

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

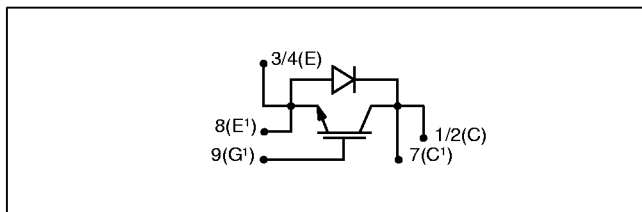


Fig. 1 Single switch circuit diagram

TYPICAL KEY PARAMETERS

V_{CES}	1600V
$V_{CE(sat)}$	3.5V
$I_{C(CONT)}$	1200A
$I_{C(PK)}$	2400A

PACKAGE OUTLINE

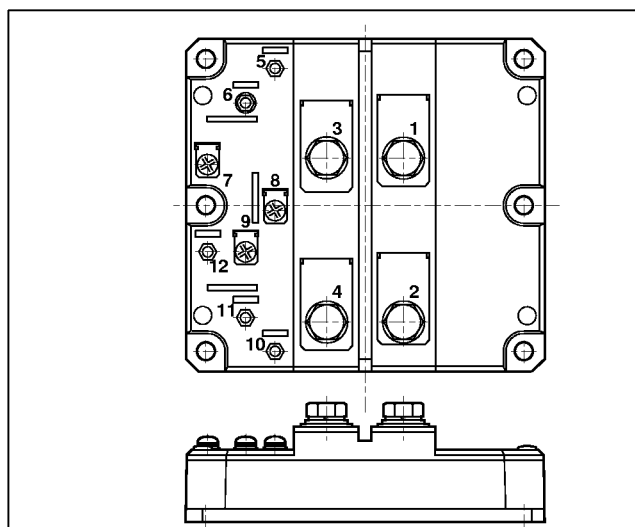


Fig. 2 Outline type code: F.
See package details for further information.

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, $T_{case} = 25^{\circ}C$	1200	A
$I_{C(PK)}$		1 ms, $T_{case} = 25^{\circ}C$	2400	A
P_{max}	Maximum power dissipation	$T_{case} = 25^{\circ}C$ (Transistor)	8300	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.

GP1200FSS16S

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - transistor	DC junction to case	-	15	°C/kW
$R_{th(j-c)}$	Thermal resistance - diode	DC junction to case	-	30	°C/kW
$R_{th(c-h)}$	Thermal resistance - Case to heatsink	Mounting torque 5Nm (with mounting grease)	-	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	$V_{GE} = 0V, V_{CE} = V_{CES}$	-	-	50	mA
		$V_{GE} = 0V, V_{CE} = V_{CES}, T_{case} = 125^{\circ}\text{C}$	-	-	100	mA
I_{GES}	Gate leakage current	$V_{GE} = \pm 20V, V_{CE} = 0V$	-	-	± 8	μA
$V_{GE(TH)}$	Gate threshold voltage	$I_C = 80\text{mA}, V_{GE} = V_{CE}$	4	-	7.5	V
$V_{CE(SAT)}$	Collector-emitter saturation voltage	$V_{GE} = 15V, I_C = 1200\text{A}$	-	3.5	4.0	V
		$V_{GE} = 15V, I_C = 1200\text{A}, T_{case} = 125^{\circ}\text{C}$	-	4.2	5.0	V
I_F	Diode forward current	DC	-	-	1200	A
I_{FM}	Diode maximum forward current	$t_p = 1\text{ms}$	-	-	2400	A
V_F	Diode forward voltage	$I_F = 1200\text{A}$,	-	2.1	2.5	V
		$I_F = 1200\text{A}, T_{case} = 125^{\circ}\text{C}$	-	2.2	2.6	V
C_{ies}	Input capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1\text{MHz}$	-	200	-	nF
L_M	Module inductance	-	-	15	-	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	$I_C = 1200A$ $V_{GE} = \pm 15V$ $V_{CE} = 50\% V_{CES}$ $R_{G(ON)} = R_{G(OFF)} = 3.3\Omega$ $L \sim 100nH$	-	1.3	-	μs
t_f	Fall time		-	300	-	ns
E_{OFF}	Turn-off energy loss		-	300	-	mJ
$t_{d(on)}$	Turn-on delay time		-	850	-	ns
t_r	Rise time		-	500	-	ns
E_{ON}	Turn-on energy loss		-	750	-	mJ
t_{rr}	Diode reverse recovery time	$I_F = 1200A$	-	700	-	ns
Q_{rr}	Diode reverse recovery charge	$V_R = 50\%V_{CES}, di_F/dt = 2000A/\mu s$	-	300	-	μC
T_{case} = 125°C unless stated otherwise.						
$t_{d(off)}$	Turn-off delay time	$I_C = 1200A$ $V_{GE} = \pm 15V$ $V_{CE} = 50\% V_{CES}$ $R_{G(ON)} = R_{G(OFF)} = 3.3\Omega$ $L \sim 100nH$	-	1.4	-	μs
t_f	Fall time		-	400	-	ns
E_{OFF}	Turn-off energy loss		-	400	-	mJ
$t_{d(on)}$	Turn-on delay time		-	900	-	ns
t_r	Rise time		-	600	-	ns
E_{ON}	Turn-on energy loss		-	950	-	mJ
t_{rr}	Diode reverse recovery time	$I_F = 1200A$	-	900	-	ns
Q_{rr}	Diode reverse recovery charge	$V_R = 50\%V_{CES}, di_F/dt = 2000A/\mu s$	-	400	-	μC

DEFINITION OF SWITCHING WAVEFORMS

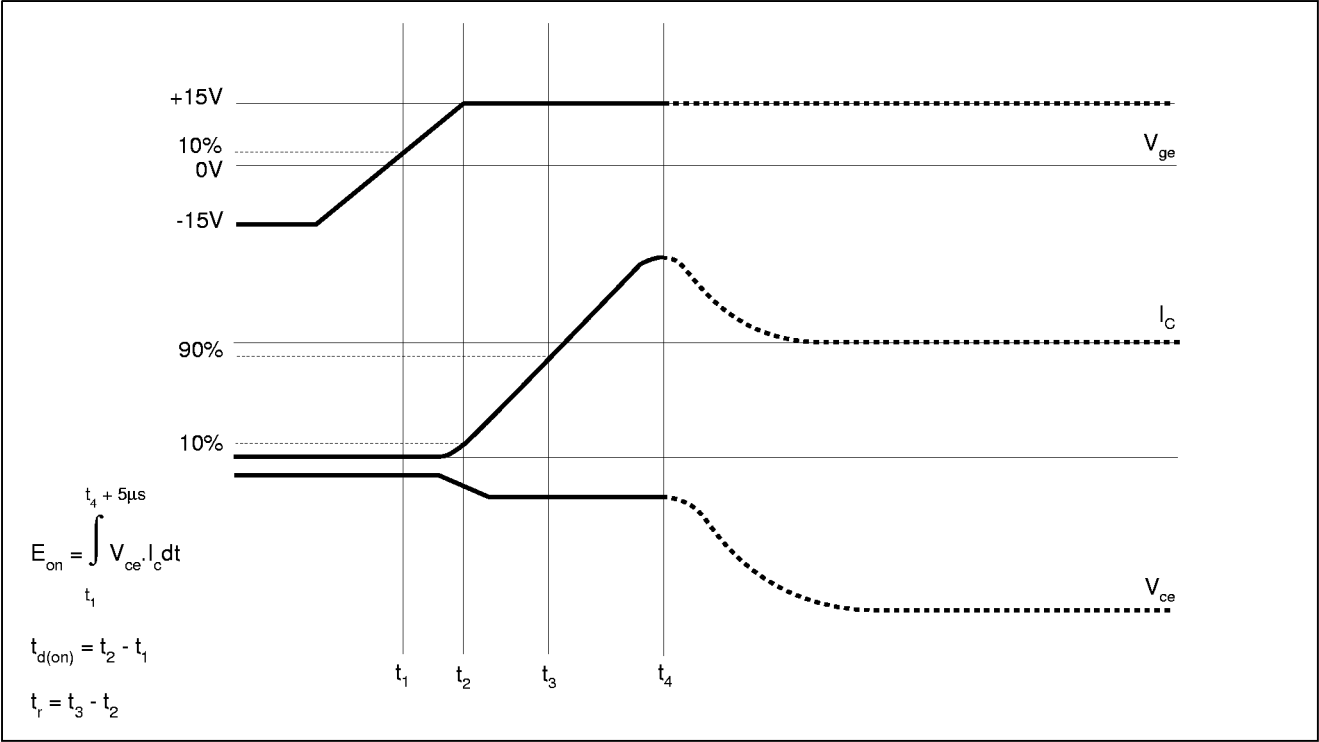


Fig.3 Definition of turn-on switching times

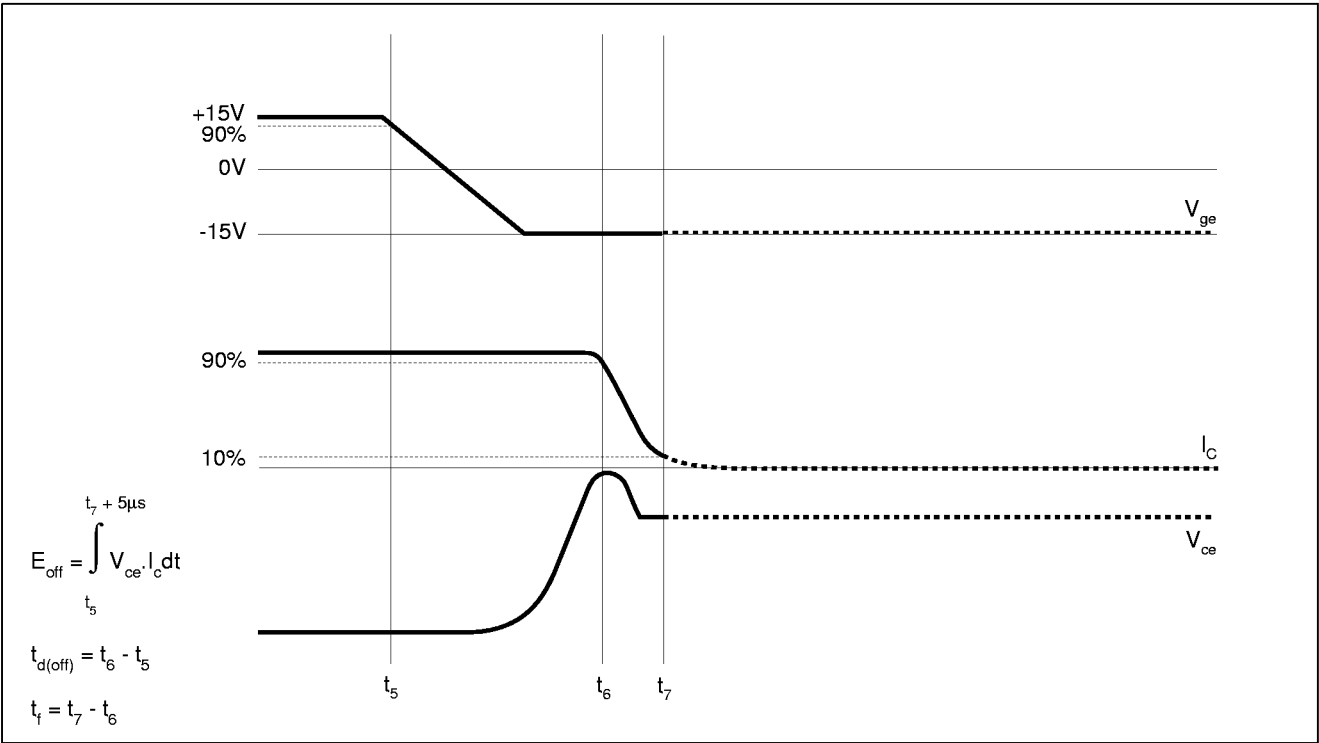


Fig.4 Definition of turn-off switching times

CURVES

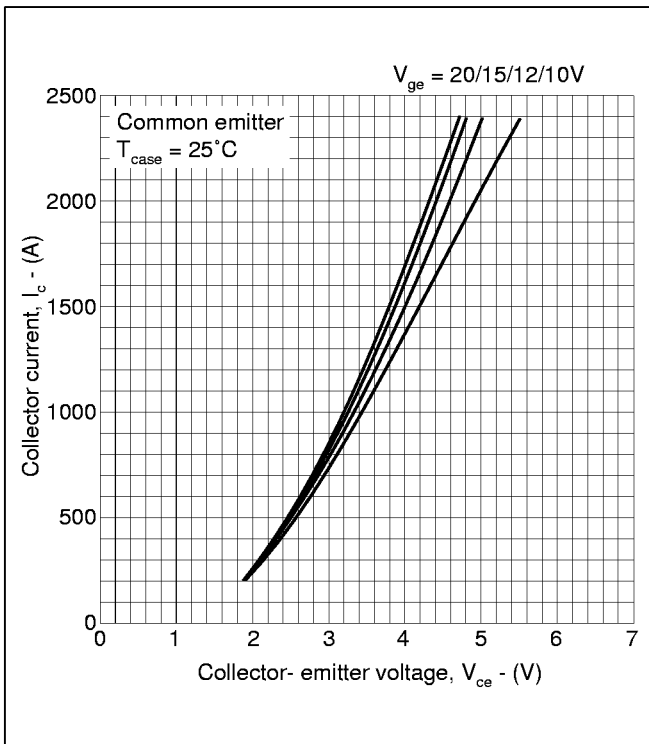


Fig.5 Typical output characteristics

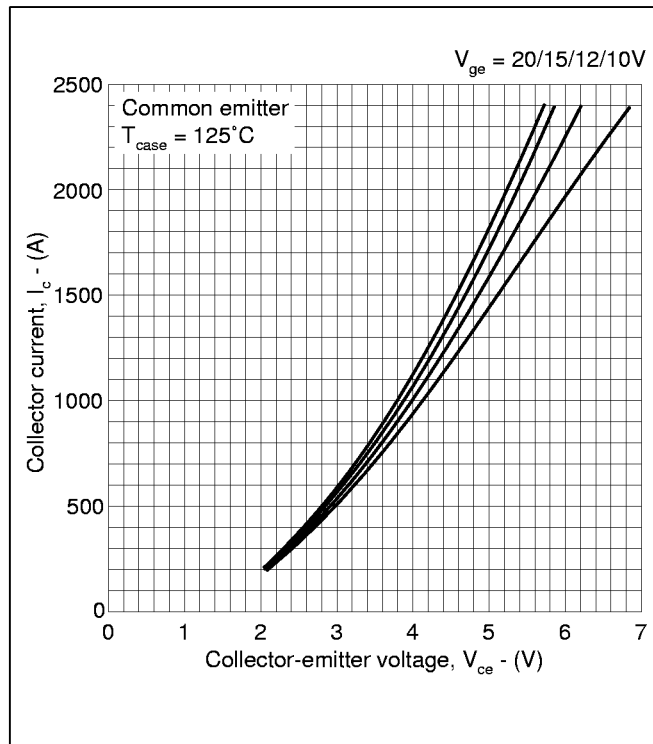


Fig.6 Typical output characteristics

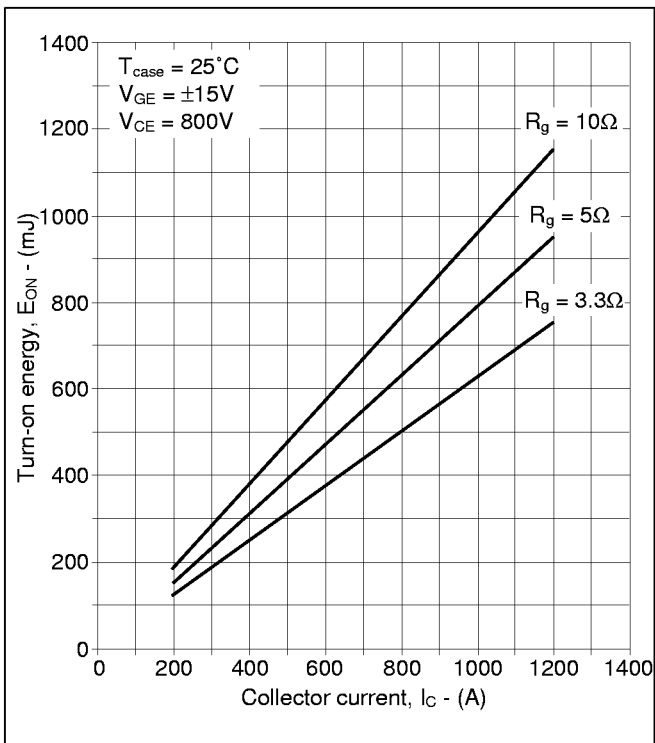


Fig.7 Typical turn-on energy vs collector current

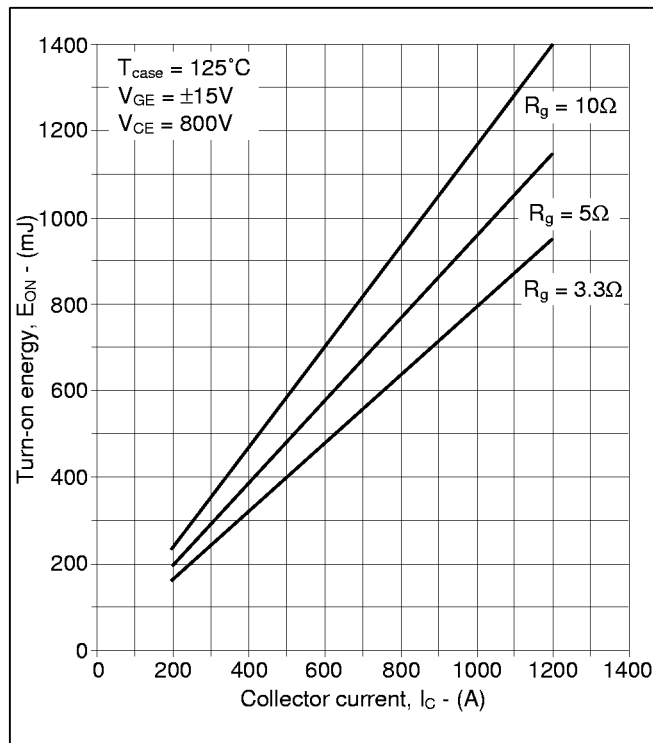


Fig.8 Typical turn-on energy vs collector current

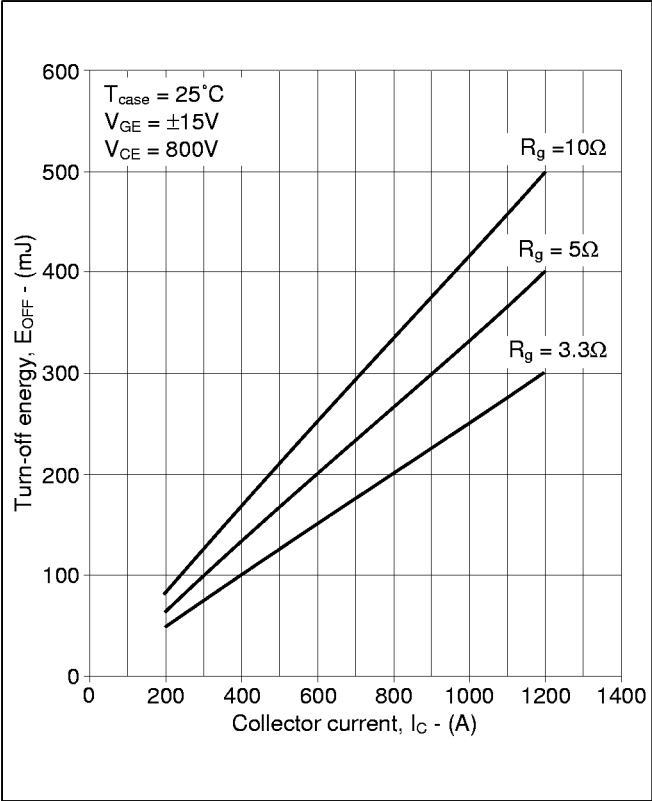


Fig.10 Typical turn-off energy vs collector current

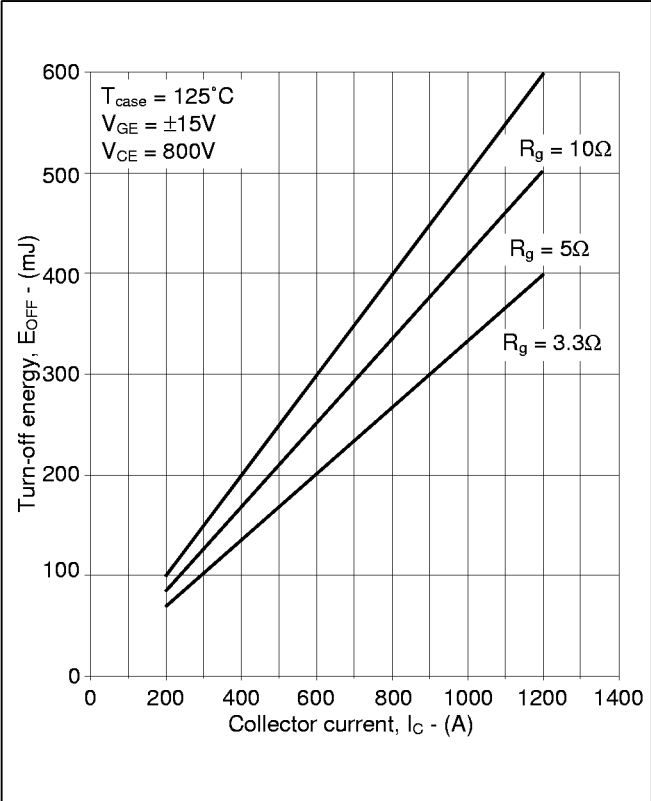


Fig.11 Typical turn-off energy vs collector current

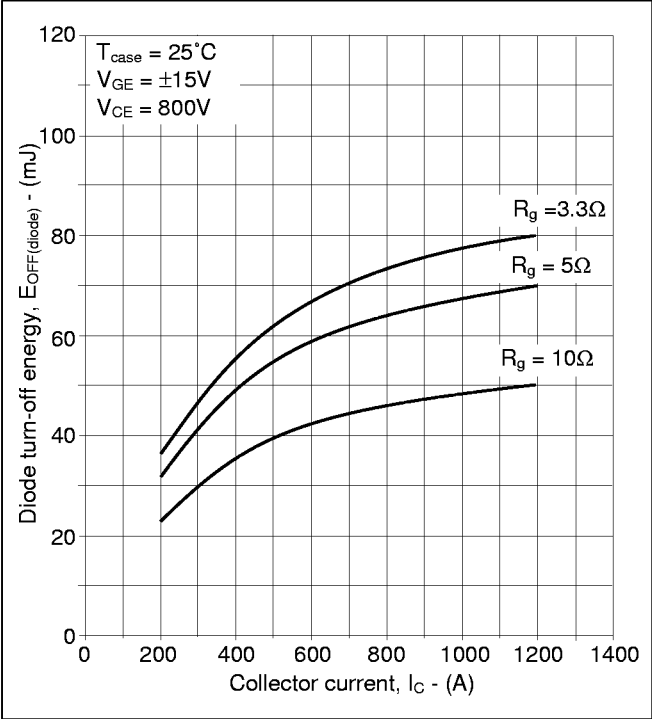


Fig.12 Typical diode turn-off energy vs collector current

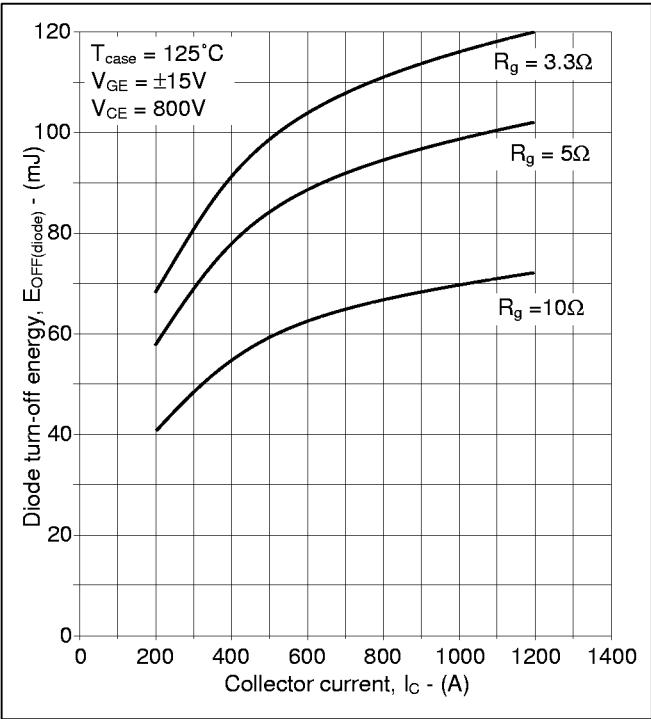


Fig.13 Typical diode turn-off energy vs collector current

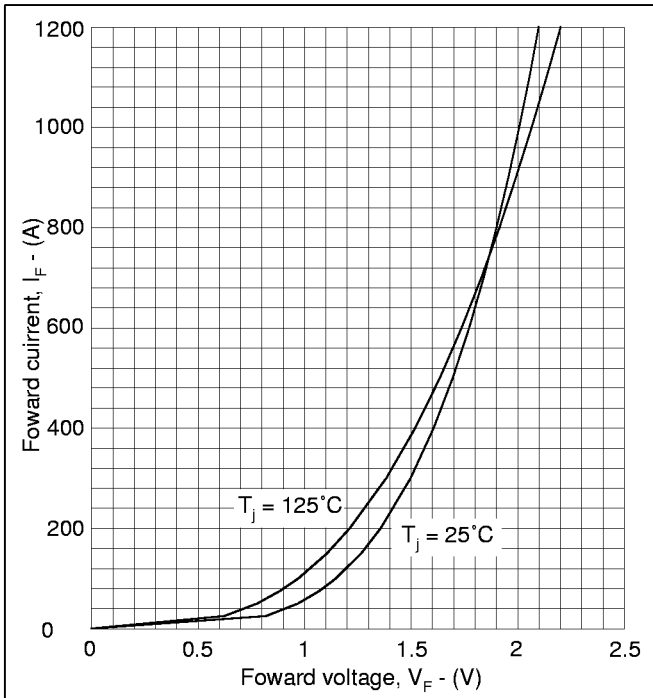


Fig. 14 Diode typical forward characteristics

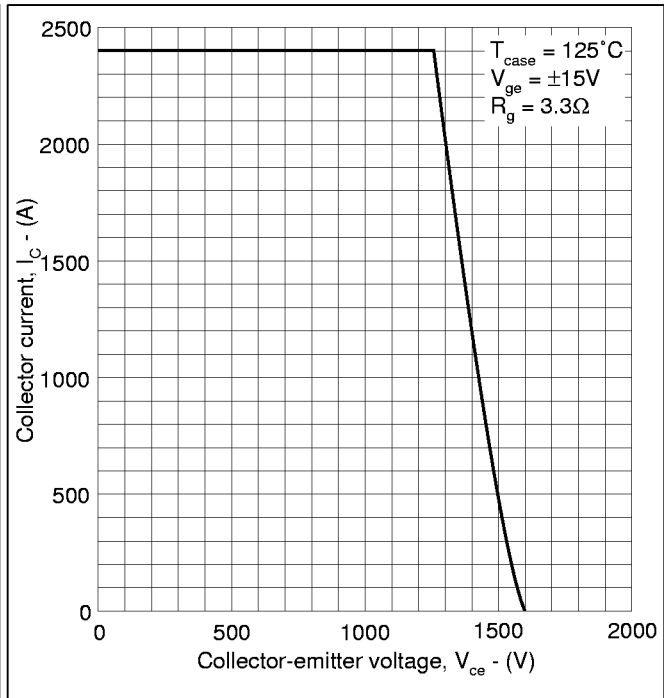


Fig. 15 Reverse bias safe operating area

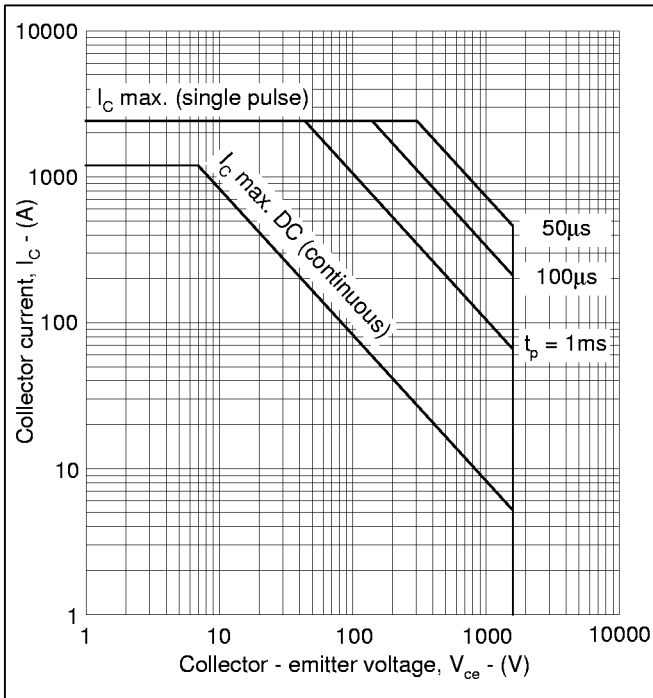


Fig. 16 Forward bias safe operating area (DC and single pulse)

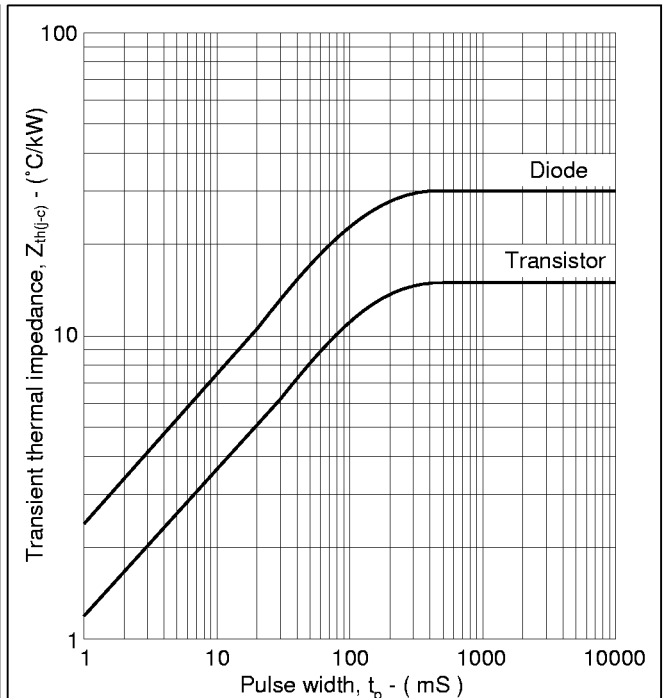
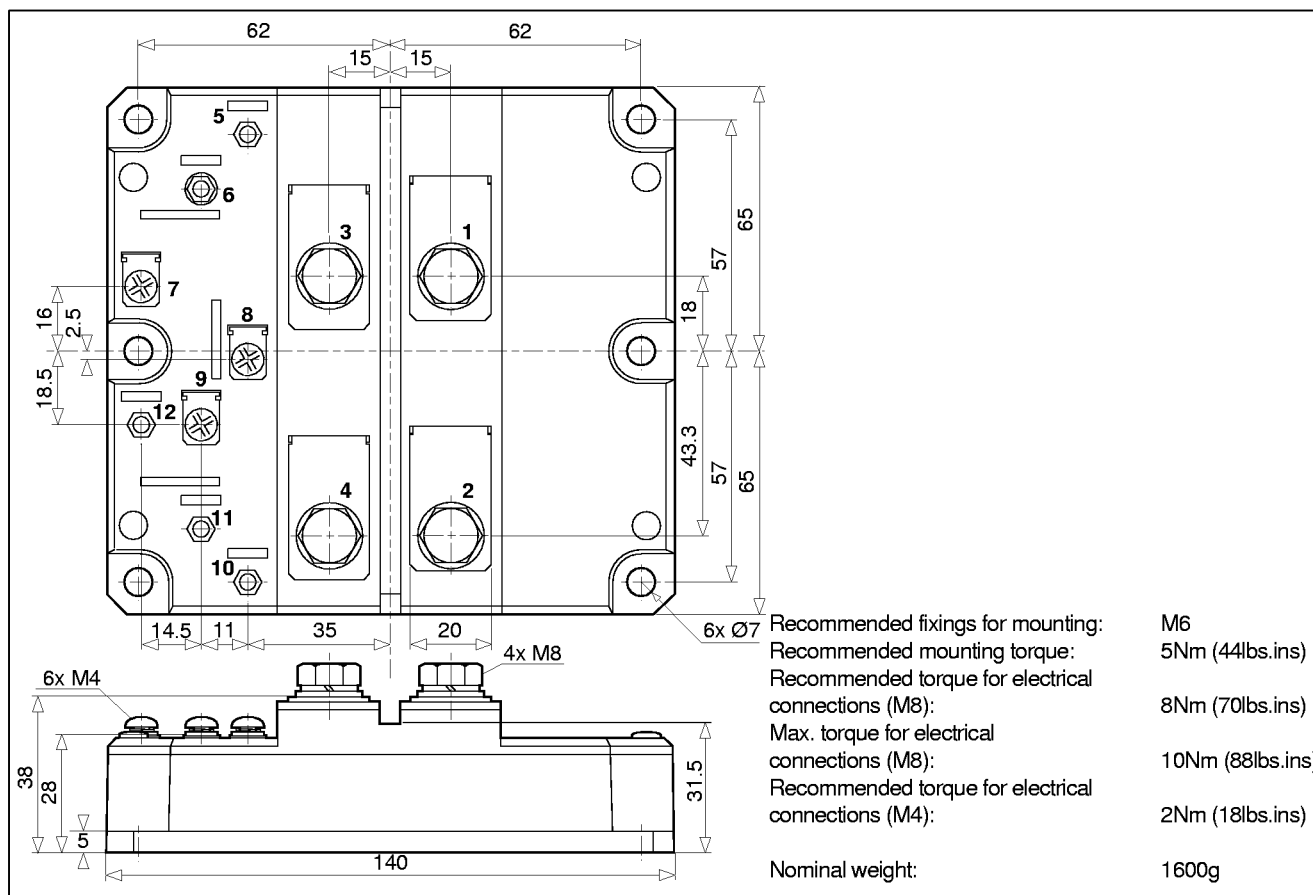


Fig. 17 Transient thermal impedance

GP1200FSS16S

PACKAGE DETAILS - F

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



HEADQUARTERS POWER OPERATIONS

MITEL SEMICONDUCTOR

Doddington Road, Lincoln,
LN6 3LF, United Kingdom.
Tel: + 44 (0)1522 500500
Fax: + 44 (0)1522 500550

Internet: <http://www.mitelsemi.com>

e-mail: power_solutions@mitel.com

POWER PRODUCT CUSTOMER SERVICE CENTRES

● **FRANCE, BENELUX & SPAIN** Tel: + 33 (0)1 69 18 90 00 Fax: +33 (0)1 64 46 54 50

● **NORTH AMERICA** Tel: 011-800-5554-5554 Fax: 011-800-5444-5444

● **UK, GERMANY, REST OF WORLD** Tel: + 44 (0)1522 500500 Fax: + 44 (0)1522 500020

These are supported by agents and distributors in major countries world-wide.

© Mitel 1998 Publication No. DS4336-6 Issue No. 6.0 December 1998

TECHNICAL DOCUMENTATION – NOT FOR RESALE. PRINTED IN UNITED KINGDOM

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior notice the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.