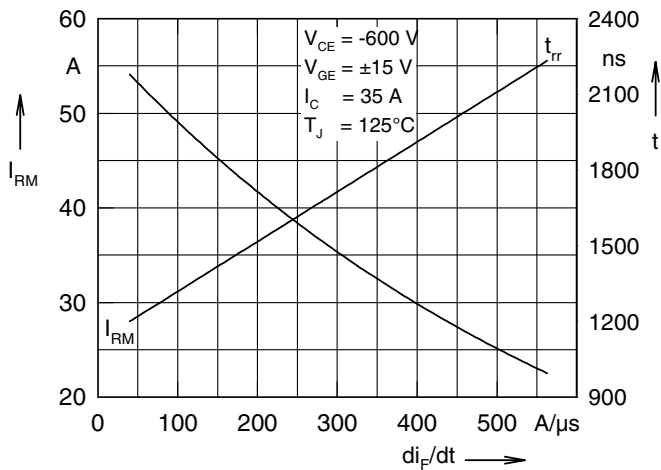IXYS reserves the right to change limits, test conditions and dimensions.

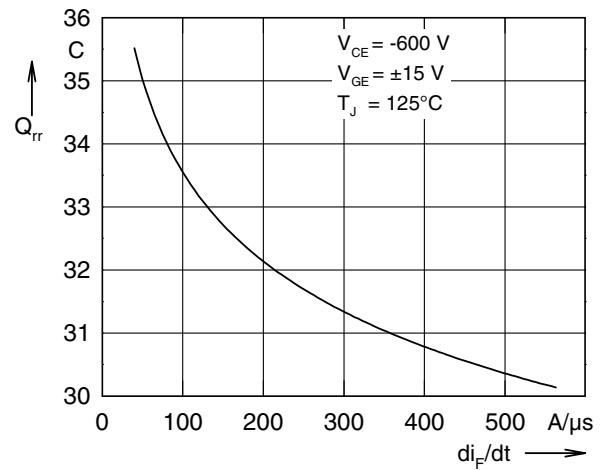Fig. 13 Typ. turn off characteristics
of the internal diode

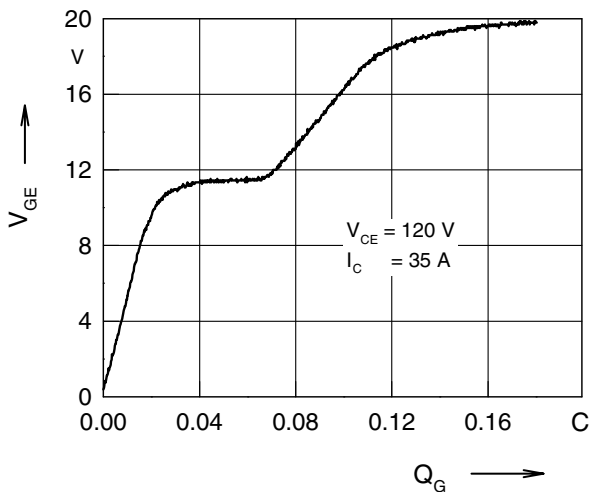Fig. 14 Typ. turn off characteristics
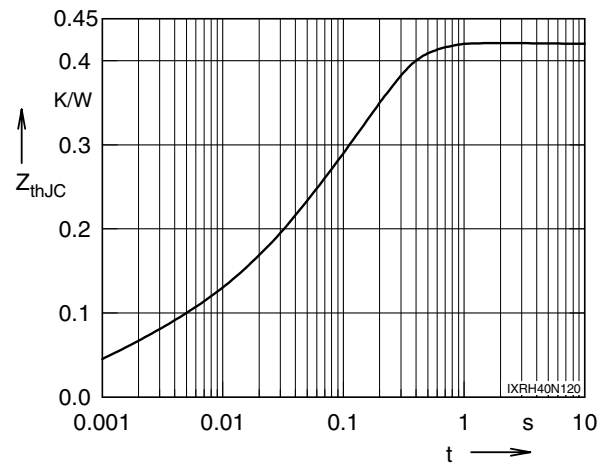of the internal diode

Fig. 15 Typical gate charge

Fig. 16 Typ. transient thermal impedance

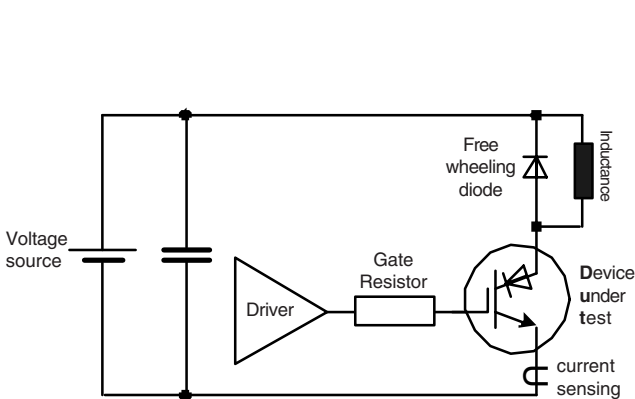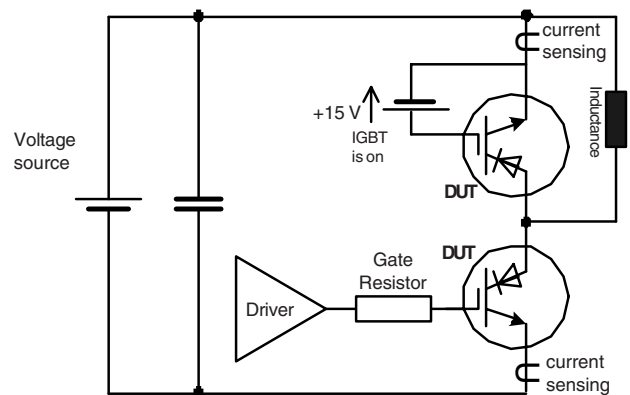| Ri	0.034	0.048	0.092	0.174	0.075
τ	0.0001	0.0035	0.02	0.142	0.18

Fig. 17 turn-on/turn-off with
external diode (DSEP 30-12)

Fig. 18 turn-on/turn-off with internal diode

IXYS reserves the right to change limits, test conditions and dimensions.