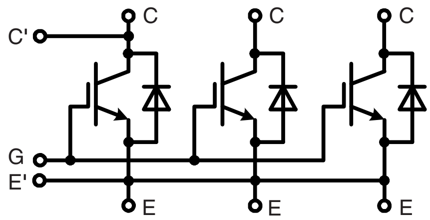
IGBT Module
Single switch

I_{C80} = 1200 A
V_{CES} = 3300 V
$V_{CE(sat)\ typ.}$ = 3.1 V

Short Circuit SOA Capability
Square RBSOA



IGBT			
Symbol	**Conditions**	**Maximum Ratings**	
V_{CES}	V_{GE} = 0 V	3300	V
V_{GES}		± 20	V
I_{C80}	T_C = 80°C	1200	A
I_{CM}	t_p = 1 ms; T_C = 80°C	2400	A
t_{SC}	V_{CC} = 2500 V; $V_{CEM\ CHIP}$ = ≤ 3300 V; V_{GE} ≤ 15 V; T_{VJ} ≤ 125°C	10	µs

Symbol	**Conditions**	**Characteristic Values** (T$_{VJ}$ = 25°C, unless otherwise specified) **min.**	**typ.**	**max.**	
$V_{CE(sat)}$ ✶	I_C = 1200 A; V_{GE} = 15 V; T_{VJ} = 25°C		3.1		V
	T_{VJ} = 125°C		3.8		V
$V_{GE(th)}$	I_C = 240 mA; V_{CE} = V_{GE}	6		8	V
I_{CES}	V_{CE} = 3300 V; V_{GE} = 0 V; T_{VJ} = 125°C			120	mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V; T_{VJ} = 125°C			500	nA
$t_{d(on)}$	Inductive load; T_{VJ} = 125°C; V_{GE} = ±15 V; V_{CC} = 1800 V; I_C = 1200 A; R_G = 1.5 Ω; L_σ = 100 nH		400		ns
t_r			200		ns
$t_{d(off)}$			1070		ns
t_f			440		ns
E_{on}			1890		mJ
E_{off}			1950		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		187		nF
C_{oes}			11.6		nF
C_{res}			2.2		nF
Q_{ge}	I_C = 1200 A; V_{CE} = 1800 V; V_{GE} = ± 15 V		12.1		µC
R_{thJC}				0.0085	K/W

✶ Collector emitter saturation voltage is given at chip level

Features

- NPT³ IGBT
  - Low-loss
  - Smooth switching waveforms for good EMC
- Industry standard package
  - High power density
  - AlSiC base-plate for high power cycling capacity
  - AlN substrate for low thermal resistance

Typical Applications

- AC power converters for
  - industrial drives
  - windmills
  - traction
- LASER pulse generator

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

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Diode

Symbol	Conditions	Maximum Ratings	
I_{F80}	T_C = 80°C	1200	A
I_{FSM}	V_R = 0 V; T_{VJ} = 125°C; t_p = 10 ms; half-sinewave	11000	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F ✷	I_F = 1200 A; T_{VJ} = 25°C		2.30		V
	T_{VJ} = 125°C		2.35		V
I_{RM}	V_{CC} = 1800 V; I_C = 1200 A; V_{GE} = ±15 V; R_G = 1.5 Ω; T_{VJ} = 125°C; Inductive load; L_σ = 100nH		1350		A
t_{rr}			1450		ns
Q_{RR}			1280		µC
E_{rec}			1530		mJ
R_{thJC}				0.017	K/W

✷ Forward voltage is given at chip level

Module

Symbol	Conditions		Maximum Ratings	
T_{JM}	max junction temperature		+150	°C
T_{VJ}	Operating temperature		-40...+125	°C
T_{stg}	Storage temperature		-40...+125	°C
V_{ISOL}	50 Hz		6000	V~
M_d	Mounting torque	Base-heatsink, M6 screws	4 - 6	Nm
		Main terminals, M8 screws	8 - 10	Nm

Symbol	Conditions		Characteristic Values min.	typ.	max.	
d_A	Clearance distance	terminal to base	23			mm
		terminal to terminal	19			mm
d_S	Surface creepage distance	terminal to base	33			mm
		terminal to terminal	33			mm
L_σ	Module stray inductance, C to E terminal			10		nH
$R_{term-chip}$ *)	Resistance terminal to chip			0.085		mΩ
R_{thCH}	per module; λ grease = 1 W/m·K			0.006		K/W
Weight				1500		g

*) $V = V_{CE(sat)} + R_{term\text{-}chip} \cdot I_C$ resp. $V = V_F + R_{term\text{-}chip} \cdot I_F$

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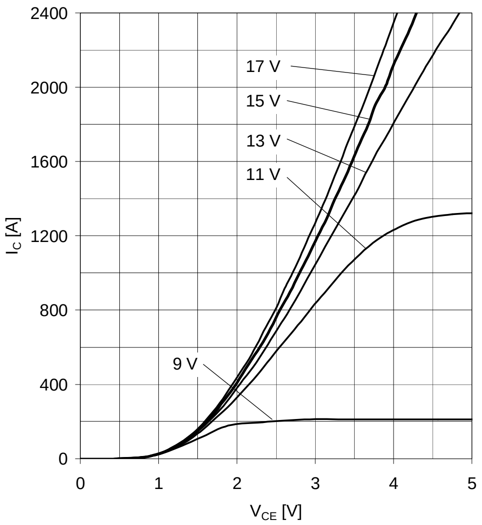

Fig. 1 Typical output characteristics, chip level

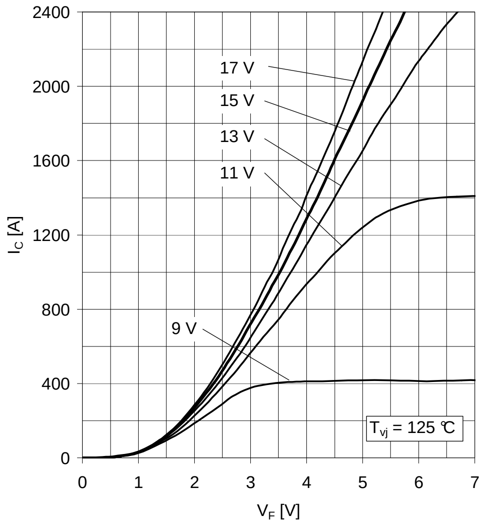

Fig. 2 Typical output characteristics, chip level

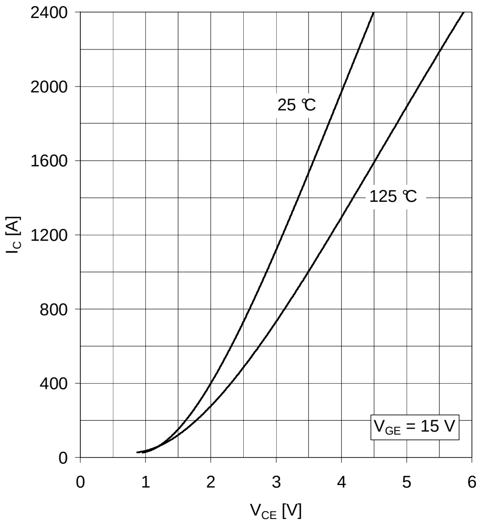

Fig. 3 Typical onstate characteristics, chip level

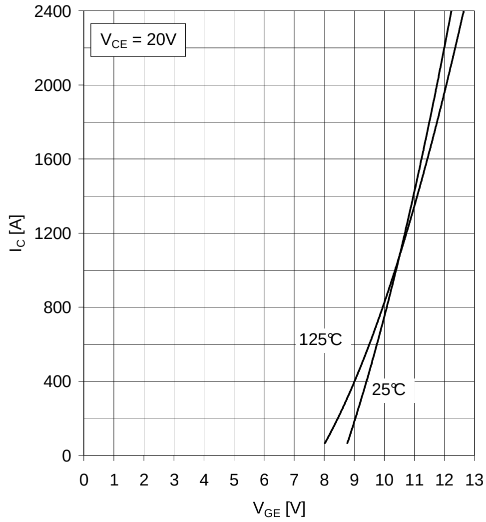

Fig. 4 Typical transfer characteristics, chip level

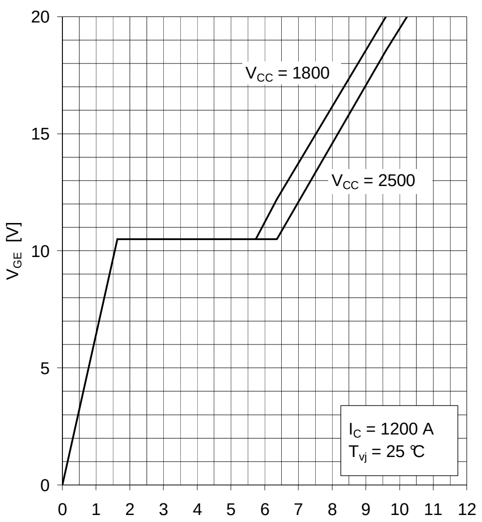

Fig. 5 Typical gate charge characteristics

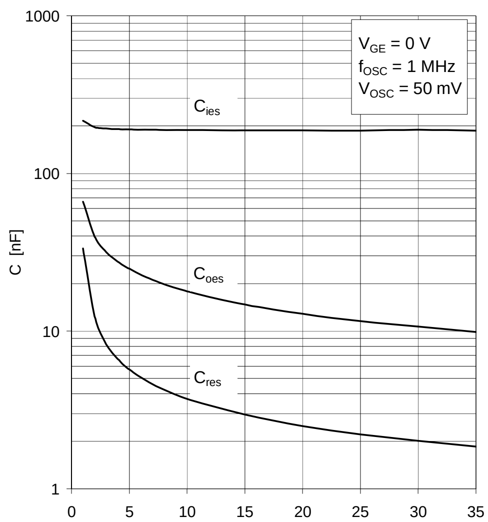

Fig. 6 Typical capacitances vs collector-emitter voltage

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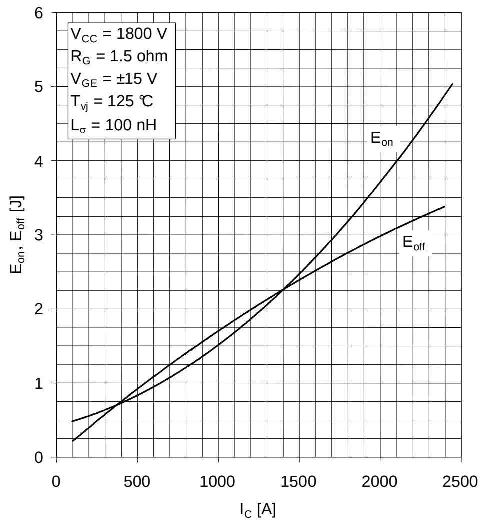

Fig. 7 Typical switching energies per pulse vs collector current

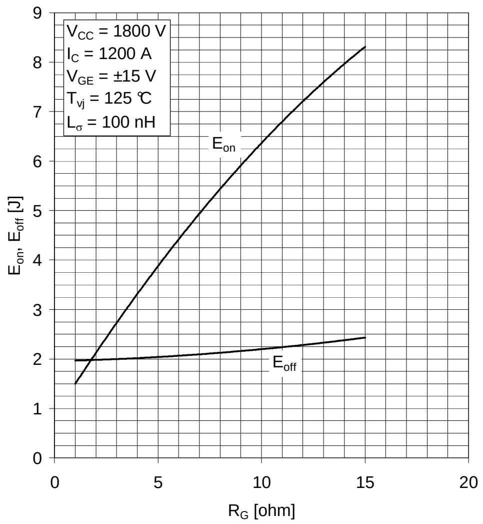

Fig. 8 Typical switching energies per pulse vs gate resistor

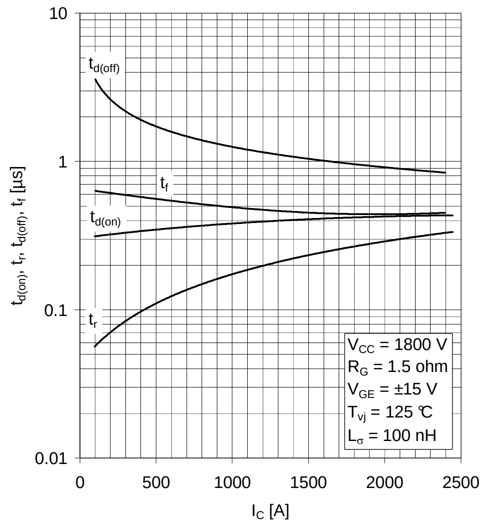

Fig. 9 Typical switching times vs collector current

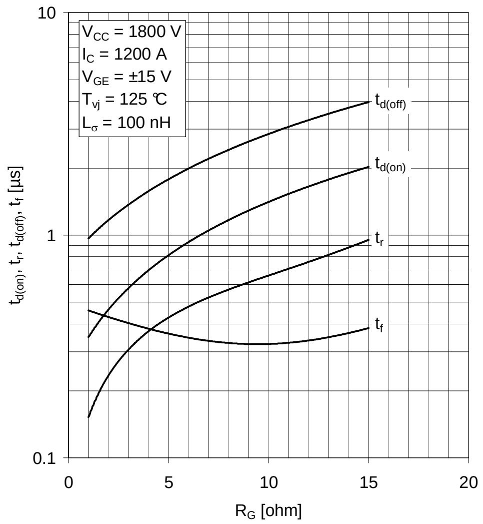

Fig. 10 Typical switching times vs gate resistor

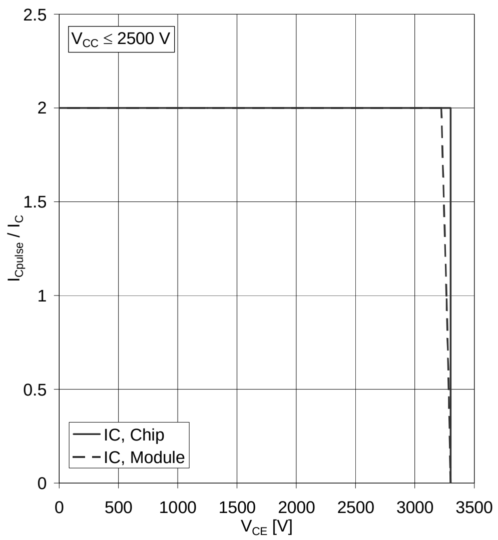

Fig. 11 Turn-off safe operating area (RBSOA)

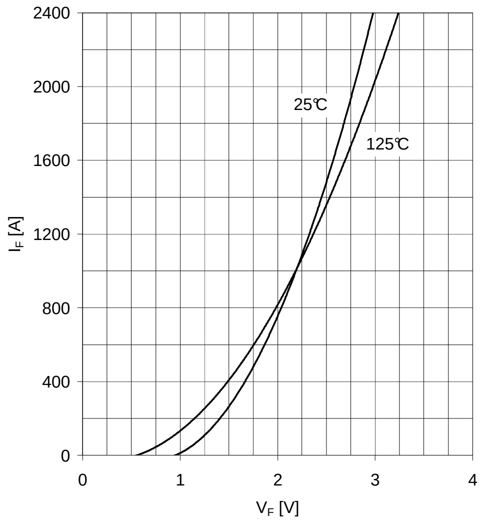

Fig. 12 Typical diode forward characteristics, chip level

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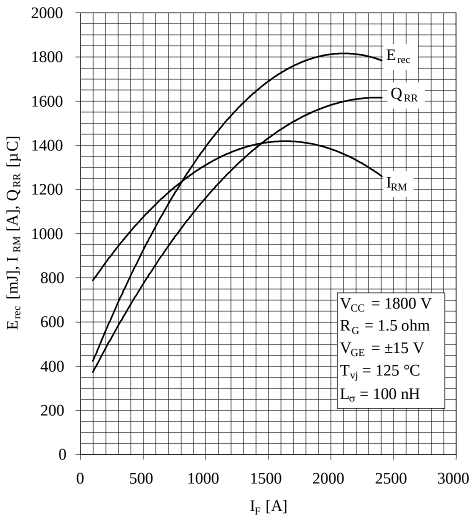

Fig. 13 Typical reverse recovery characteristics vs forward current

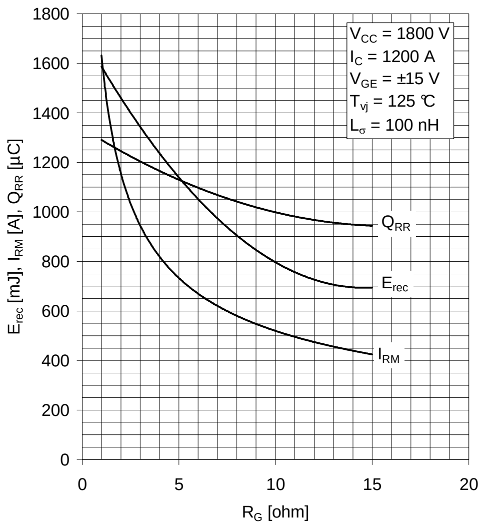

Fig. 14 Typical reverse recovery characteristics vs gate resistor

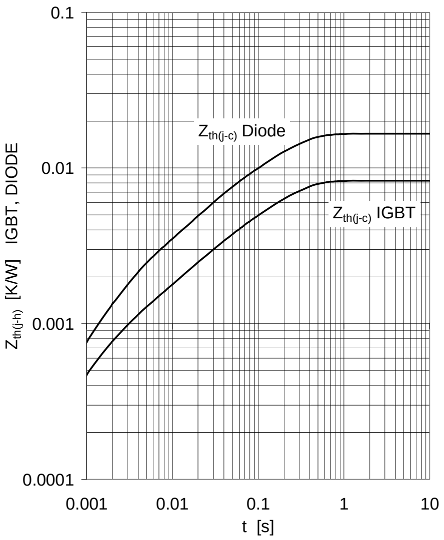

Fig. 15 Thermal impedance vs time

$$Z_{th\,JC}(t) = \sum_{i=1}^{n} R_i(1 - e^{-t/\tau_i})$$

	i	1	2	3	4
IGBT	Ri(K/kW)	5.50	1.53	0.621	0.646
	τ_i(ms)	193	31.2	8.0	1.48
DIODE	Ri(K/kW)	11.2	3.73	1.30	0.42
	τ_i(ms)	189	24.5	2.69	2.36

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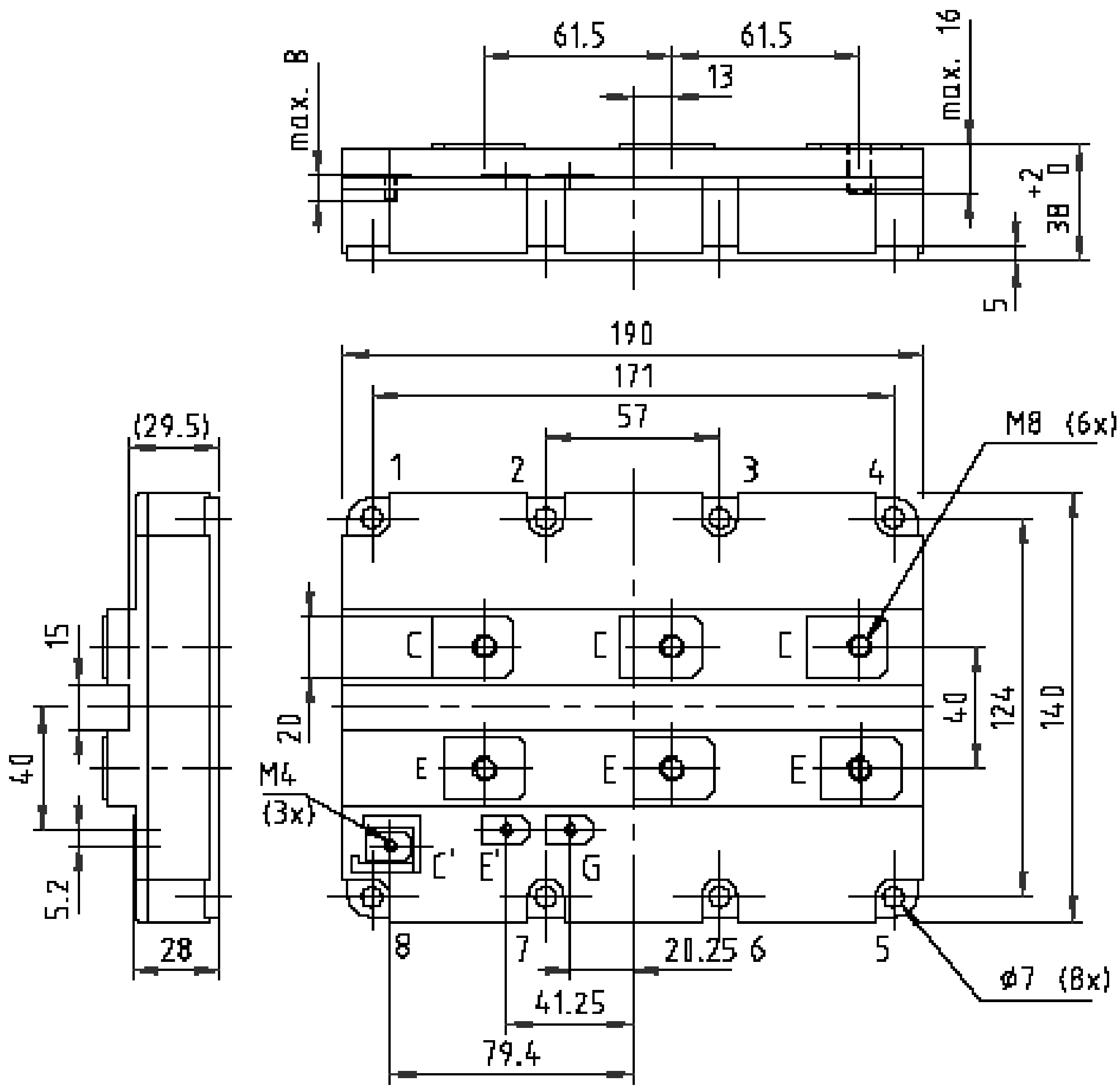
Outline drawing



Note: all dimensions are shown in mm