

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

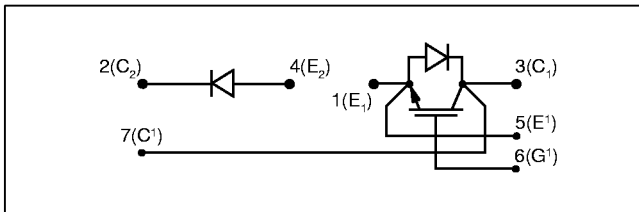


Fig. 1 Chopper circuit diagram

TYPICAL KEY PARAMETERS

V_{CES}	1600V
$V_{CE(sat)}$	3.5V
$I_{C(CONT)}$	600A
$I_{C(PK)}$	1200A

PACKAGE OUTLINE

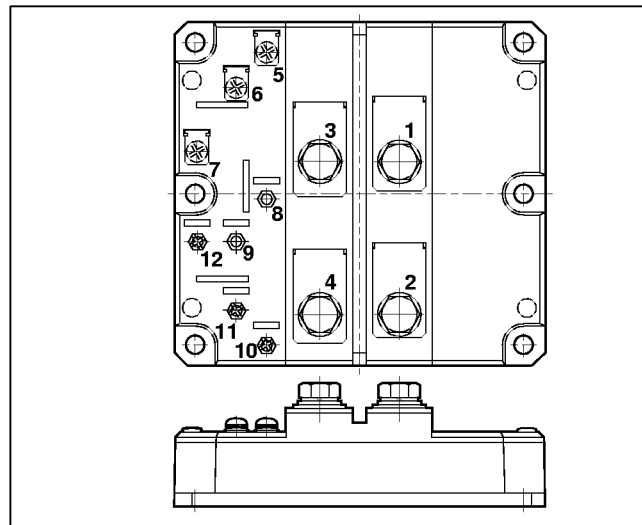


Fig. 2 Outline type code: F.
See package details for further information.

RATINGS

$T_{case} = 25^{\circ}C$ 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, $T_{case} = 25^{\circ}C$	600	A
$I_{C(PK)}$		1ms, $T_{case} = 25^{\circ}C$	1200	A
P_{max}	Maximum power dissipation (per arm)	$T_{case} = 25^{\circ}C$ (Transistor)	4150	W
V_{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	3400	V

Caution: These devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

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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_{stg}	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} , di _F /dt = 2000A/μs	-	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} , di _F /dt = 2000A/μs	-	250	-	μC

DEFINITION OF SWITCHING WAVEFORMS

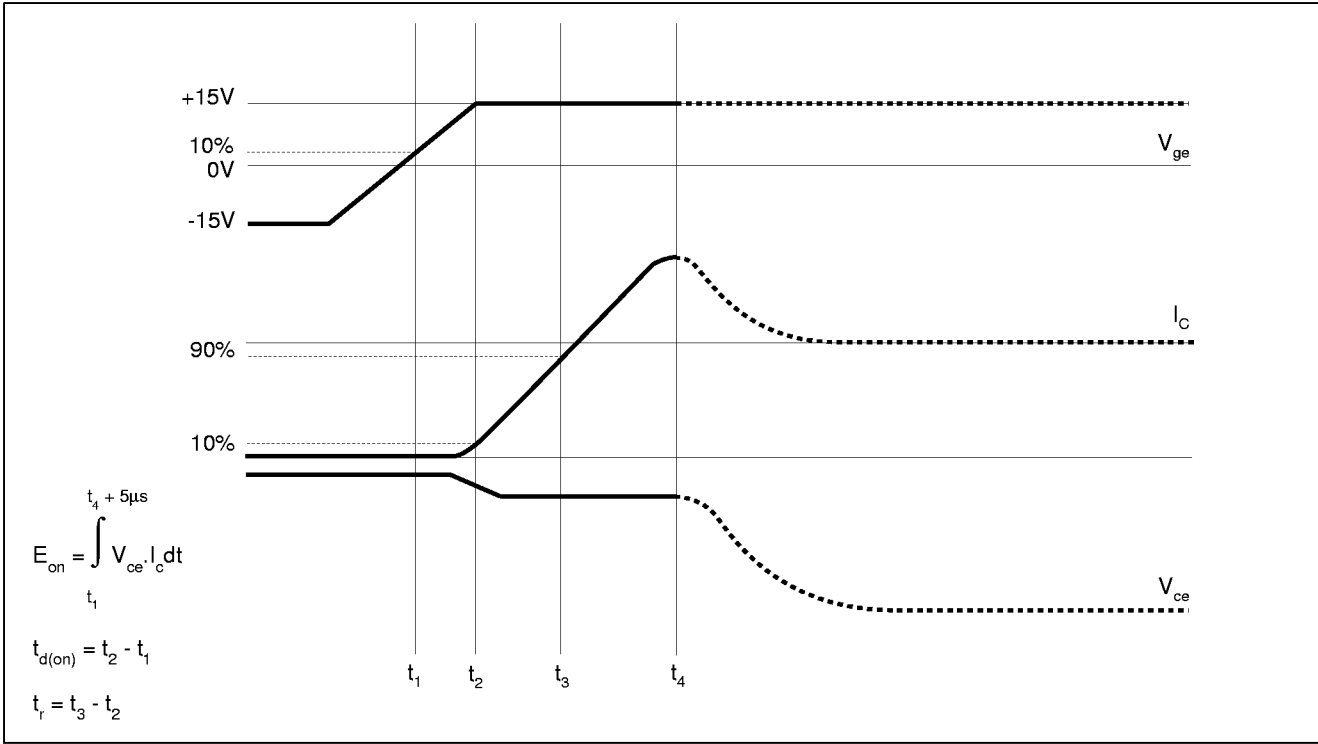


Fig.3 Definition of turn-on switching times

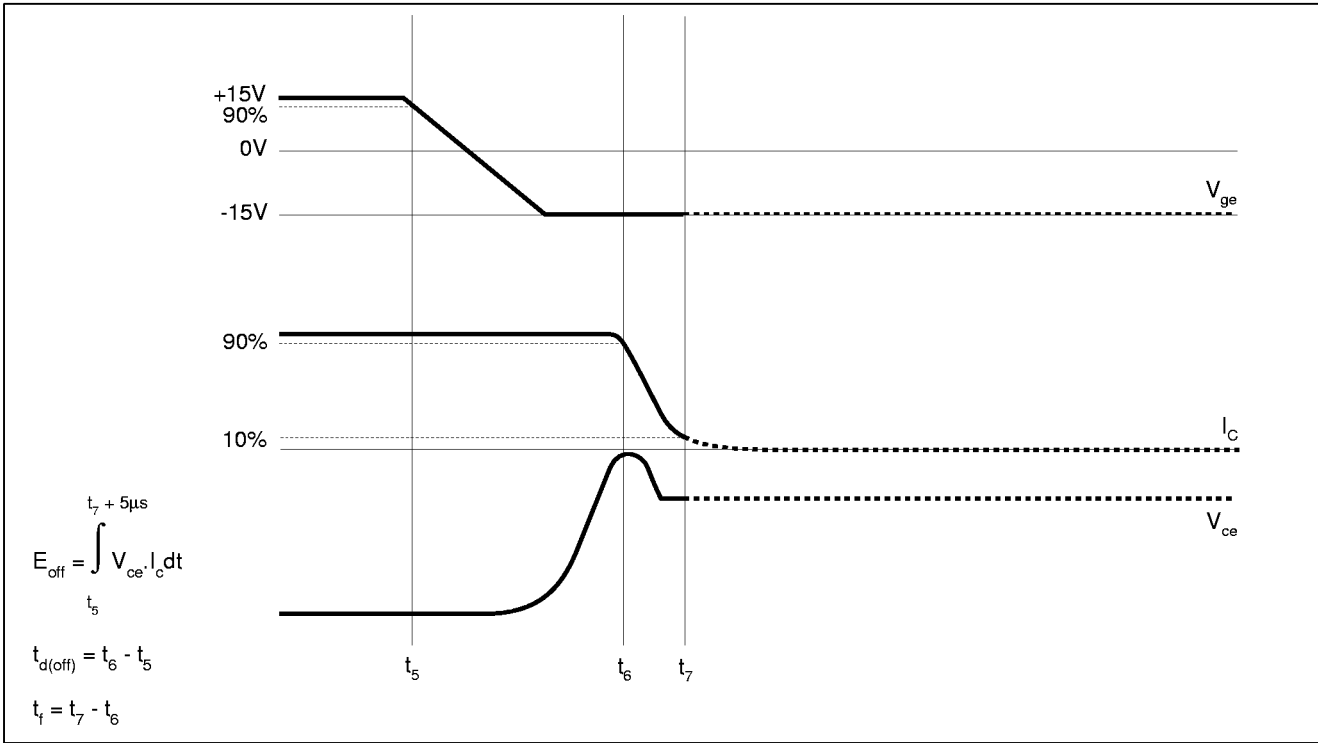


Fig.4 Definition of turn-off switching times

CURVES

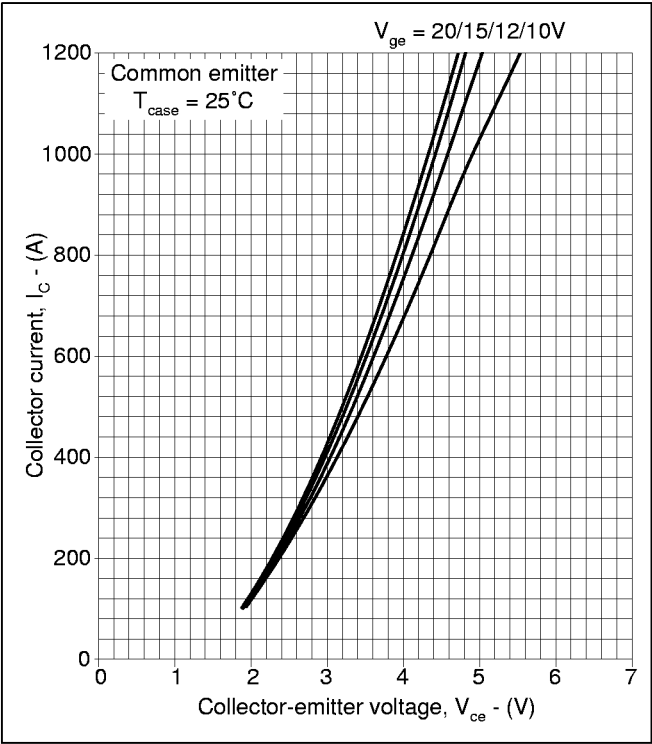


Fig.5 Typical output characteristics

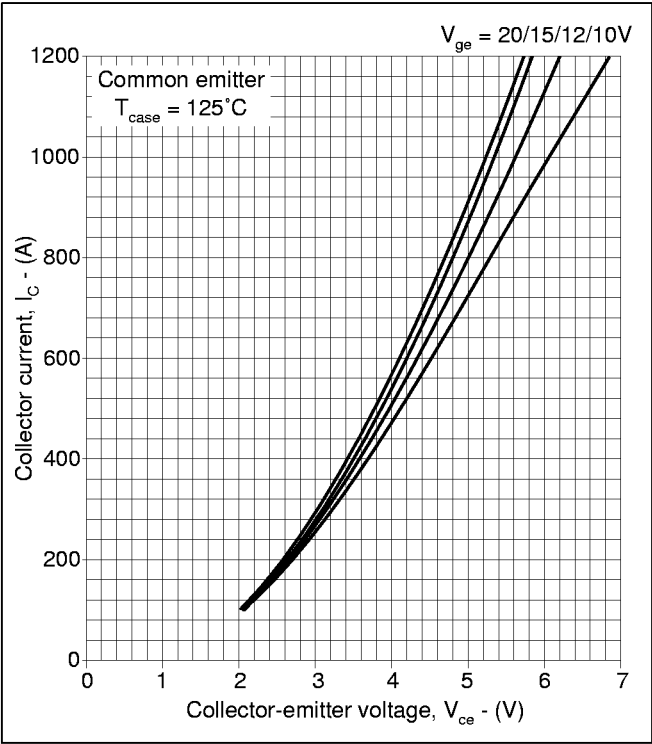


Fig.6 Typical output characteristics

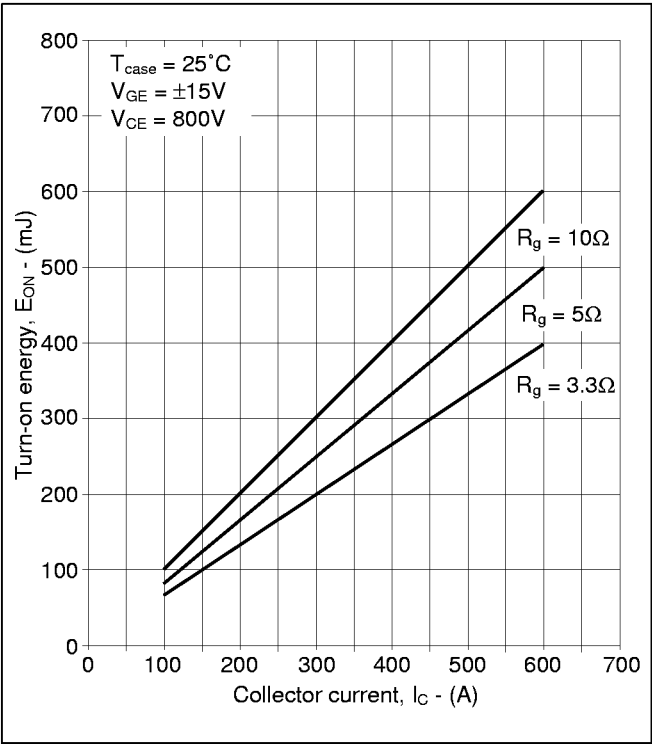


Fig.7 Typical turn-on energy vs collector current

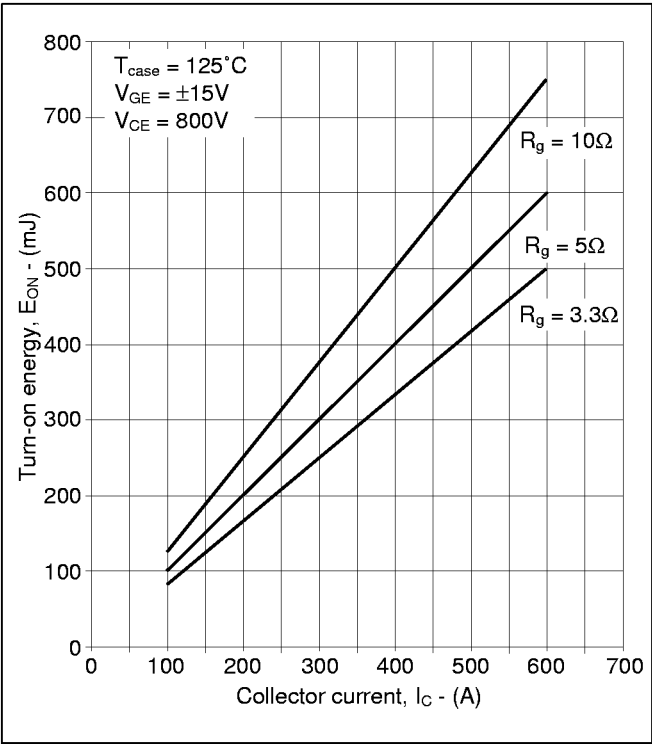


Fig.8 Typical turn-on energy vs collector current

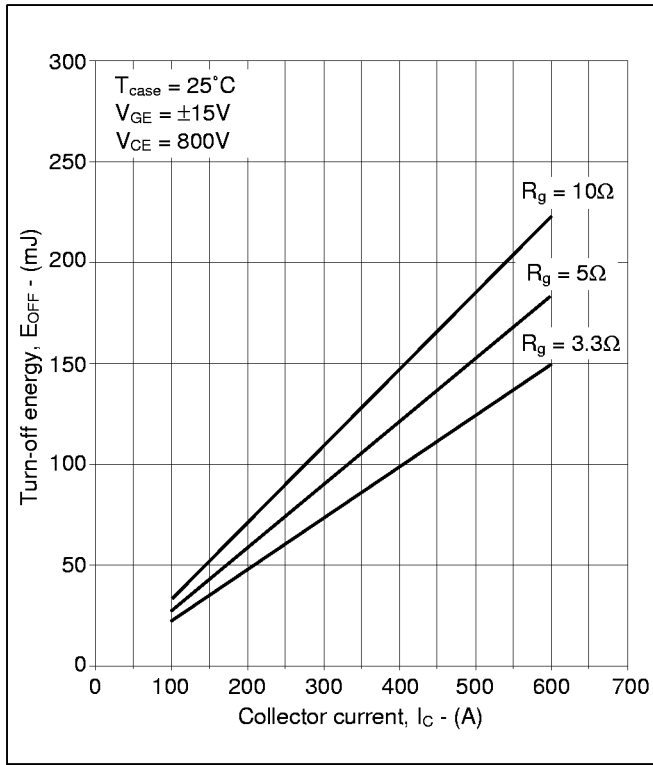


Fig.10 Typical turn-off energy vs collector current

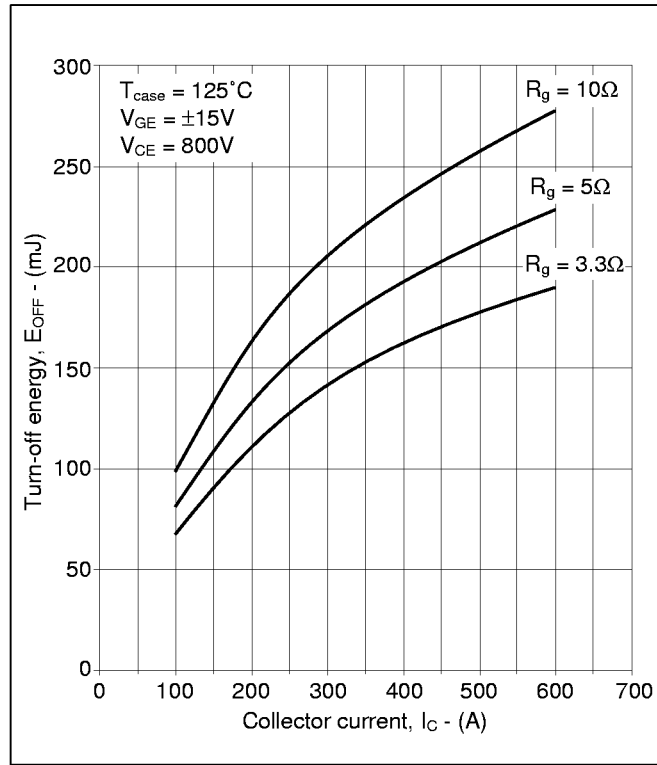


Fig.11 Typical turn-off energy vs collector current

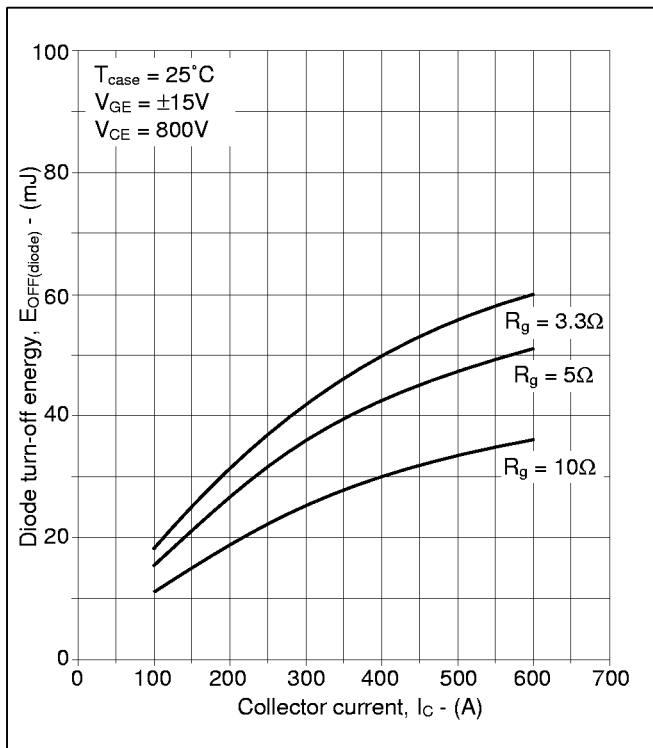


Fig.12 Diode typical turn-off energy vs collector current

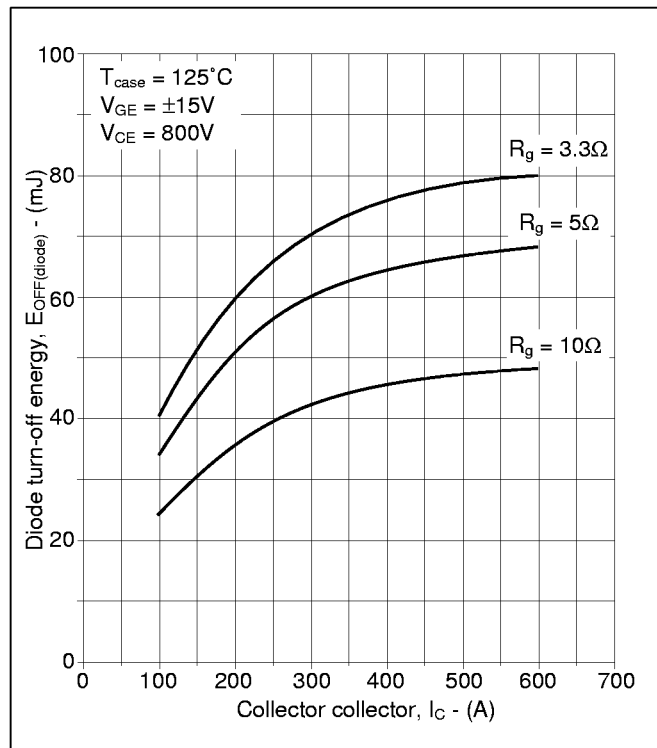


Fig.13 Diode typical turn-off energy vs collector current

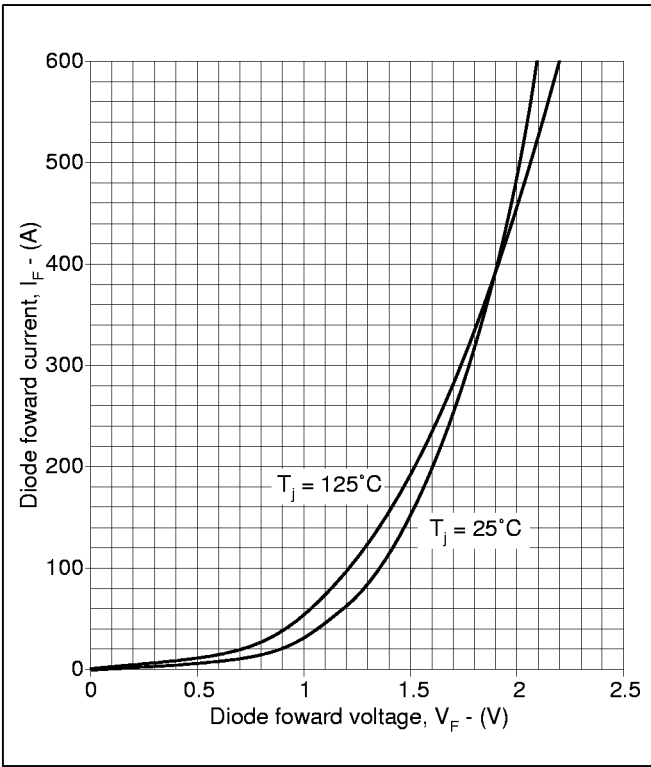


Fig.14 Diode typical forward characteristics

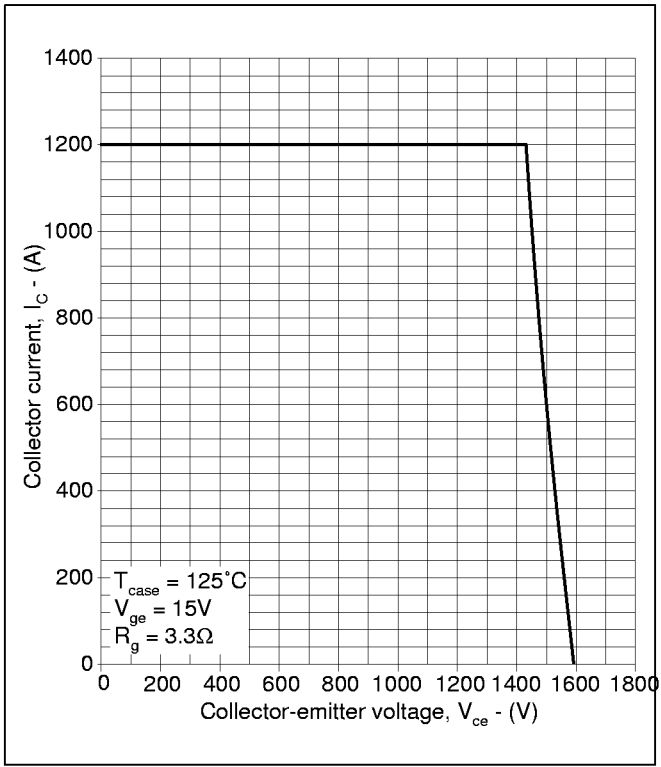


Fig.15 Reverse bias safe operating area

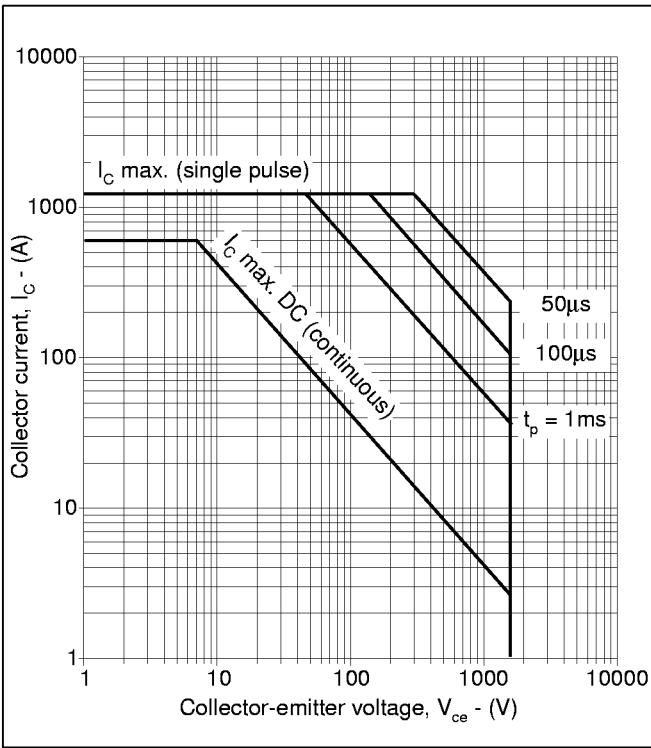


Fig.16 Forward bias safe operating area (DC and single pulse)

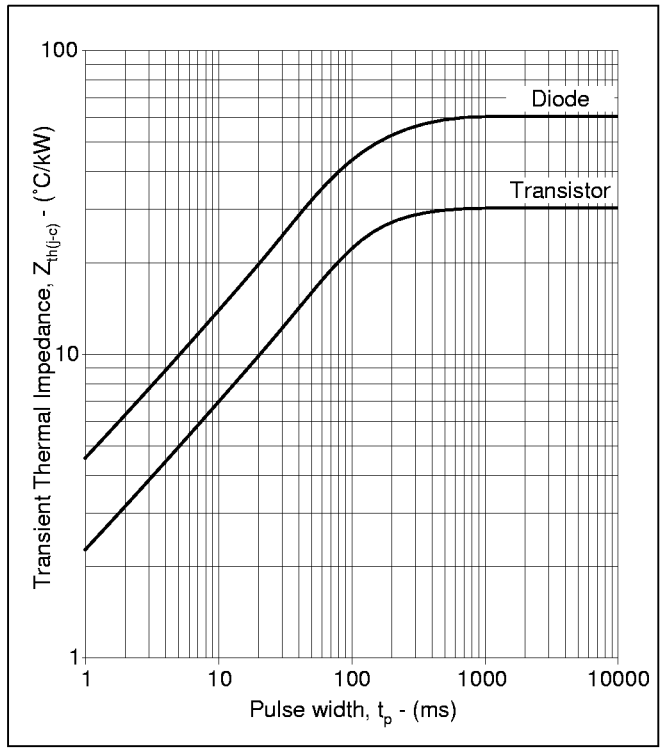
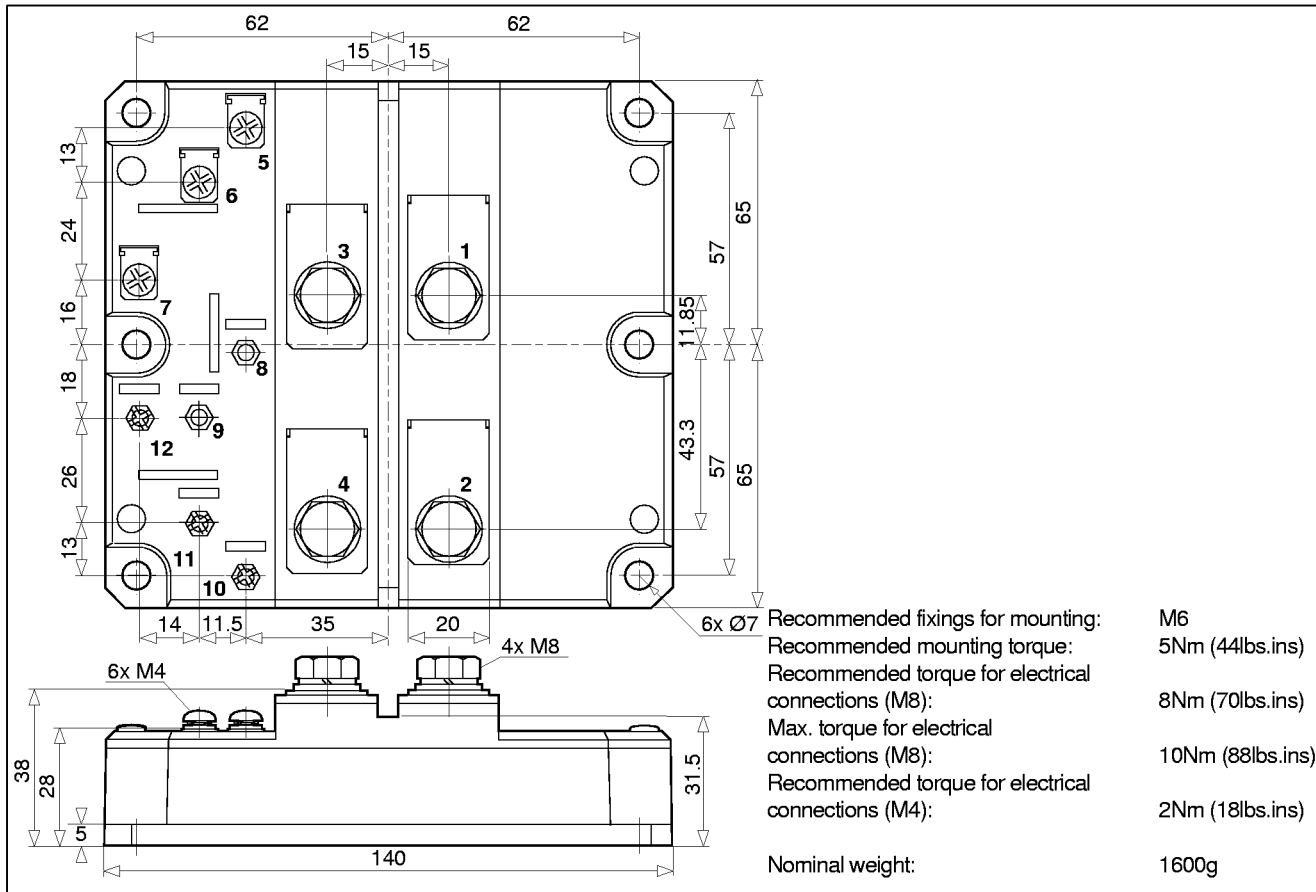


Fig.17 Transient thermal impedance

GP600FHB16S

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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8/8 Caution: These devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.