IGBT Module (2 in one-package), 300A

Features

1. High frequency operation
2. Low losses and soft switching
3. Isolated baseplate for easy heat sinking
4. Discrete super-fast recovery free-wheel diode
5. Small temperature dependence of the turn-off switching loss

Typical Applications

- AC Motor Control
- DC Motor Control
- UPS
- Welding Power Supplies
- Inverter
- Electronic welders at f_{sw} up to 20kHz

Ordering code

NSGM	300	GB	xx	B
(1)	(2)	(3)	(4)	(5)

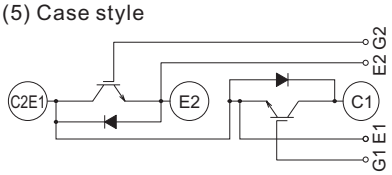
(1) For IGBT module

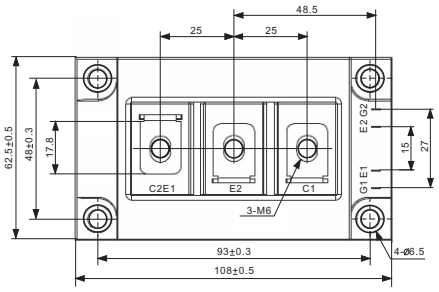
(2) Maximum average forward current , A

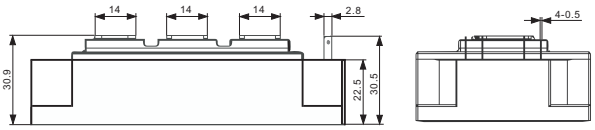
(3) 2 in one-package

(4) Voltage code , V (code x 10 = / V_{RRM})

(5) Case style







All dimensions in millimeters

Electrical Characteristics

Absolute maximum ratings , T_j=25℃ unless otherwise specified

Symbol	Parameter	Condition	Max. Value	Unit
I_C	Collector current	T_c=80℃	300	A
I_{CM}	Peak collector current	T_c=25℃	600	A
P_c	Maximum collector dissipation	T_c=25℃ , T_j≤150℃	2100	W
V_{CES}	Collector-emitter voltage	G-E Short	1200	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
V_{iso}	Isolation voltage	Main terminal to baseplate , AC 1 min	3000	V
T_j	Junction temperature		-40 to 150	℃
T_{stg}	Storage temperature		-40 to 125	℃
T	Mounting torque , M6 main terminal		3 to 5	N.m
	Mounting torque , M6 mounting		3 to 5	
W_t	Approximate weight		370	g

Static electrical characteristics , T_j=25℃ unless otherwise specified

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
I_{CES}	Collector-cutoff current	V_{CE}=V_{CES} , V_{GE}=0V			1.0	mA
I_{GES}	Gate leakage current	V_{GE}=±20V , V_{CE}=0V , T_J=125℃			200	μA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=6mA , V_{CE}=VGE , T_J=25℃	5	6.2	7	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=300A , V_{GE}=15V , T_J=25℃		2		V
		I_C=300A , V_{GE}=15V , T_J=125℃		2.3		
Q_G	Total gate charge			3060		nC
V_{EC}	Emitter-collector voltage	I_C=-190A , V_{GE}=0V			2.2	V

Dynamic electrical characteristics , T_j=25℃ unless otherwise specified

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
C_{ies}	Input capacitance	V_{GE}=0V , V_{CE}=25V f=1MHz		30		nF
C_{oes}	Output capacitance			2		
C_{res}	Reverse transfer capacitance			1.6		
$t_{d(on)}$	Turn-on delay time , Resistive	V_{CC}=600V , I_C=300A V_{GE1}=V_{GE2}=±15V , R_G=5Ω		220		ns
t_r	Rise time , Load			60		
$t_{d(off)}$	Turn-off delay time , Switching			530		
t_f	Fall time , Times			350		
t_{rr}	Diode reverse recovery time	I_C=-190A , $d_{i/dt}$=-150A/μs			250	ns
Q_{rr}	Diode reverse recovery charge	I_C=-190A , $d_{i/dt}$=-150A/μs		12		μC

Thermal and mechanical characterisitics , T_j=25℃ unless otherwise specified

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
$R_{th(j-c)}$	Thermal resistance , junction to case	Per IGBT			0.09	℃/W
		Per FWDi			0.24	
$R_{th(c-f)}$	Contact thermal resistance	Per module , thermal grease applied			0.05	℃/W

Fig.1 Typ. output characteristic ,t_p=80 μs; 125°C

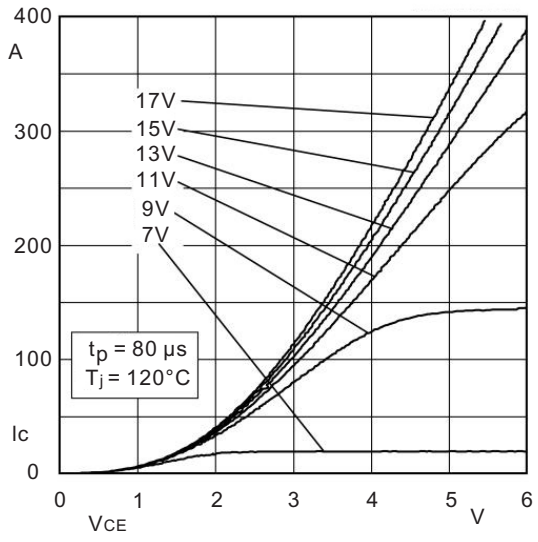


Fig.2 Rated current vs. temperature I_c = f (T_c)

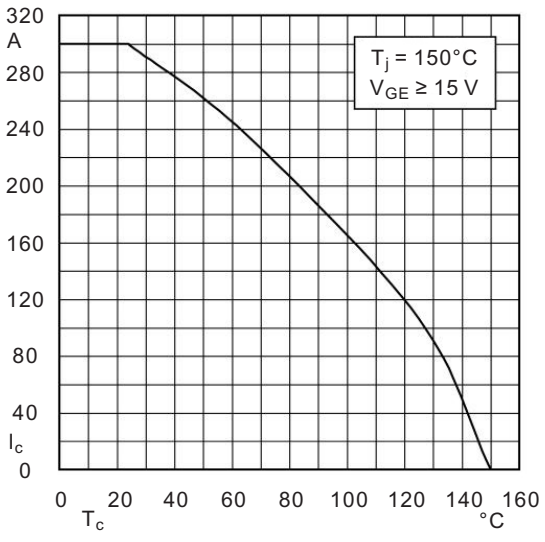


Fig.3 Typ. turn-on/off energy = f (I_c)

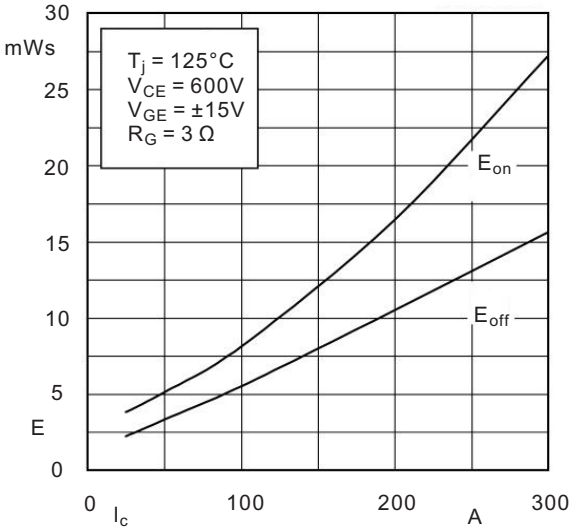


Fig. 4 Typ. turn-on/off energy = f (F_G)

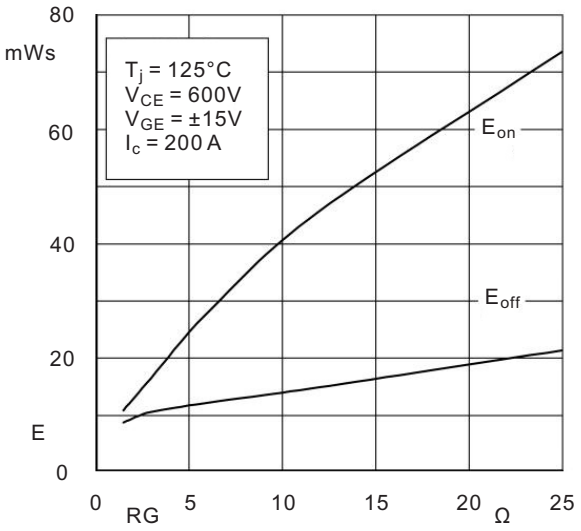


Fig. 5 Typ. transfer characteristic,
t_p = 80µs;V_{CE} = 20V

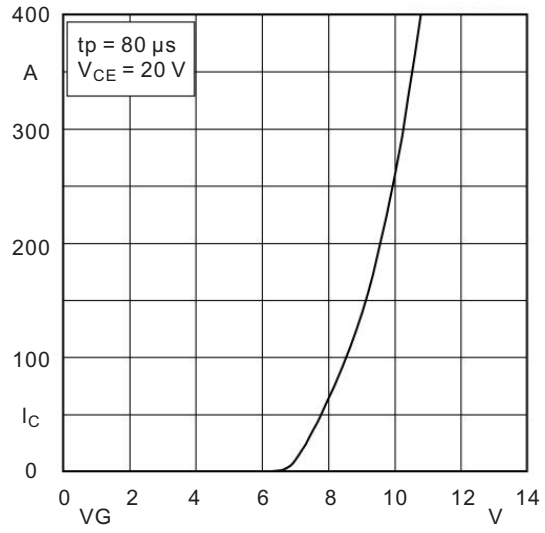


Fig. 6 Typ. gate charge characteristic

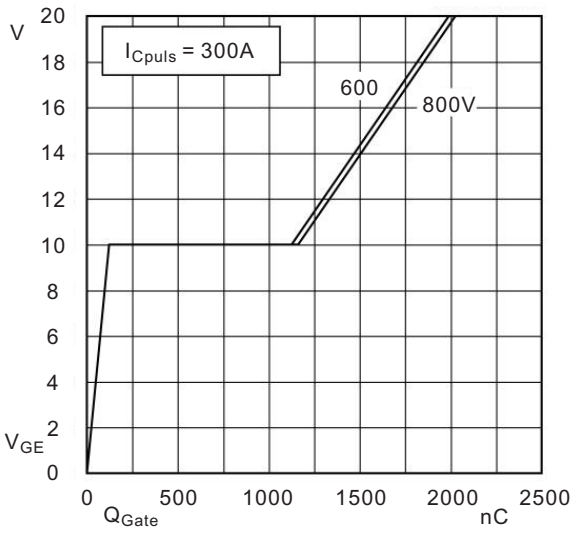


Fig. 7 Typ. switching times vs. I_C

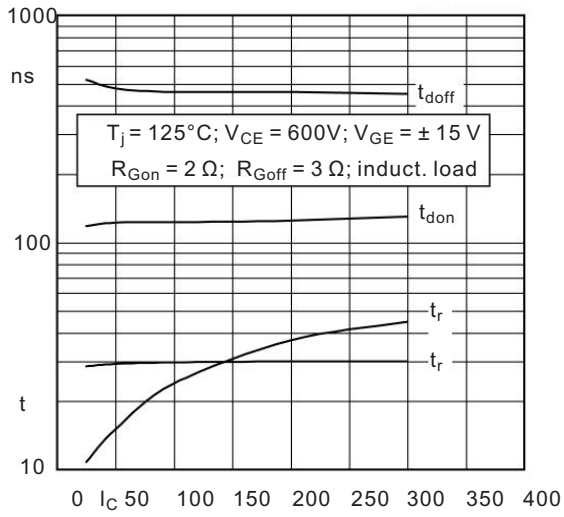


Fig.8 Typ. switching times vs. gate resistor R_G

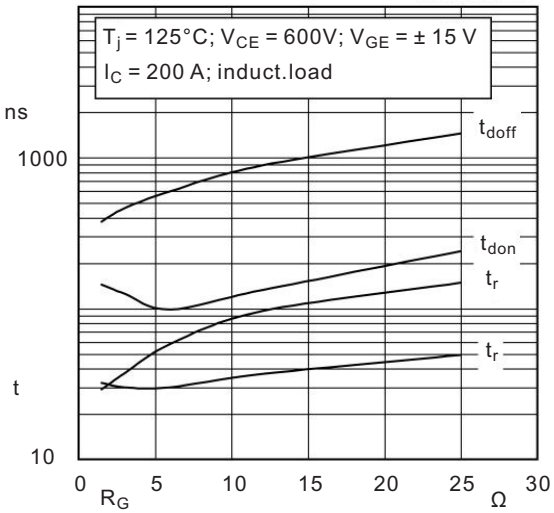


Fig. 9 Transient thermal impedance of IGBT
$Z_{thp(j-c)} = f(t_p)$; $D = t_p/tc = t_p * f$

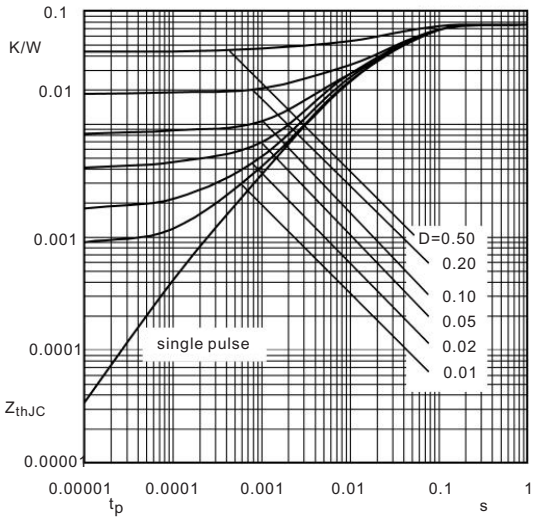


Fig. 10 Transient thermal impedance of FWD
$Z_{thp(j-c)} = f(t_p)$; $D = t_p/tc = t_p * f$

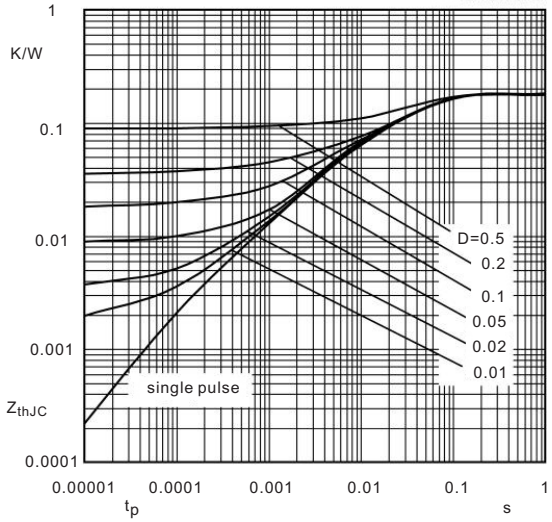


Fig.11 CAL diode forward characteristic

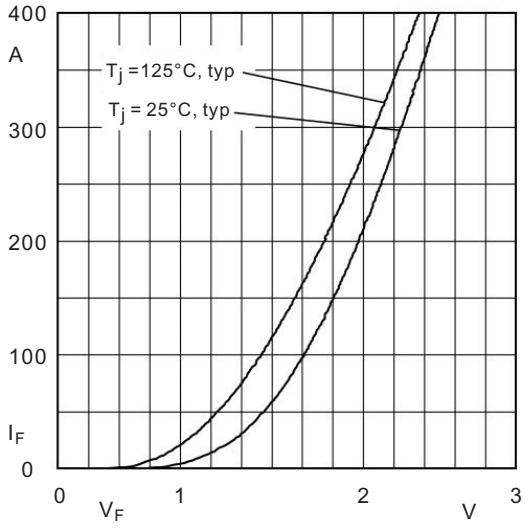


Fig. 12 Typ. CAL diode peak reverse recovery cyrrebt