

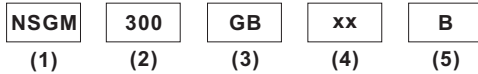
## Features IGBT Module (2 in one-package), 300A

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

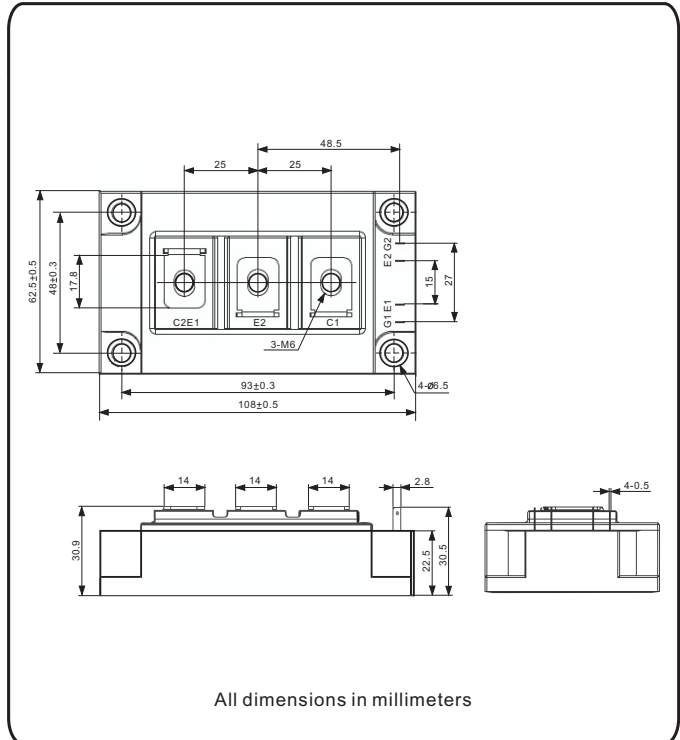
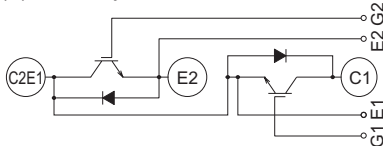
### Typical Applications

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

Ordering code



- (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



### Electrical Characteristics

Absolute maximum ratings,  $T_j=25^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	Condition	Max. Value	Unit
$I_C$	Collector current	$T_C=80^\circ\text{C}$	300	A
$I_{CM}$	Peak collector current	$T_C=25^\circ\text{C}$	600	A
$P_c$	Maximum collector dissipation	$T_C=25^\circ\text{C}, T_j \leq 150^\circ\text{C}$	2100	W
$V_{CES}$	Collector-emitter voltage	G-E Short	1200	V
$V_{GES}$	Gate-emitter voltage	C-E Short	$\pm 20$	V
$V_{iso}$	Isolation voltage	Main terminal to baseplate, AC 1 min	3000	V
$T_j$	Junction temperature		-40 to 150	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-40 to 125	$^\circ\text{C}$
$T$	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,  $T_j=25^\circ\text{C}$  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	$V_{GE}=\pm 20V, V_{CE}=0V, T_j=125^\circ\text{C}$			200	$\mu\text{A}$
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=6mA, V_{CE}=V_{GE}, T_j=25^\circ\text{C}$	5	6.2	7	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_C=300A, V_{GE}=15V, T_j=25^\circ\text{C}$		2		V
		$I_C=300A, V_{GE}=15V, T_j=125^\circ\text{C}$		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 ,  $T_j=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
$C_{ies}$	Input capacitance	$V_{GE}=0\text{V}, V_{CE}=25\text{V}$ $f=1\text{MHz}$		30		nF
$C_{oes}$	Output capacitance			2		
$C_{res}$	Reverse transfer capacitance			1.6		
$t_{d(on)}$	Turn-on delay time , Resistive	$V_{CC}=600\text{V}, I_C=300\text{A}$ $V_{GE1}=V_{GE2}=\pm 15\text{V}, R_G=5\Omega$		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	$I_C=-190\text{A}, d_i/d_t=-150\text{A}/\mu\text{s}$			250	ns
$Q_{rr}$	Diode reverse recovery charge	$I_C=-190\text{A}, d_i/d_t=-150\text{A}/\mu\text{s}$		12		$\mu\text{C}$

Thermal and mechanical characteristics ,  $T_j=25^{\circ}\text{C}$  unless otherwise specified

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

Fig.1 Typ. output characteristic ,  $t_p=80\ \mu\text{s}$ ;  $125^{\circ}\text{C}$

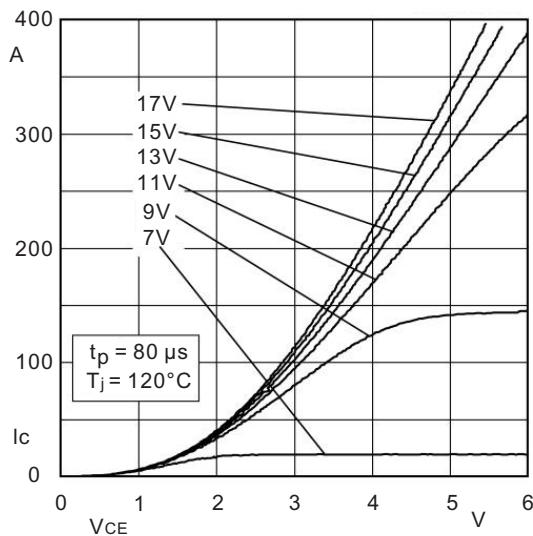


Fig.2 Rated current vs. temperature  $I_C = f(T_C)$

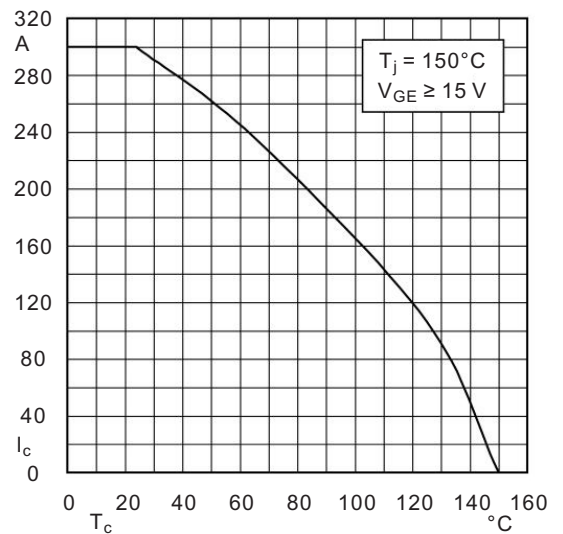


Fig.3 Typ. turn-on/off energy = f (I<sub>c</sub>)

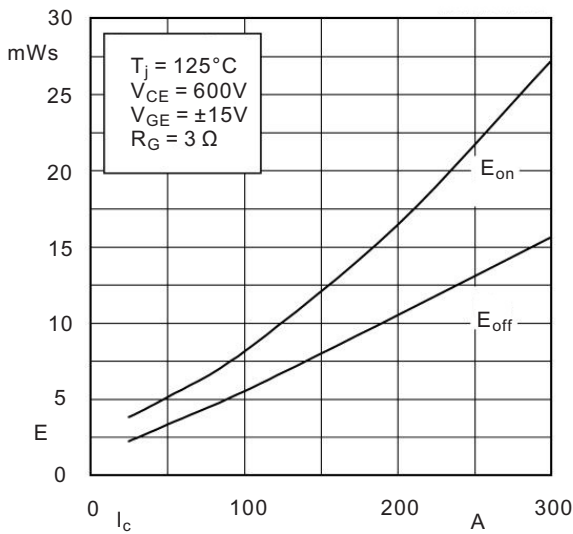


Fig. 4 Typ. turn-on/off energy = f (R<sub>G</sub>)

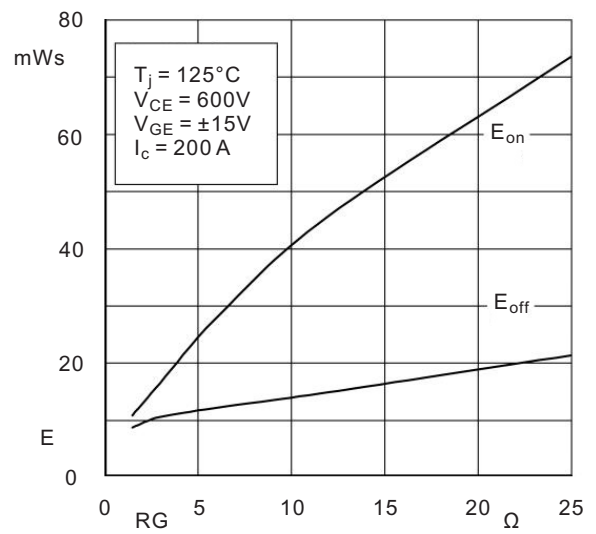


Fig. 5 Typ. transfer characteristic, t<sub>p</sub> = 80μs; V<sub>CE</sub> = 20V

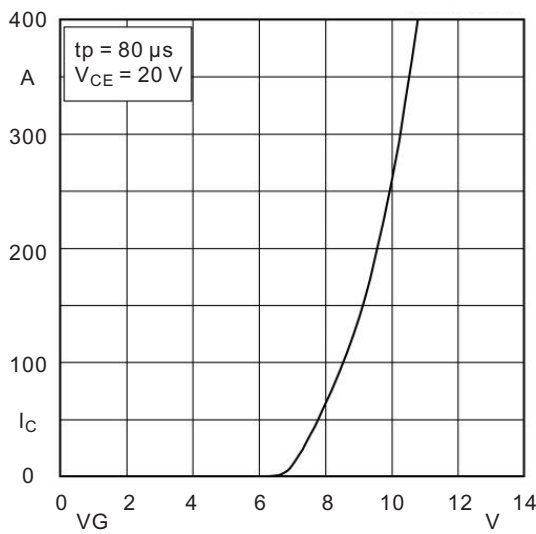


Fig. 6 Typ. gate charge characteristic

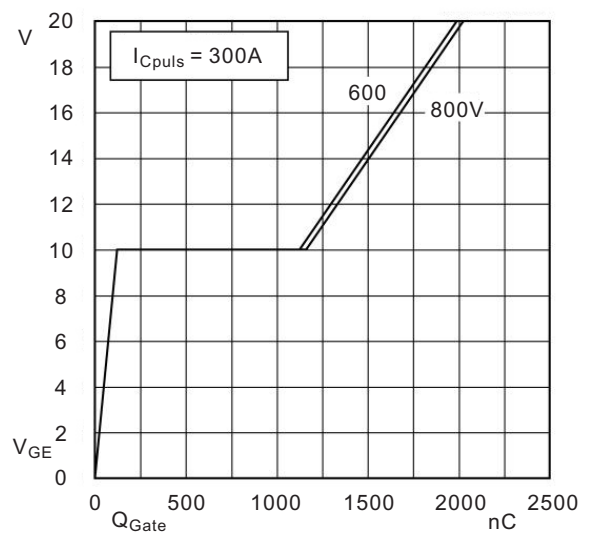


Fig. 7 Typ. switching times vs. I<sub>c</sub>

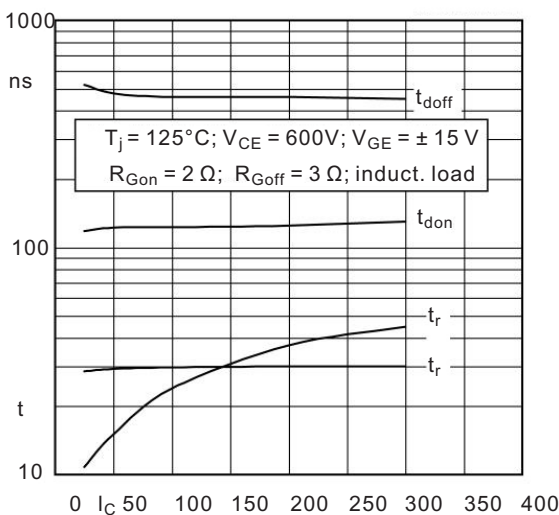


Fig.8 Typ. switching times vs. gate resistor R<sub>G</sub>

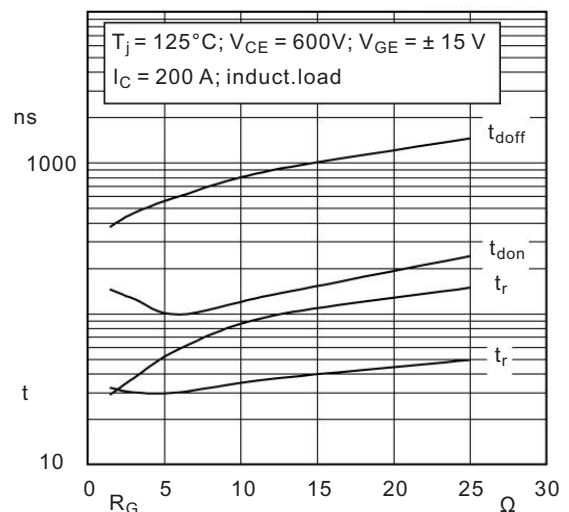


Fig. 9 Transient thermal impedance of IGBT  
 $Z_{thp(j-c)} = f(t_p)$ ;  $D = t_p/t_c = t_p * f$

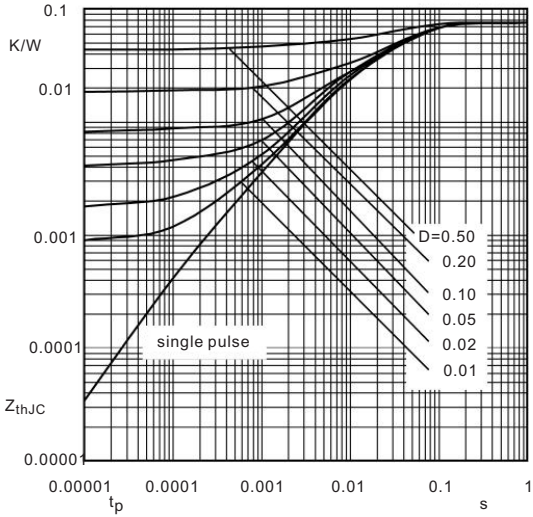


Fig. 10 Transient thermal impedance of FWD  
 $Z_{thp(j-c)} = f(t_p)$ ;  $D = t_p/t_c = t_p * f$

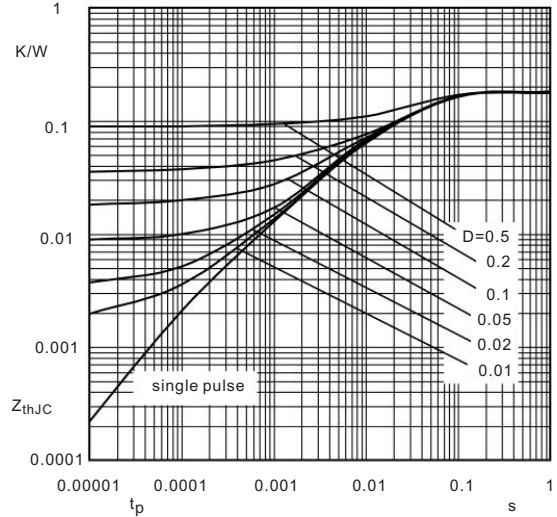


Fig. 11 CAL diode forward characteristic

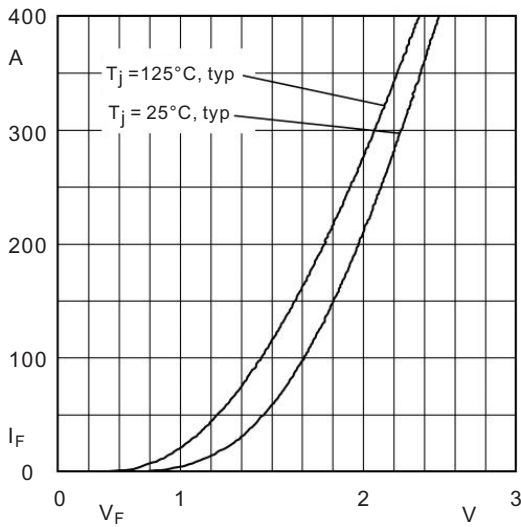


Fig. 12 Typ. CAL diode peak reverse recovery current

