

GP600FHB16S

POWERLINE N-CHANNEL IGBT MODULE

APPLICATIONS

- High Power Switching.
- Motor Control.
- UPS.
- AC And DC Servo Drive Amplifiers.

FEATURES

- n - Channel.
- Enhancement Mode.
- High Input Impedance.
- High Switching Speed.
- Latch-Free Operation.
- Low Forward Voltage Drop.
- Isolated Base.

CIRCUIT

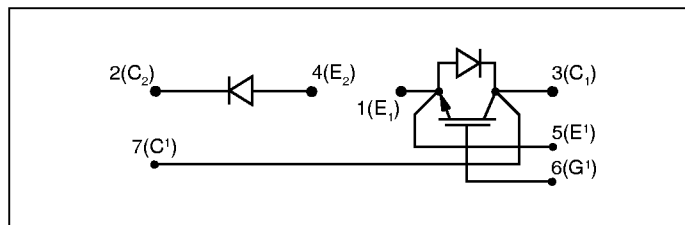


Fig.1 Chopper circuit diagram

RATINGS

T_{case} = 25°C unless stated otherwise.				
Symbol	Parameter	Test Conditions	Max.	Units
V _{CES}	Collector-emitter voltage	V _{GE} = 0V	1600	V
V _{GES}	Gate-emitter voltage	-	±20	V
I _C	Collector current	DC, T _{case} = 25°C	600	A
I _{C(PK)}		1ms, T _{case} = 25°C	1200	A
P _{max}	Maximum power dissipation (per arm)	T _{case} = 25°C (Transistor)	4150	W
V _{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	3400	V

TYPICAL KEY PARAMETERS

V _{CES}	1600V
V _{CE(sat)}	3.5V
I _{C(CONT)}	600A
I _{C(PK)}	1200A

PACKAGE OUTLINE

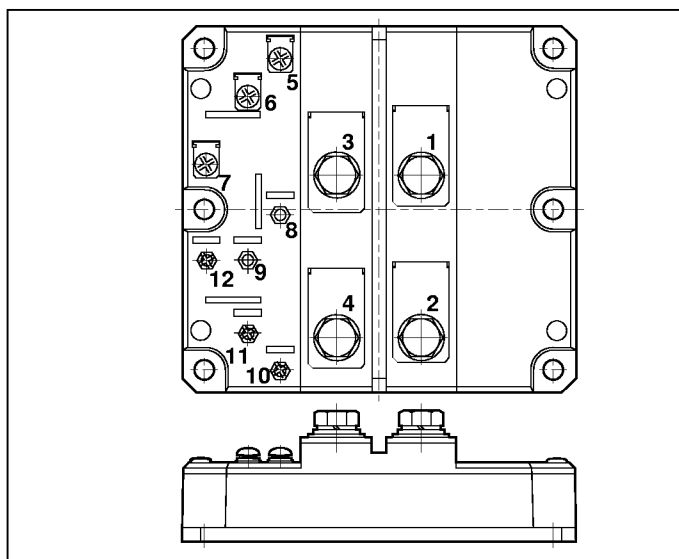


Fig. 2 Outline type code: F.

See package details for further information.

GP600FHB16S

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - transistor	DC junction to case	Per module	-	30	°C/kW
$R_{th(j-c)}$	Thermal resistance - diode	DC junction to case	Per arm	-	60	°C/kW
			Per module	-	30	°C/kW
$R_{th(c-h)}$	Thermal resistance - Case to heatsink	Mounting torque 5Nm (with mounting grease)	Per module	-	8	°C/kW
T_j	Junction temperature	Transistor		-	150	°C
		Diode		-	125	°C
T_{sig}	Storage temperature range	-		-40	125	°C
-	Screw torque	Mounting - M6		-	5.0	Nm
		Electrical connections - M4		-	2.0	Nm
		Electrical connections - M8		-	10.0	Nm

ELECTRICAL CHARACTERISTICS

$T_{case} = 25^{\circ}\text{C}$ unless stated otherwise.						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_{CES}	Collector cut-off current	$V_{GE} = 0V, V_{CE} = V_{CES}$	-	-	25	mA
		$V_{GE} = 0V, V_{CE} = V_{CES}, T_{case} = 125^{\circ}\text{C}$	-	-	50	mA
I_{GES}	Gate leakage current	$V_{GE} = \pm 20V, V_{CE} = 0V$	-	-	± 4	μA
$V_{GE(TH)}$	Gate threshold voltage	$I_C = 40\text{mA}, V_{GE} = V_{CE}$	4	-	7.5	V
$V_{CE(SAT)}$	Collector-emitter saturation voltage	$V_{GE} = 15V, I_C = 600\text{A}$	-	3.5	4.0	V
		$V_{GE} = 15V, I_C = 600\text{A}, T_{case} = 125^{\circ}\text{C}$	-	4.2	5.0	V
I_F	Diode forward current	DC	-	-	600	A
I_{FM}	Diode maximum forward current	$t_p = 1\text{ms}$	-	-	1200	A
V_F	Diode forward voltage	$I_F = 600\text{A},$	-	2.1	2.5	V
		$I_F = 600\text{A}, T_{case} = 125^{\circ}\text{C}$	-	2.2	2.6	V
C_{ies}	Input capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1\text{MHz}$	-	100	-	nF
L_M	Module inductance	-	-	20	-	nH

INDUCTIVE SWITCHING CHARACTERISTICS

For definition of switching waveforms, refer to figure 3 and 4.

T_{case} = 25°C unless stated otherwise						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$t_{d(off)}$	Turn-off delay time	$I_C = 600A$ $V_{GE} = \pm 15V$ $V_{CE} = 50\% V_{CES}$ $R_{G(ON)} = R_{G(OFF)} = 3.3\Omega$ $L \sim 100nH$	-	1.1	-	μs
t_f	Fall time		-	200	-	ns
E_{OFF}	Turn-off energy loss		-	150	-	mJ
$t_{d(on)}$	Turn-on delay time		-	420	-	ns
t_r	Rise time		-	260	-	ns
E_{ON}	Turn-on energy loss		-	400	-	mJ
t_{rr}	Diode reverse recovery time	$I_F = 600A$	-	500	-	ns
Q_{rr}	Diode reverse recovery charge	$V_R = 50\% V_{CES}, dl_F/dt = 2000A/\mu s$	-	200	-	μC
T_{case} = 125°C unless stated otherwise.						
$t_{d(off)}$	Turn-off delay time	$I_C = 600A$ $V_{GE} = \pm 15V$ $V_{CE} = 50\% V_{CES}$ $R_{G(ON)} = R_{G(OFF)} = 3.3\Omega$ $L \sim 100nH$	-	1.3	-	μs
t_f	Fall time		-	300	-	ns
E_{OFF}	Turn-off energy loss		-	190	-	mJ
$t_{d(on)}$	Turn-on delay time		-	440	-	ns
t_r	Rise time		-	300	-	ns
E_{ON}	Turn-on energy loss		-	500	-	mJ
t_{rr}	Diode reverse recovery time	$I_F = 600A$	-	650	-	ns
Q_{rr}	Diode reverse recovery charge	$V_R = 50\% V_{CES}, dl_F/dt = 2000A/\mu s$	-	250	-	μC

DEFINITION OF SWITCHING WAVEFORMS

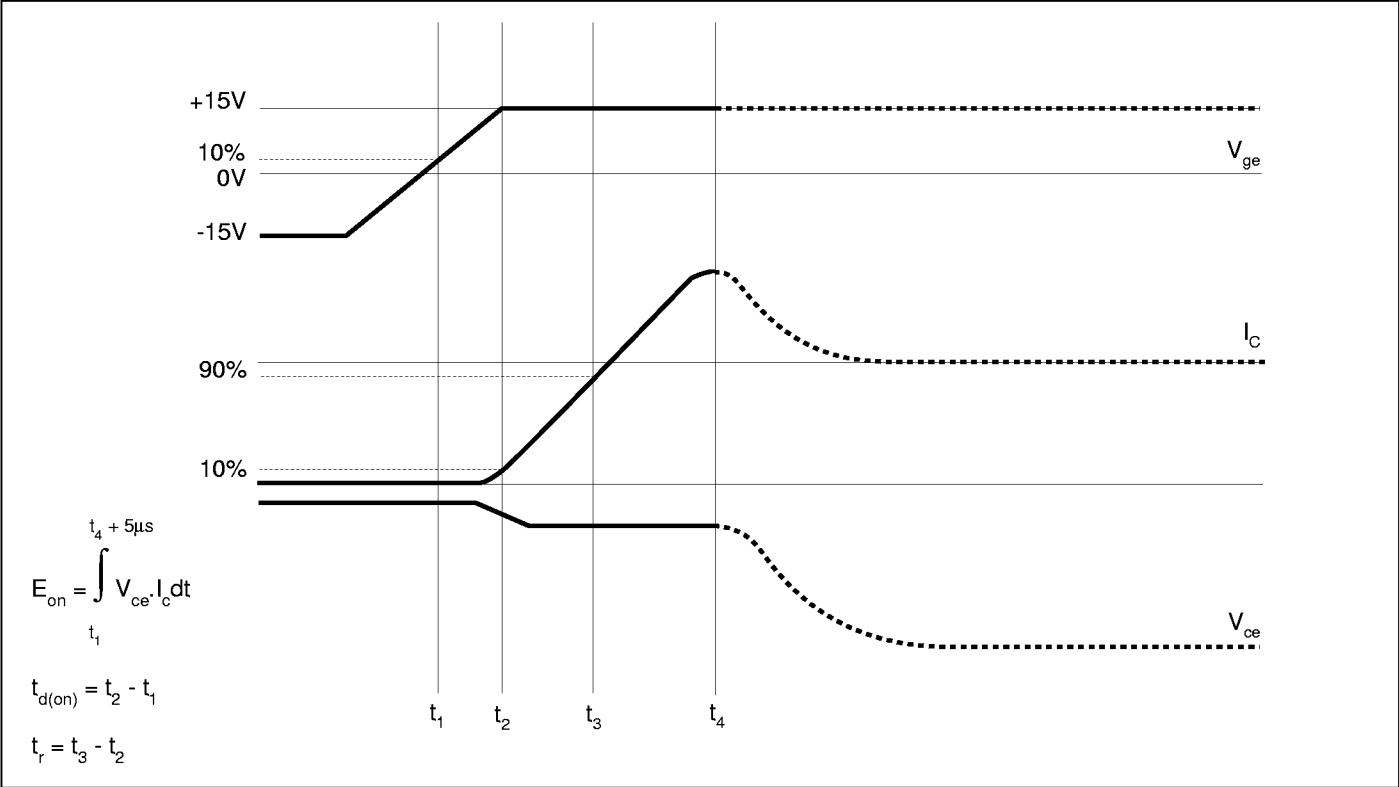


Fig.3 Definition of turn-on switching times

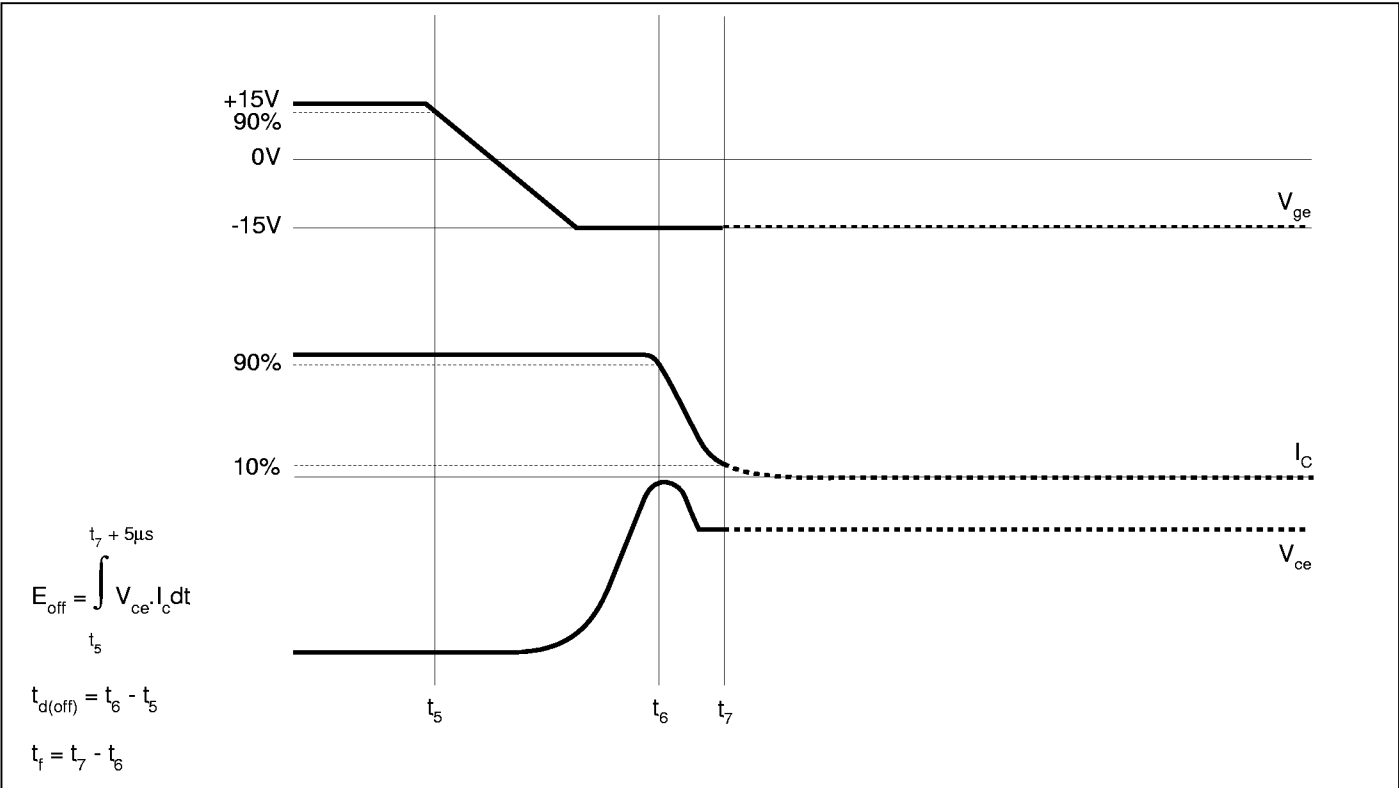


Fig.4 Definition of turn-off switching times

CURVES

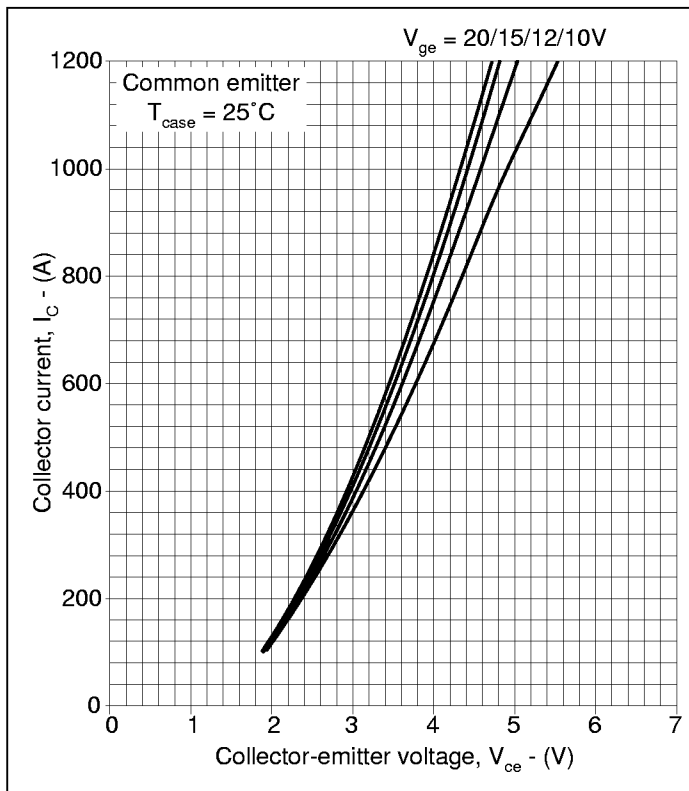


Fig.5 Typical output characteristics

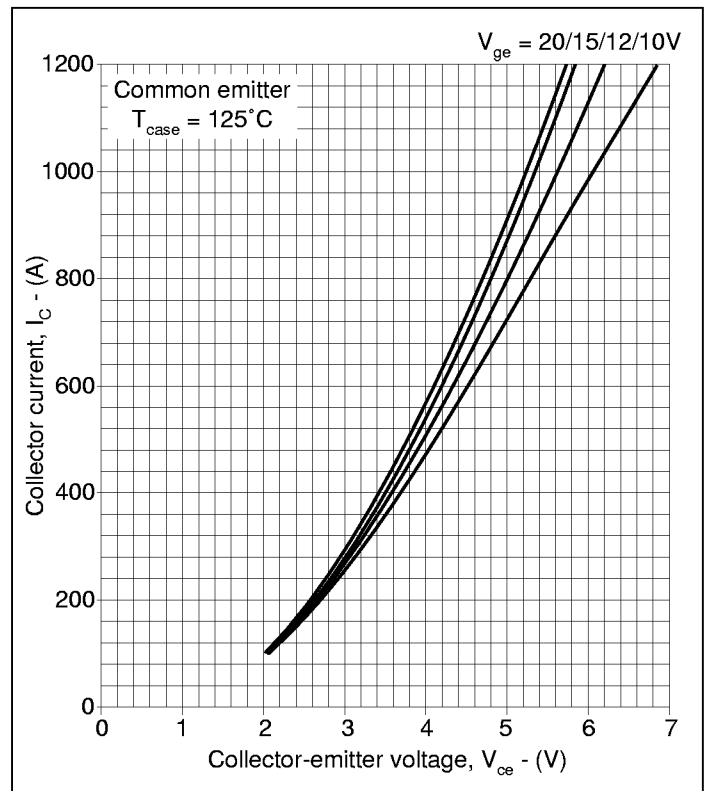


Fig.6 Typical output characteristics

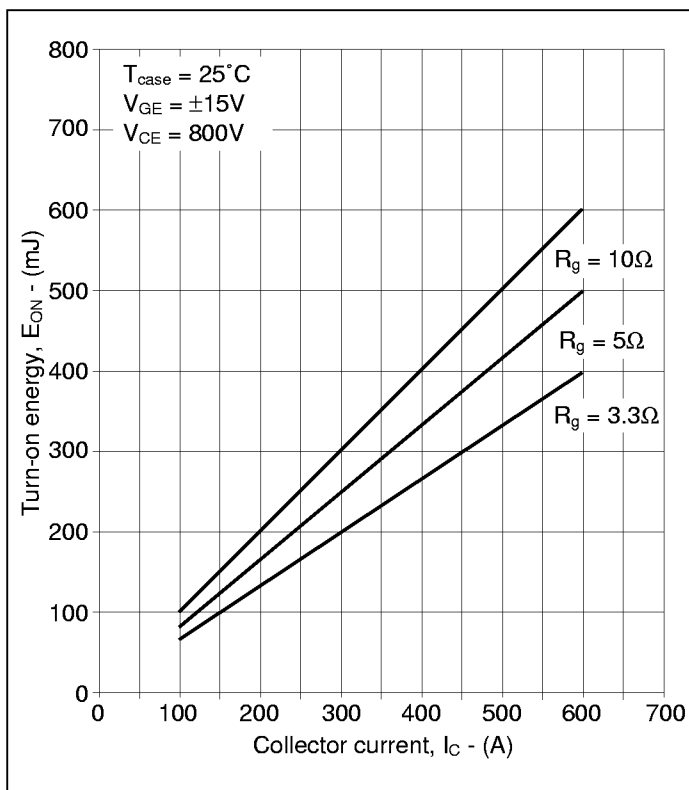


Fig.7 Typical turn-on energy vs collector current

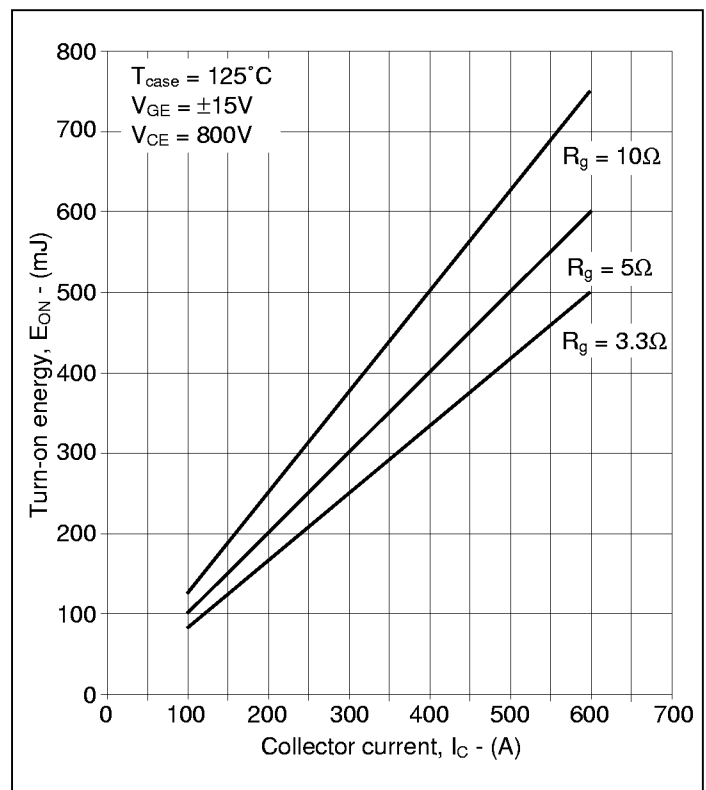


Fig.8 Typical turn-on energy vs collector current

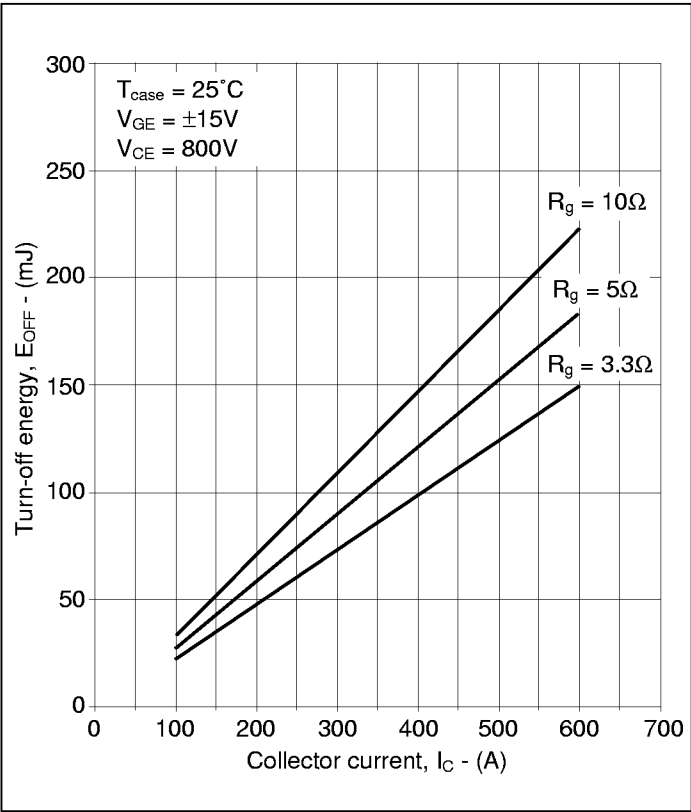


Fig.10 Typical turn-off energy vs collector current

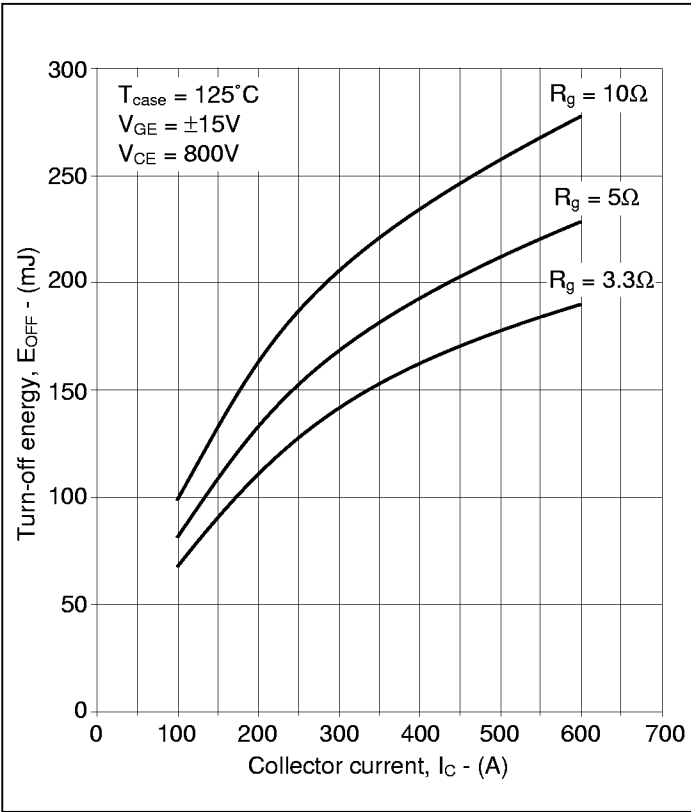


Fig.11 Typical turn-off energy vs collector current

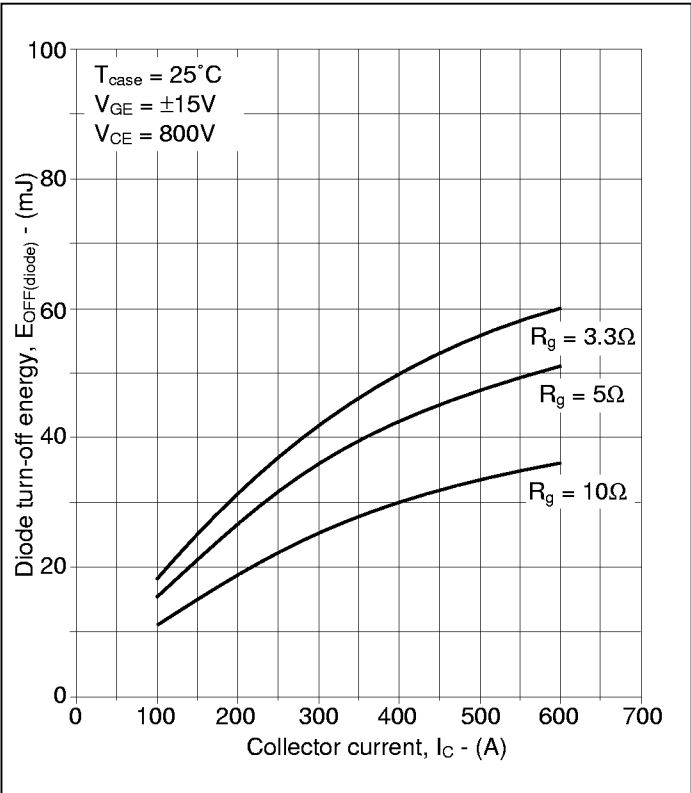


Fig.12 Diode typical turn-off energy vs collector current

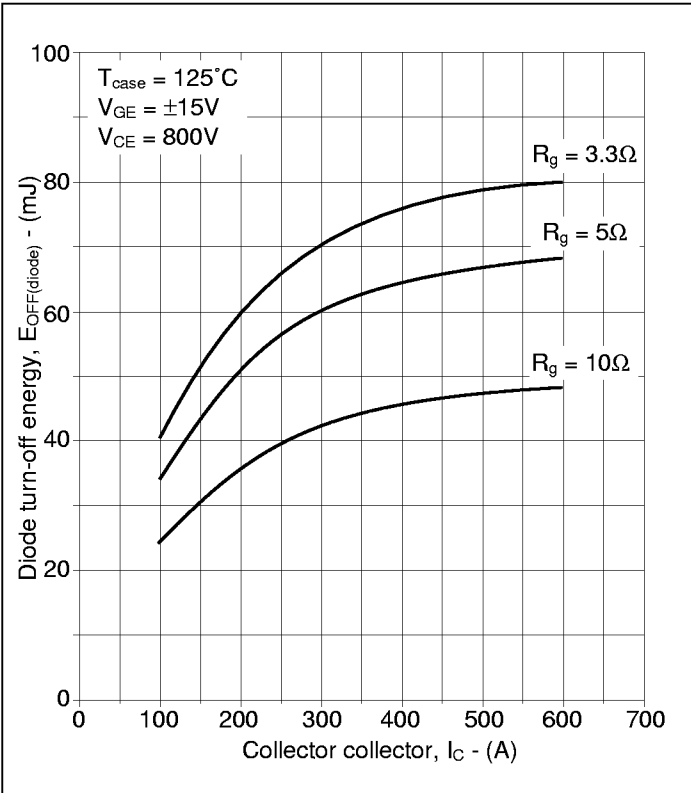


Fig.13 Diode typical turn-off energy vs collector current

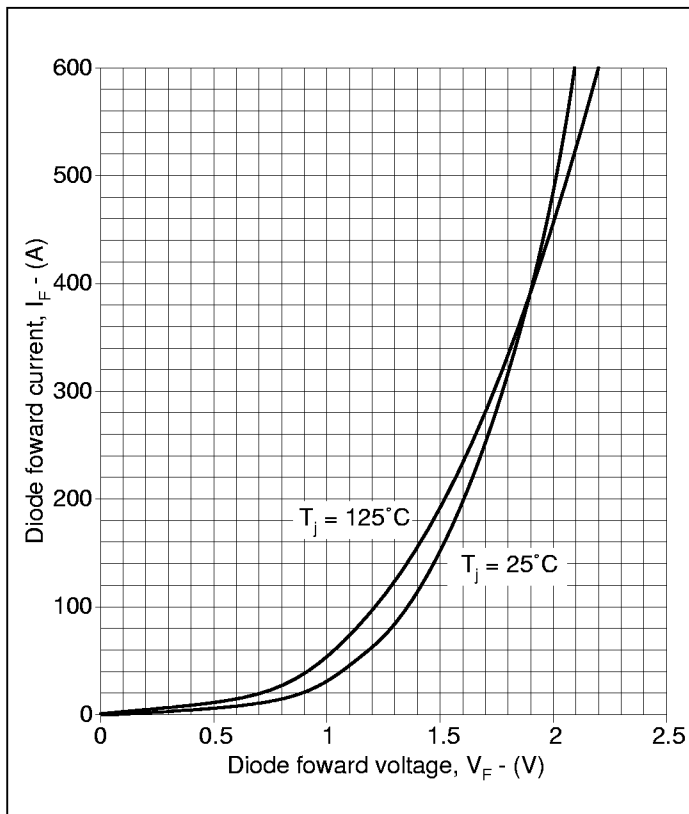


Fig.14 Diode typical forward characteristics

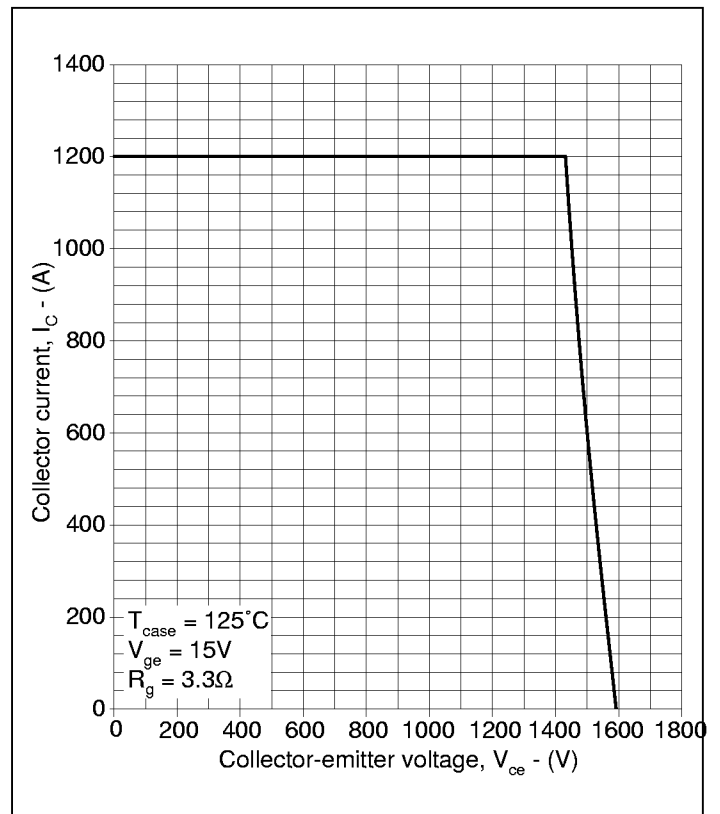


Fig.15 Reverse bias safe operating area

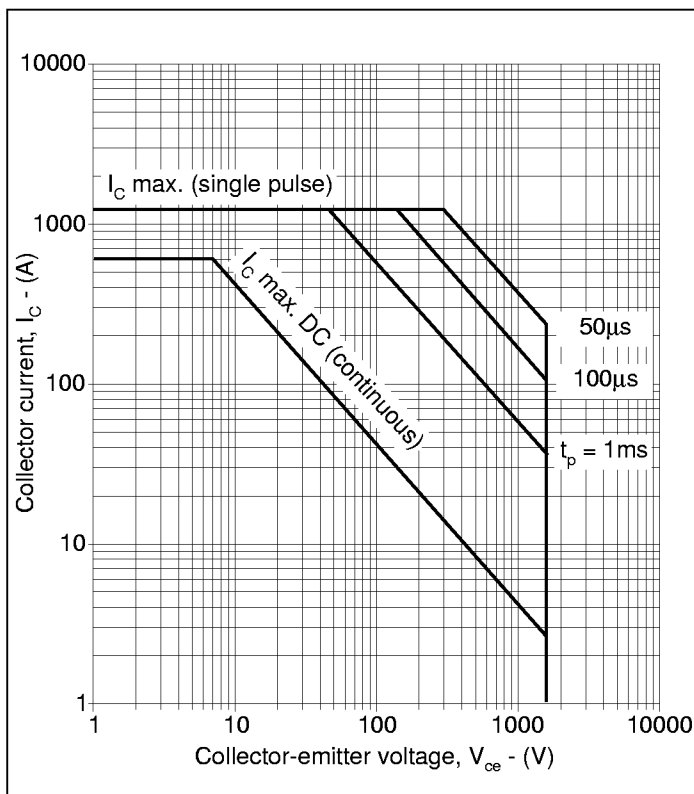


Fig.16 Forward bias safe operating area (DC and single pulse)

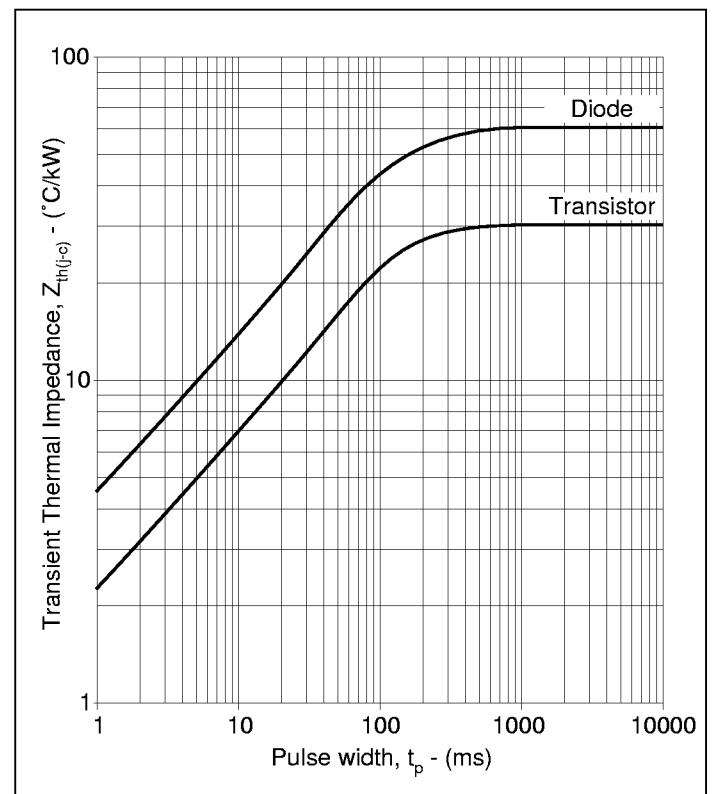
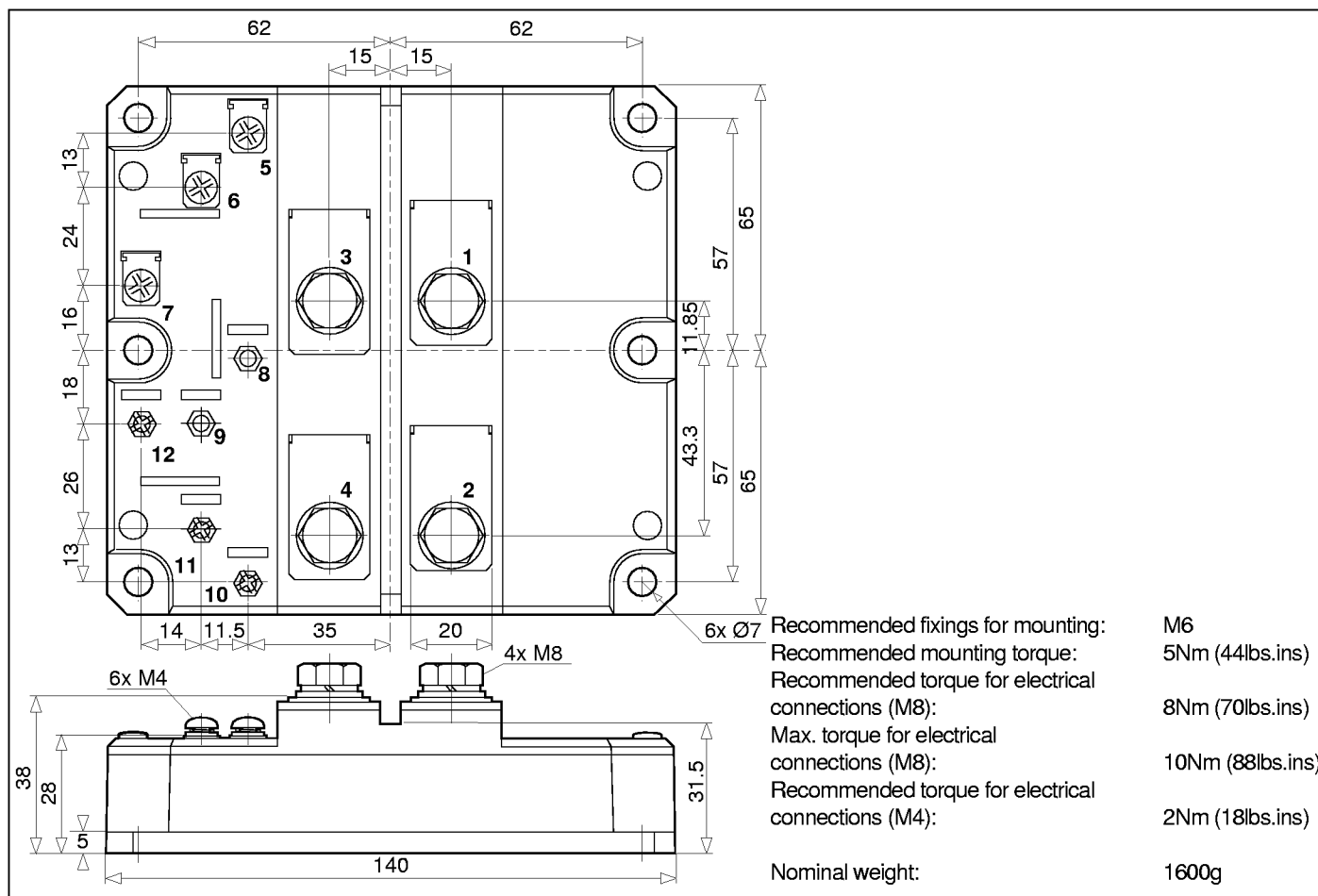


Fig.17 Transient thermal impedance

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PACKAGE DETAILS - F

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



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