

GP2000FSS06S

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.
- Short Circuit Capability (10μs).

CIRCUIT

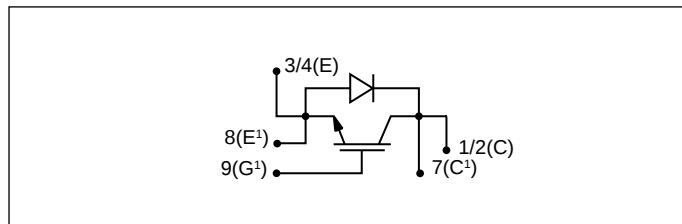


Fig.1 Single switch circuit diagram

TYPICAL KEY PARAMETERS

V_{CES}	600V
$V_{CE(sat)}$	2.1V
$I_{C(CONT)}$	2000A
$I_{C(PK)}$	4000A
t_r	290ns
t_f	430ns

PACKAGE OUTLINE

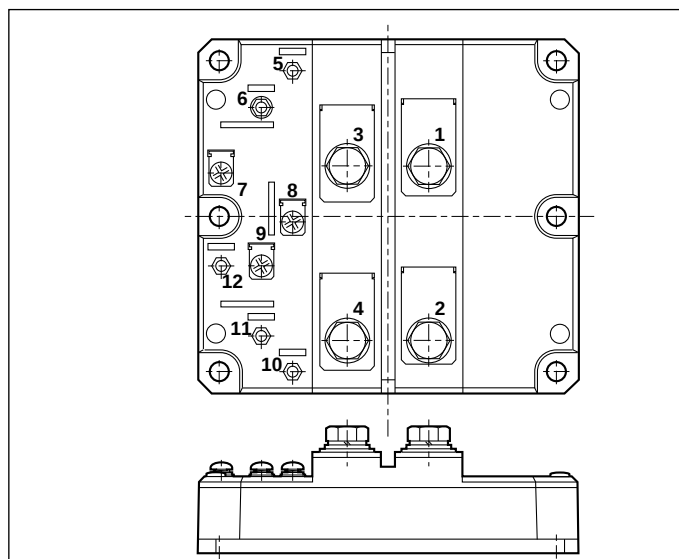


Fig.2

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	$V_{GE} = 0V$	600	V
V_{GES}	Gate-emitter voltage	-	±20	V
I_C	Collector current	DC, $T_{case} = 75^{\circ}C$	2000	A
$I_{C(PK)}$		1ms, $T_{case} = 75^{\circ}C$	4000	A
P_{max}	Maximum power dissipation		10000	W
V_{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	2500	V

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance	DC junction to case	-	0.0125	°C/W
$R_{th(c-h)}$	Thermal resistance - Case to heatsink	Mounting torque 5Nm (with mounting grease)	-	0.002	°C/W
T_j	Junction temperature	-	-	150	°C
T_{stg}	Storage temperature range	-	-40	150	°C
-	Screw torque (mounting)	-	-	6.0	Nm

DC ELECTRICAL CHARACTERISTICS

$T_{case} = 25^{\circ}C$ unless stated otherwise.						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_{CES}	Collector cut-off current	$V_{GE} = 0V, V_{CE} = V_{CES}$	-	-	16	mA
I_{GES}	Gate leakage current	$V_{GE} = \pm 20V, V_{CE} = 0V$	-	-	± 8	μA
$V_{GE(TH)}$	Gate threshold voltage	$I_C = 80mA, V_{GE} = V_{CE}$	4	-	7.5	V
$V_{CE(SAT)}$	Collector-emitter saturation voltage	$V_{GE} = 15V, I_C = 2000A$	-	2.1	2.8	V
		$V_{GE} = 15V, I_C = 2000A, T_{case} = 125^{\circ}C$	-	2.3	3.0	V

DIODE DC CHARACTERISTICS

$T_{case} = 25^{\circ}C$ unless stated otherwise.						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_F	Diode forward current	DC, $T_{case} = 75^{\circ}C$	-	-	1200	A
I_{FM}	Diode maximum forward current	$T_{case} = 75^{\circ}C, t_p = 1ms$	-	-	4000	A
V_F	Diode forward voltage	$I_F = 2000A$	-	1.7	2.2	V
$R_{th(j-c)}$	Thermal resistance	DC junction to case	-	-	0.043	°C/W

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
C_{ies}	Input capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	232000	-	pF
C_{oes}	Output capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	35200	-	pF
C_{res}	Reverse transfer capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	33600	-	pF

INDUCTIVE SWITCHING CHARACTERISTICS

For definition of switching waveforms, refer to figures 6 and 7 shown in application note AN4504 IGBT Ratings and Characteristics.

$T_{\text{case}} = 125^{\circ}\text{C}$ unless stated otherwise.						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$t_{d(\text{off})}$	Turn-off delay time	$I_C = 2000\text{A},$ $V_{GE} = \pm 15\text{V},$ $V_{CE} = 50\% V_{CES},$ $R_{G(\text{ON})} = R_{G(\text{OFF})} = 0.4\Omega$	-	560	-	ns
t_f	Fall time		-	430	-	ns
E_{OFF}	Turn-off energy loss		-	184	-	mJ
$t_{d(\text{on})}$	Turn-on delay time		-	810	-	ns
t_r	Rise time		-	290	-	ns
E_{ON}	Turn-on energy loss		-	144	-	mJ

DIODE DYNAMIC CHARACTERISTICS (INDUCTIVE)

$T_{\text{case}} = 125^{\circ}\text{C}$ unless stated otherwise.						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
t_{rr}	Reverse recovery time	$T_{\text{case}} = 25^{\circ}\text{C}, I_F = 2000\text{A}$ $V_R = 50\% V_{CES}, di_F/dt = 3200\text{A}/\mu\text{s}$	-	90	-	ns
Q_{rr}	Reverse recovery charge		-	8	-	μC
t_{rr}	Reverse recovery time	$I_F = 2000\text{A}$ $V_R = 50\% V_{CES}, di_F/dt = 3200\text{A}/\mu\text{s}$	-	228	-	ns
Q_{rr}	Reverse recovery charge		-	43	-	μC

CURVES

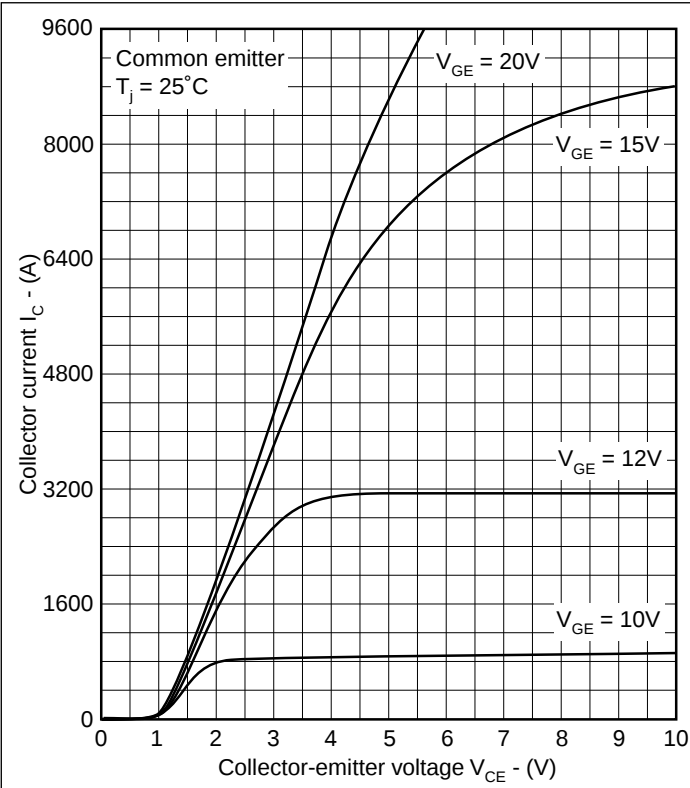


Fig.3 Typical output characteristics @ 25°C

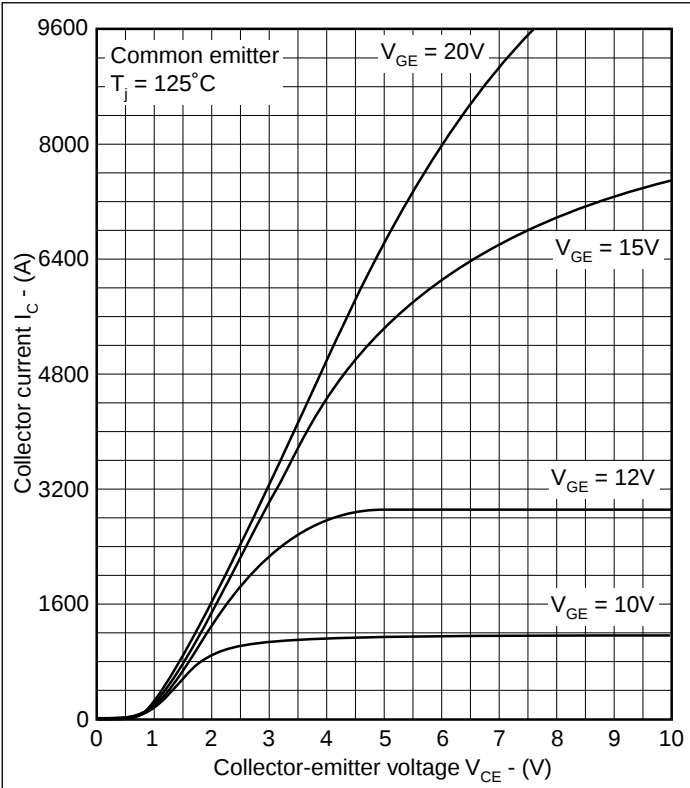


Fig.4 Typical output characteristics @ 125°C

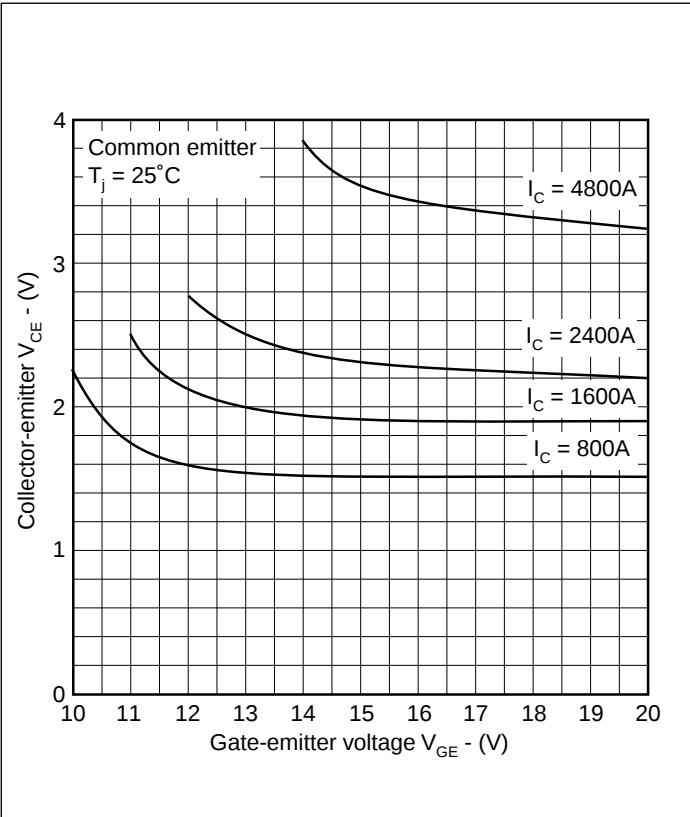


Fig.5 Typical transfer characteristics @ 25°C

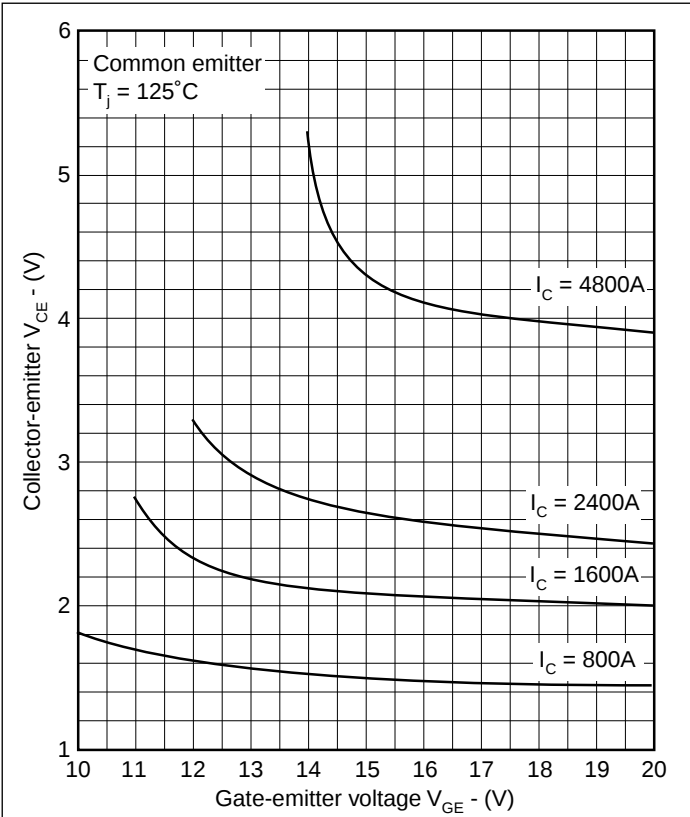


Fig.6 Typical transfer characteristics @ 125°C

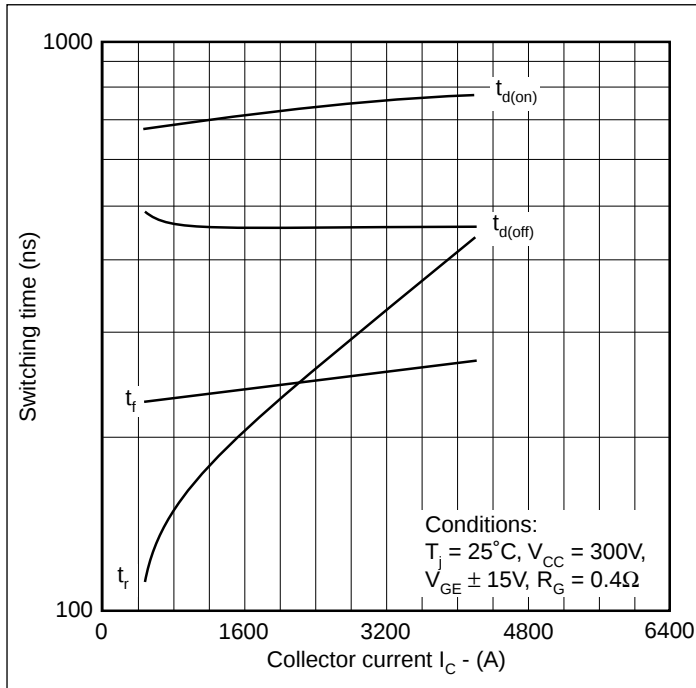
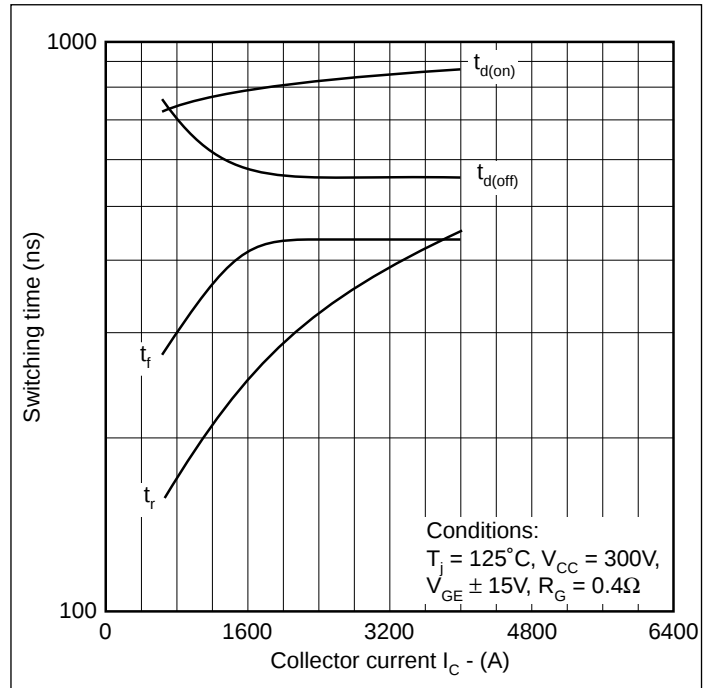
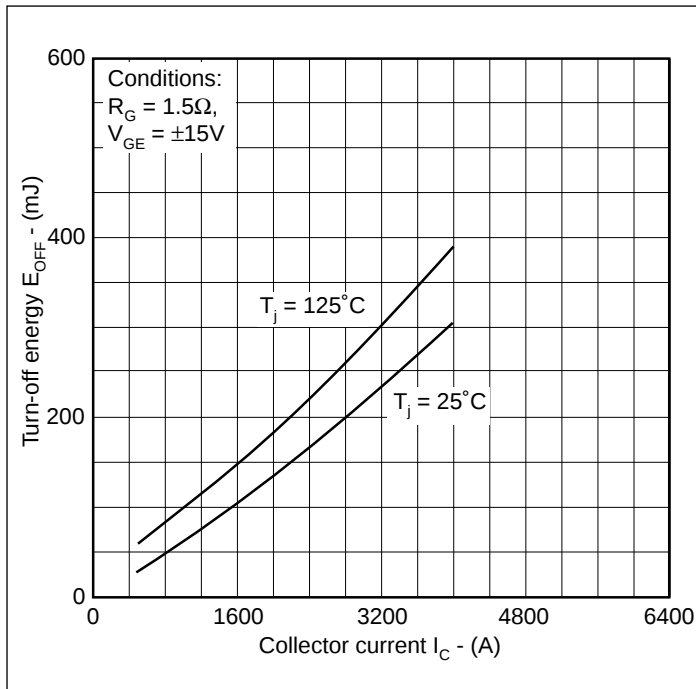
Fig.7 Typical switching time vs I_C @ 25°C Fig.8 Typical switching time vs I_C @ 125°C 

Fig.9 Typical turn-off losses

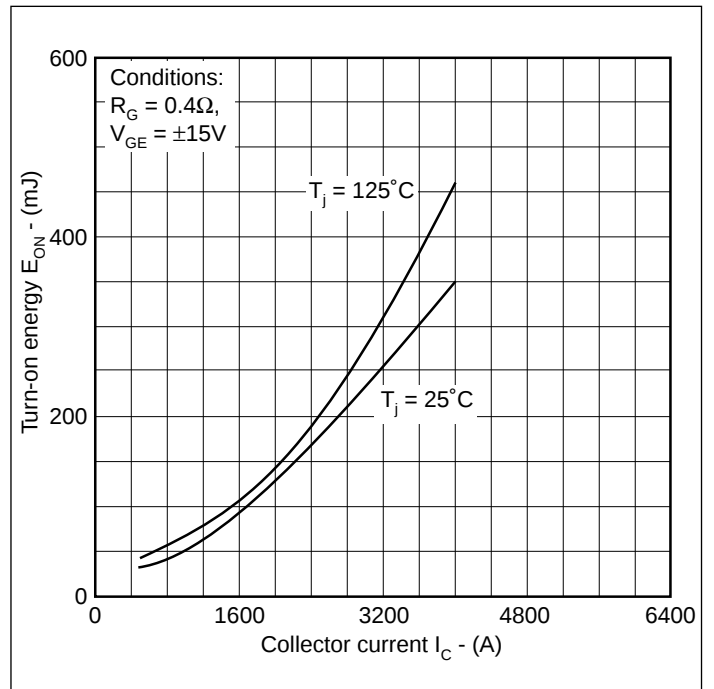


Fig.10 Typical turn-on losses

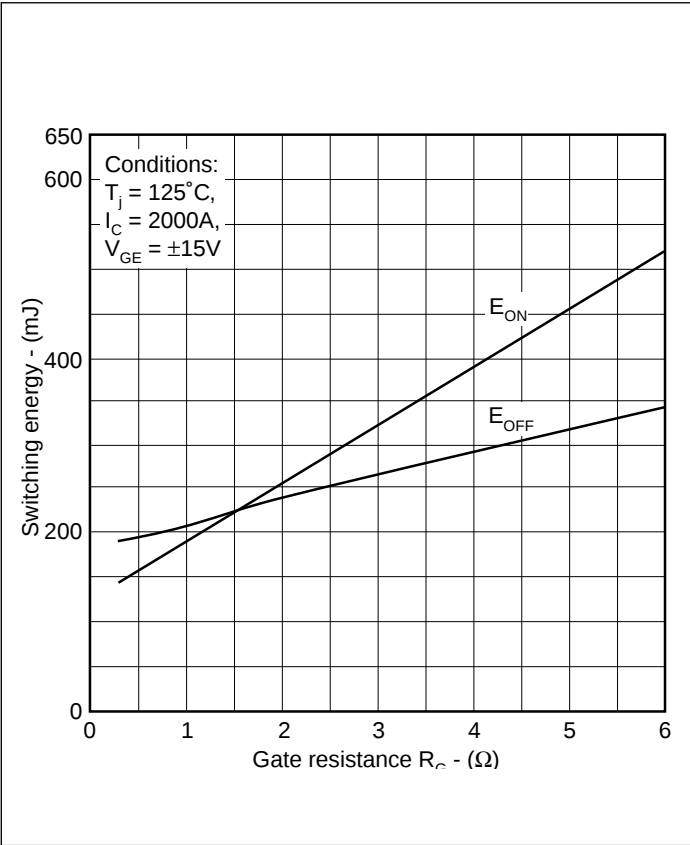


Fig.11 Typical switching energy @125°C

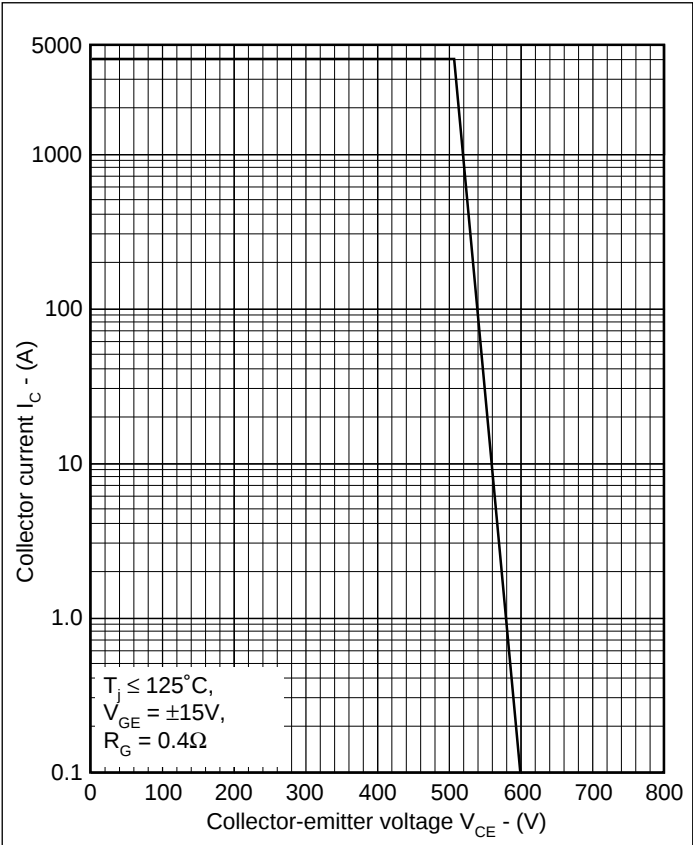


Fig.12 Reverse bias safe operating area

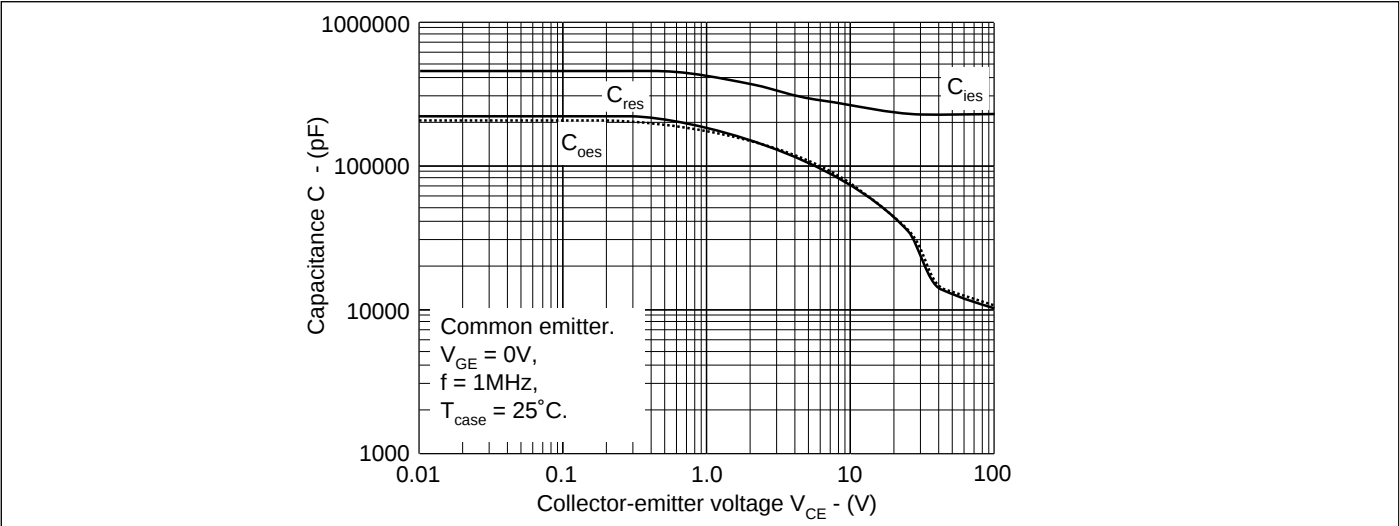


Fig.13 Typical capacitance

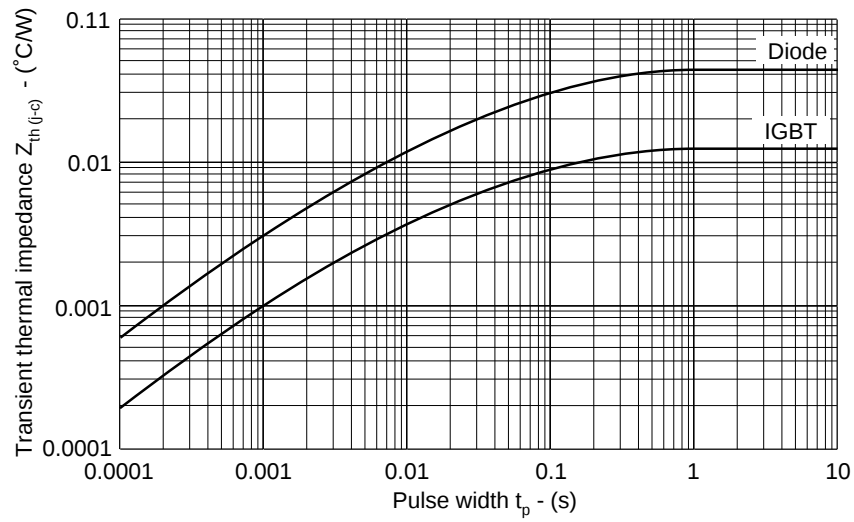


Fig.14 Transient thermal impedance

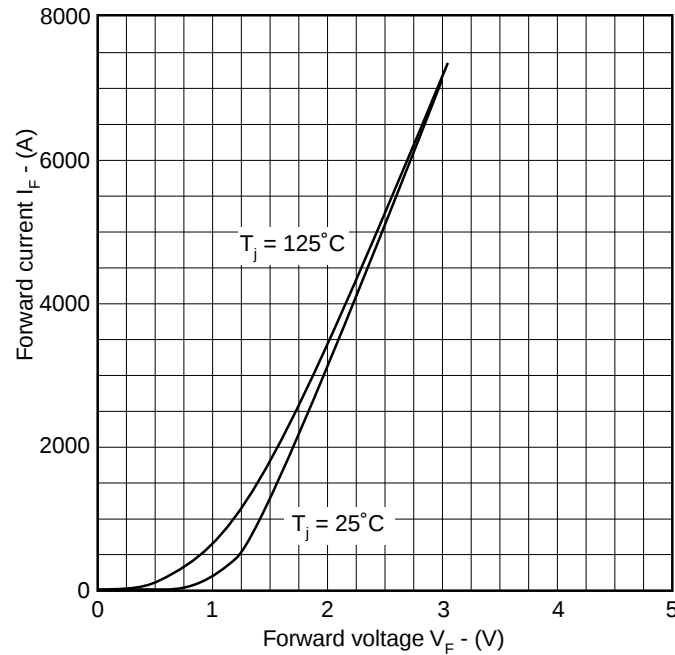
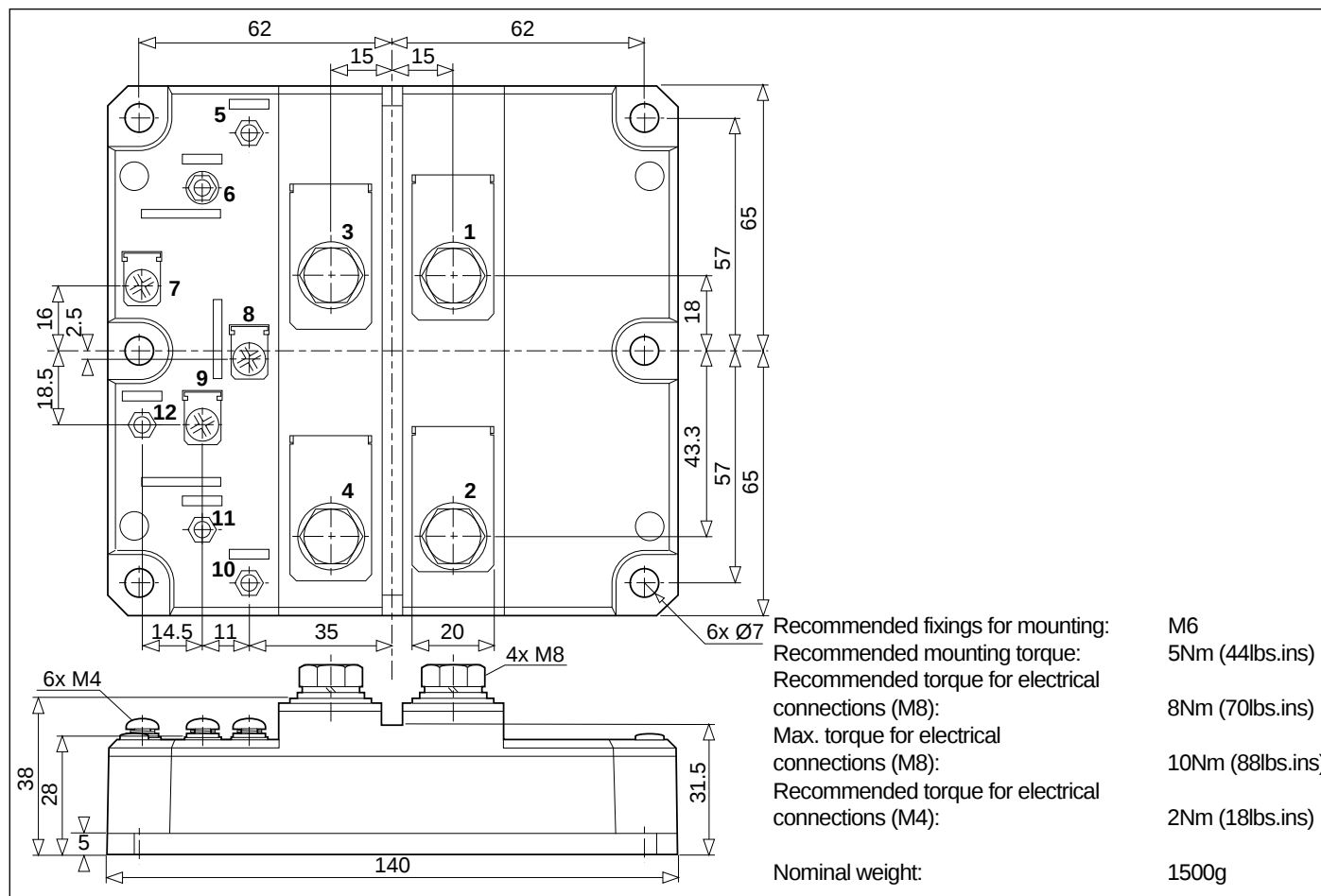


Fig.15 Typical diode forward characteristics

PACKAGE DETAILS - F

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



GEC PLESSEY
SEMICONDUCTORS

HEADQUARTERS OPERATIONS

GEC PLESSEY SEMICONDUCTORS

Cheney Manor, Swindon,
Wiltshire, SN2 2QW, United Kingdom.

Tel: + 44 (0)1793 518000

Fax: + 44 (0)1793 518411

GEC PLESSEY SEMICONDUCTORS

P.O. Box 660017

1500 Green Hills Road,
Scotts Valley, California 95067-0017,
United States of America.

Tel: + 1 (408) 438 2900

Fax: + 1 (408) 438 5576

POWER PRODUCT CUSTOMER SERVICE CENTRES

- **FRANCE.** 2 rue Henri-Bergson, 92665 Asnieres Cedex.
Tel: + 33 1 40 80 54 00. Fax: + 33 1 40 80 55 87.
- **GERMANY.** Ungererstrasse 129, 80505 München.
Tel: + 49 (0)89 36 09 060. Fax: + 49 (0)89 36 09 06 55.
- **NORTH AMERICA.** At Dedham Place, Suite 125, 3 Allied Drive, Dedham. MA 02026.
Tel: + 1 617 251 0126. Fax: + 1 617 251 0106.
- **UNITED KINGDOM.** Doddington Road, Lincoln. LN6 3LF.
Tel: + 44 (0)1522 500500. Fax: + 44 (0)1522 500550.

These are supported by Agents and Distributors in major countries world-wide.

© GEC Plessey Semiconductors 1996

Publication No. DS4326-3 Issue No. 3.1 July 1996 ADVANCE INFORMATION

TECHNICAL DOCUMENTATION - NOT FOR RESALE.

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.