

GP250MHB06S

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

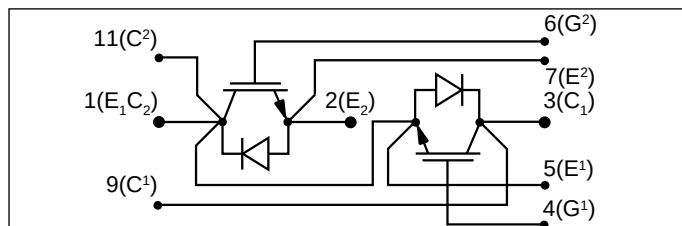


Fig.1 Half bridge circuit diagram

TYPICAL KEY PARAMETERS

V_{CES}	600V
$V_{CE(sat)}$	2.1V
$I_{C(CONT)}$	250A
$I_{C(PK)}$	500A
t_r	290ns
t_f	430ns

PACKAGE OUTLINE

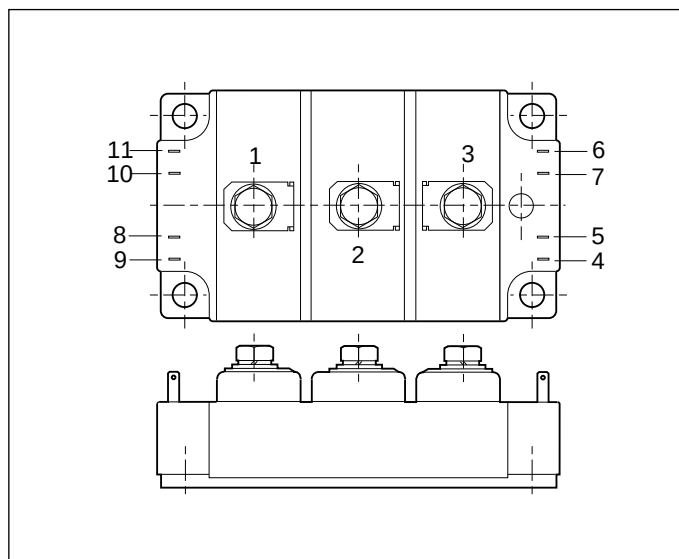


Fig.2

Outline type code: M. 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, $T_{case} = 75^{\circ}C$	250	A
$I_{C(PK)}$		1ms, $T_{case} = 75^{\circ}C$	500	A
P_{max}	Maximum power dissipation	Per arm	1250	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 per arm	-	0.1	°C/W
$R_{th(c-h)}$	Thermal resistance - Case to heatsink	Mounting torque 5Nm (with mounting grease)	-	0.015	°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	$V_{GE} = 0V, V_{CE} = V_{CES}$	-	-	2	mA
I_{GES}	Gate leakage current	$V_{GE} = \pm 20V$	-	-	± 1	μA
$V_{GE(TH)}$	Gate threshold voltage	$I_C = 10mA, V_{GE} = V_{CE}$	4	-	7.5	V
$V_{CE(SAT)}$	Collector-emitter saturation voltage	$V_{GE} = 15V, I_C = 250A$	-	2.1	2.8	V
		$V_{GE} = 15V, I_C = 250A, T_{case} = 125^{\circ}C$	-	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, $T_{case} = 75^{\circ}C$	-	-	150	A
I_{FM}	Diode maximum forward current	$T_{case} = 75^{\circ}C, t_p = 1ms$	-	-	500	A
V_F	Diode forward voltage	$I_F = 250A$	-	1.7	2.2	V
$R_{th(j-c)}$	Thermal resistance	DC junction to case per arm	-	-	0.34	°C/W

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
C_{ies}	Input capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	29000	-	pF
C_{oes}	Output capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	4400	-	pF
C_{res}	Reverse transfer capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$	-	4200	-	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
$t_{\text{d(off)}}$	Turn-off delay time	$I_{\text{C}} = 250\text{A},$ $V_{\text{GE}} = \pm 15\text{V},$ $V_{\text{CE}} = 50\% V_{\text{CES}},$ $R_{\text{G(ON)}} = R_{\text{G(OFF)}} = 3.3\Omega$	-	560	-	ns
t_{f}	Fall time		-	430	-	ns
E_{OFF}	Turn-off energy loss		-	24	-	mJ
$t_{\text{d(on)}}$	Turn-on delay time		-	810	-	ns
t_{r}	Rise time		-	290	-	ns
E_{ON}	Turn-on energy loss		-	20	-	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	$T_{\text{case}} = 25^{\circ}\text{C}, I_{\text{F}} = 250\text{A}$ $V_{\text{R}} = 50\% V_{\text{CES}}, dI_{\text{F}}/dt = 400\text{A}/\mu\text{s}$	-	90	-	ns
Q_{rr}	Reverse recovery charge		-	1	-	μC
t_{rr}	Reverse recovery time	$I_{\text{F}} = 250\text{A}$ $V_{\text{R}} = 50\% V_{\text{CES}}, dI_{\text{F}}/dt = 400\text{A}/\mu\text{s}$	-	228	-	ns
Q_{rr}	Reverse recovery charge		-	5.4	-	μC

CURVES

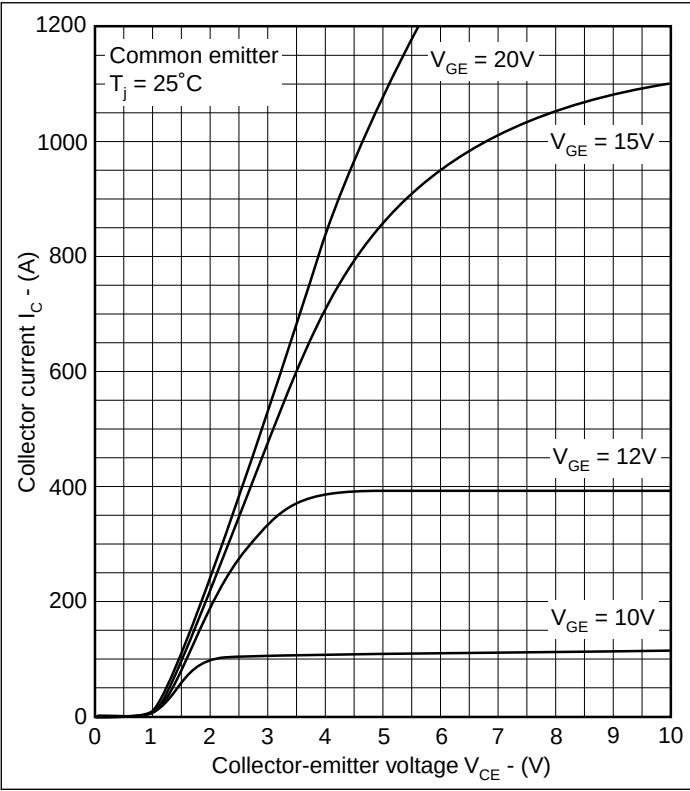


Fig.3 Typical output characteristics @ 25°C

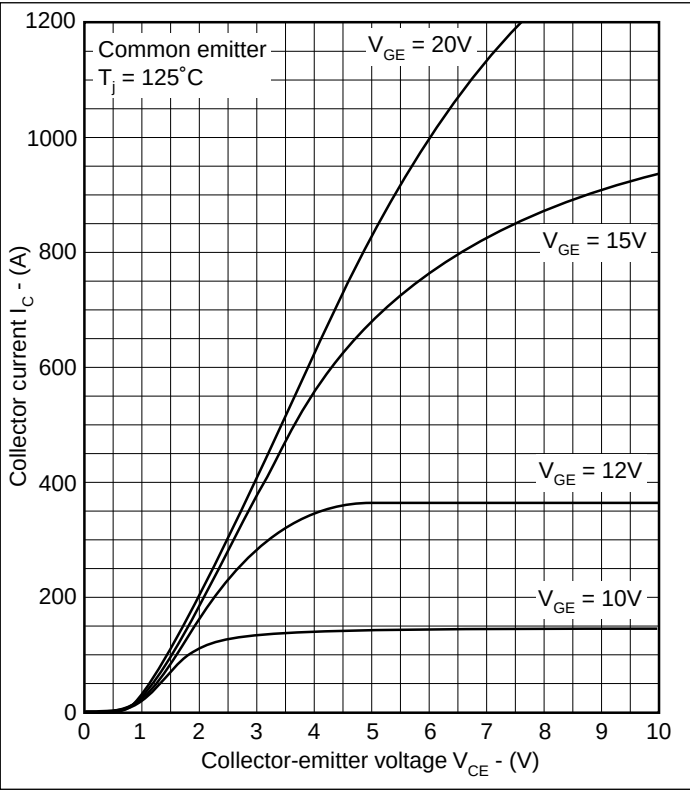


Fig.4 Typical output characteristics @ 125°C

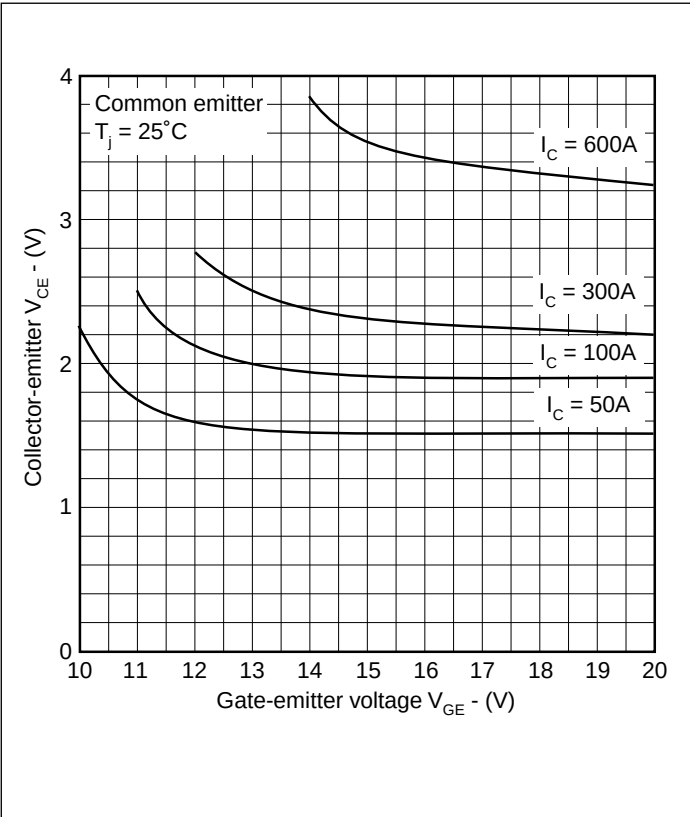


Fig.5 Typical transfer characteristics @ 25°C

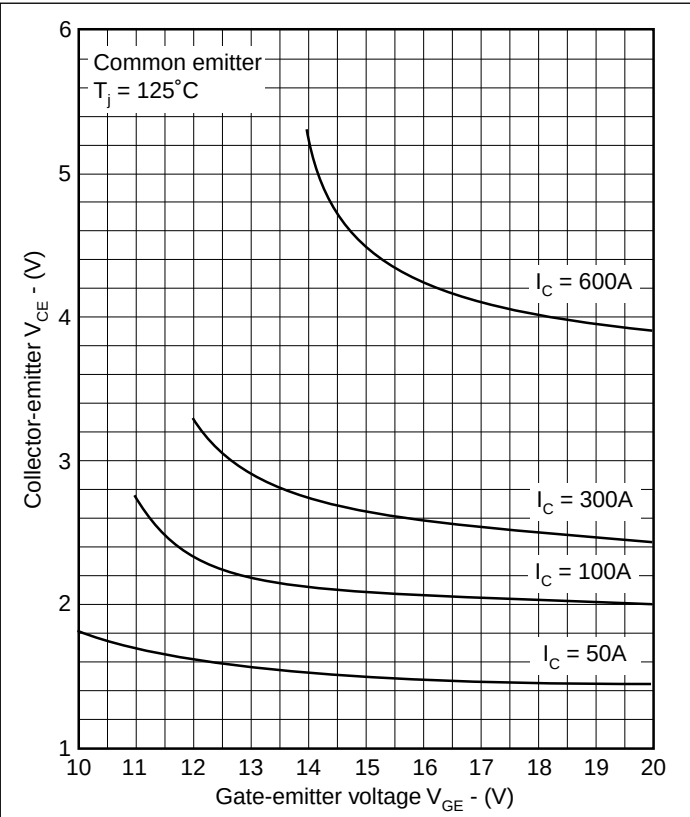


Fig.6 Typical transfer characteristics @ 125°C

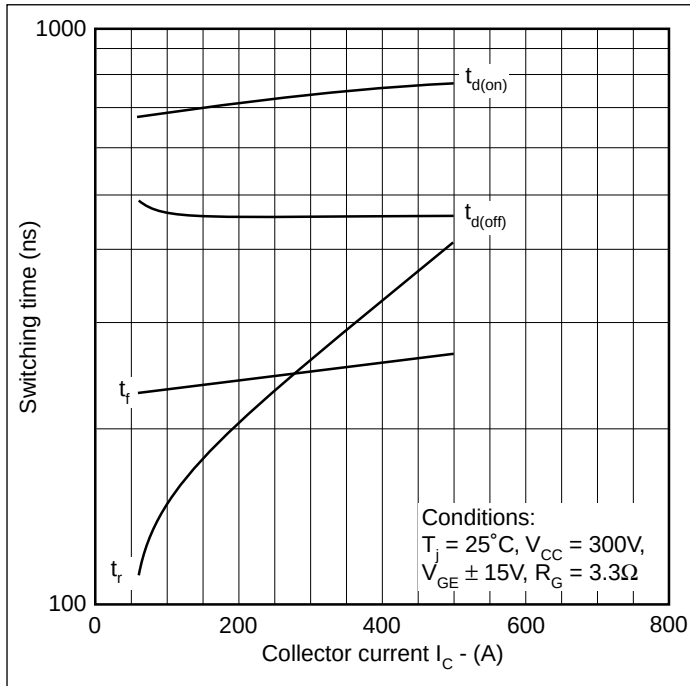
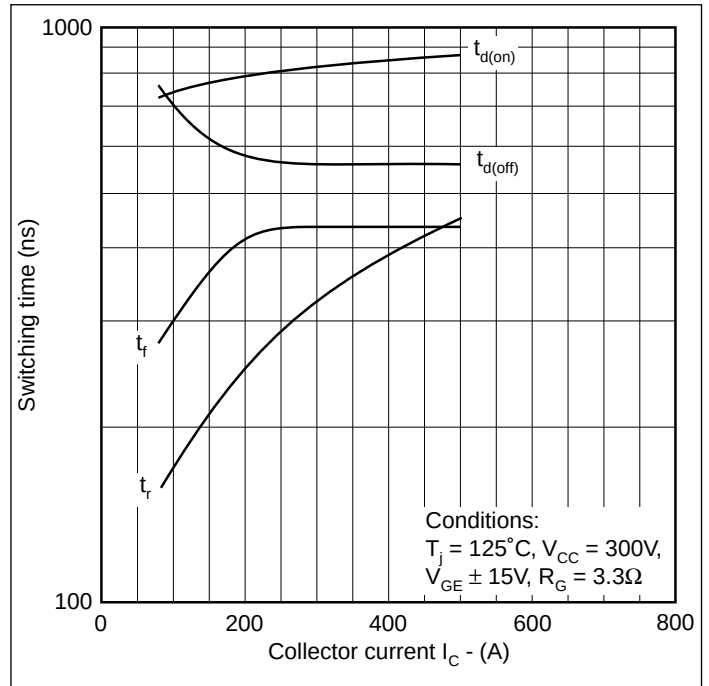
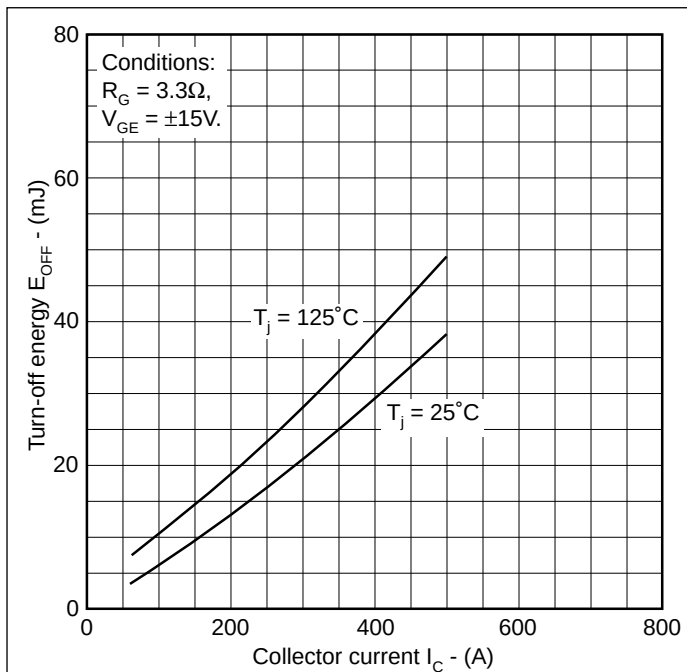
Fig.7 Typical switching time vs I_C @ 25°C Fig.8 Typical switching time vs I_C @ 125°C 

Fig.9 Typical turn-off losses

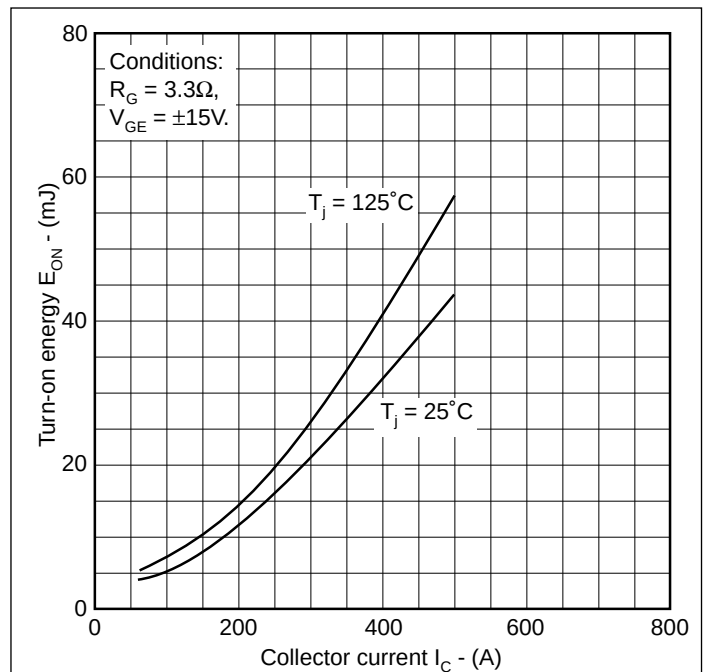


Fig.10 Typical turn-on losses

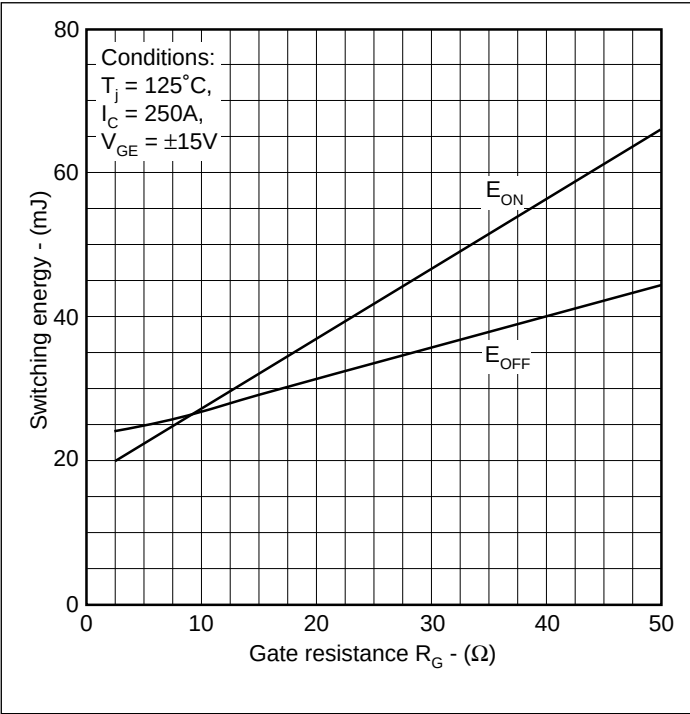


Fig.11 Typical switching energy @125°C

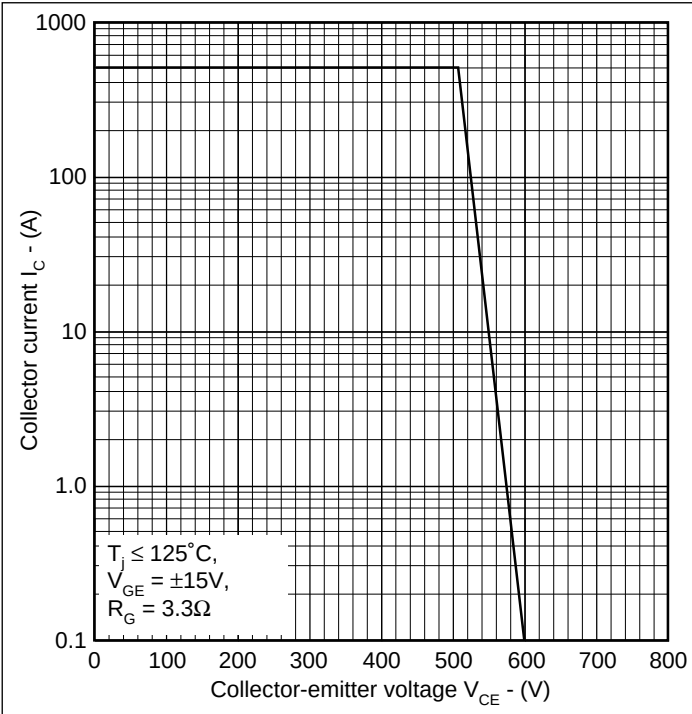


Fig.12 Reverse bias safe operating area

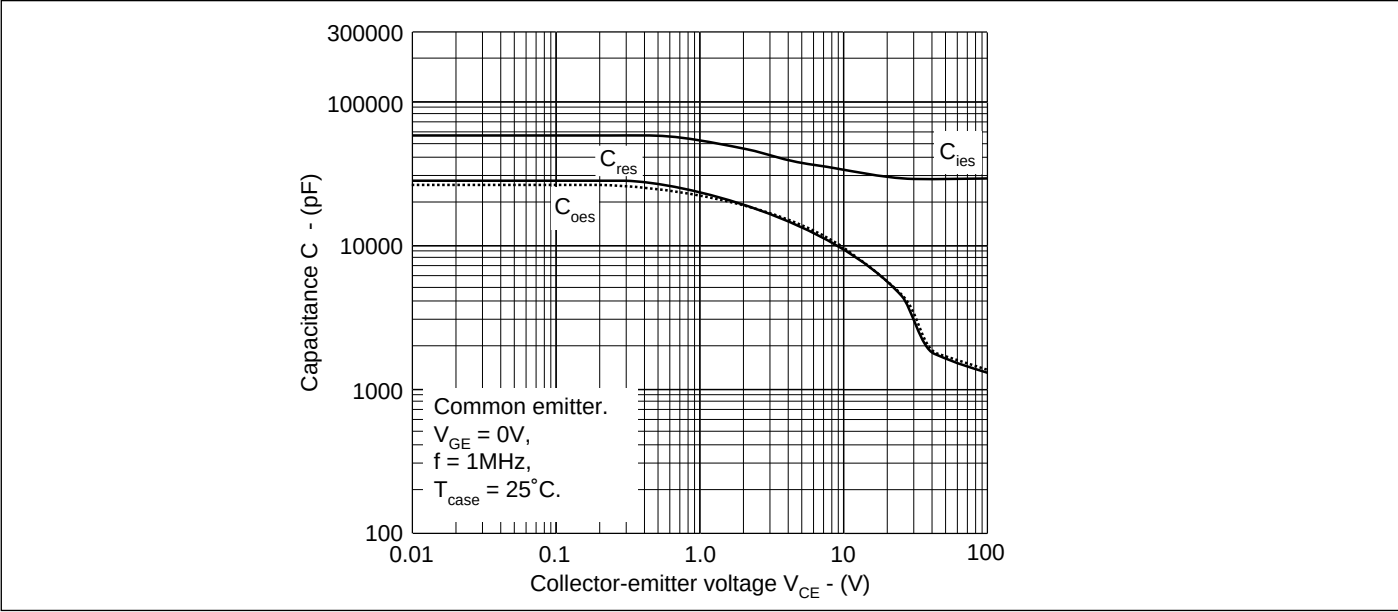


Fig.13 Typical capacitance

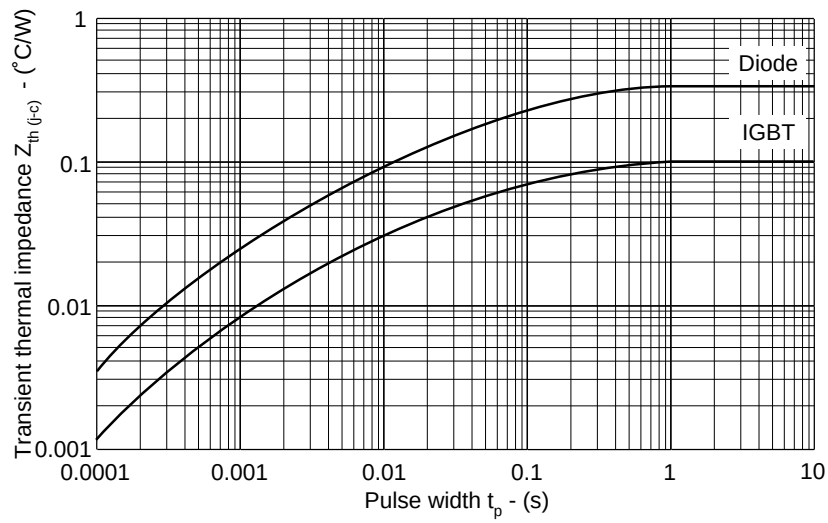


Fig.14 Transient thermal impedance

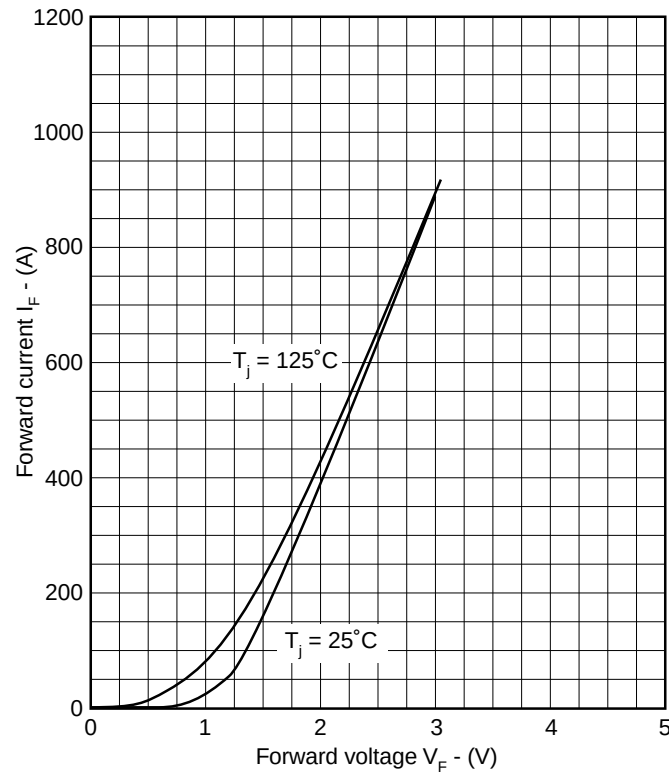
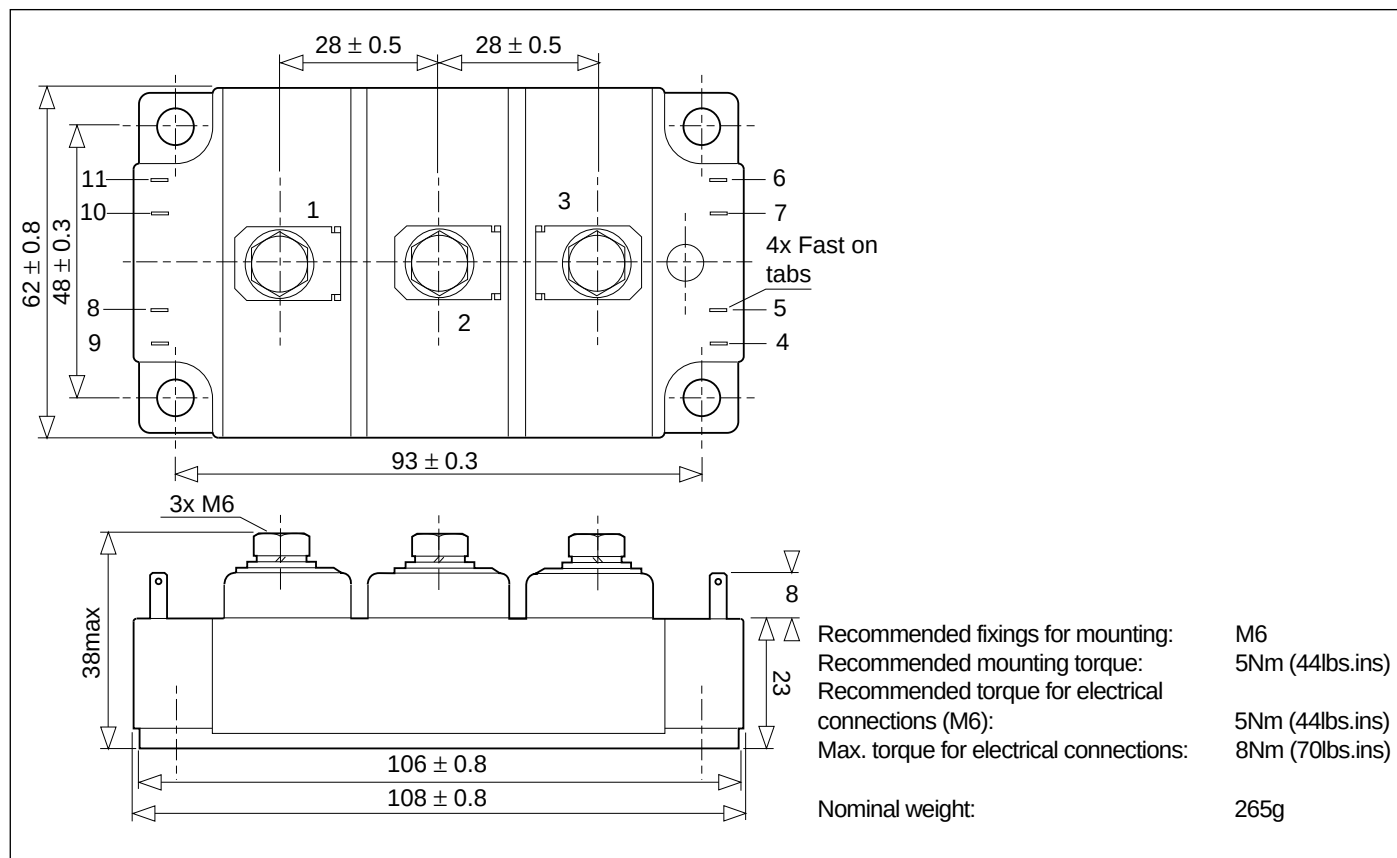


Fig.15 Typical diode forward characteristics

PACKAGE DETAILS - M

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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