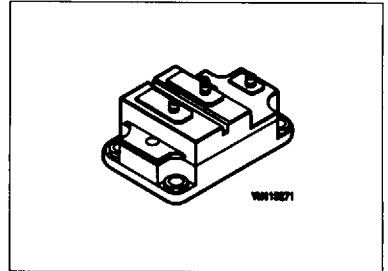


IGBT Module® 300ga16a doc

$V_{CE} = 1600\text{ V}$
 $I_C = 400\text{ A at } T_C = 25^\circ\text{C}$
 $I_C = 300\text{ A at } T_C = 80^\circ\text{C}$

- Power module
- Single switch
- Including fast free-wheel diodes
- Package with insulated metal base plate



Single switch			
Type	Ordering code	Type	Ordering code
BSM 300 GA 160D	C67076-A2015-A2		

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector emitter voltage	V_{CE}	1600	V
Collector gate voltage, $R_{GE} = 20\text{k}\Omega$	V_{CGR}	1600	
Gate-Emitter voltage	V_{GE}	± 20	
Continuous collector current	I_C	$T_C = 25^\circ\text{C}$	400
		$T_C = 80^\circ\text{C}$	300
Pulsed collector current	$I_C \text{ puls}$	$T_C = 25^\circ\text{C}$	800
		$T_C = 80^\circ\text{C}$	600
Operating and storage temperature range	T_j, T_{stg}	-55...+150	$^\circ\text{C}$
Power dissipation, $T_C = 25^\circ\text{C}$	P_{tot}	2500	W
Thermal resistance, chip-case	R_{thJC}	≤ 0.05	K/W
Insulation test voltage ¹⁾ , $t = 1\text{ min.}$	V_{is}	4000	V _{ac}
Creepage distance	-	20	mm
Clearance	-	11	
DIN humidity category, DIN 40 040	-	F	--
IEC climatic category, DIN IEC 68-1	-	55/150/56	

¹⁾Insulation test voltage between collector and metal base plate referred to standard climate 23/50 in acc.with DIN 50 014, IEC, para 492 1.

Electrical Characteristics

Parameter and conditions at $T_j = 25^\circ\text{C}$, unless otherwise specified	Symbol	Values			Unit
		min	typ	max	

Static Characteristics

Collector-emitter breakdown voltage $V_{GE}=0, I_C=2\text{mA}$	$V_{(BR)CES}$	1600	-	-	V
Gate threshold voltage $V_{GE}=V_{CE}, I_C=5.6\text{mA}$	$V_{GE(th)}$	4.8	5.5	6.2	
Collector-emitter saturation voltage $V_{GE}=15\text{V}, I_C=300\text{A}$ $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$ $T_j = 150^\circ\text{C}$	$V_{CE(sat)}$	--	3.7	--	
		--	4.6	--	
		--	4.8	--	
Zero gate voltage collector current $V_{CE}=1600\text{V}, V_{GE}=0\text{V}$ $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	I_{CES}	--	2000	--	μA
		--	4500	--	
Gate-emitter leakage current $V_{GE}=25\text{V}, V_{CE}=0\text{V}$	I_{CES}	--	--	100	nA

AC Characteristics

Forward transconductance $V_{CE}=20\text{V}, I_C=300\text{A}$	g_{fs}	108	--	--	S
Input capacitance $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$	C_{iss}	--	44	--	nF
Output capacitance $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$	C_{oss}	--	3,4	--	
Reverse transfer capacitance $V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$	C_{rss}	--	1,4	--	

Parameter and conditions at $T_j = 25^\circ\text{C}$, unless otherwise specified	Symbol	Values			Unit
		min	typ	max	

Switching Characteristics, Inductive Loadat $T_j=125^\circ\text{C}$

Turn on delay time $V_{CC}=1200\text{V}, V_{GE}=+15\text{V}, I_C=300\text{A}$ $R_{G(\text{on})}=10\Omega$	$t_{d(\text{on})}$	--	0,85	--	μs
Rise time $V_{CC}=1200\text{V}, V_{GE}=+15\text{V}, I_C=300\text{A}$ $R_{G(\text{on})}=10\Omega$	t_r	--	0,3	--	μs
Turn off delay time $V_{CC}=1200\text{V}, V_{GE}=-15\text{V}, I_C=300\text{A}$ $R_{G(\text{off})}=3,3\Omega$	$t_{d(\text{off})}$	--	2,5	--	μs
Fall time $V_{CC}=1200\text{V}, V_{GE}=-15\text{V}, I_C=300\text{A}$ $R_{G(\text{off})}=3,3\Omega$	t_f	--	0,15	--	μs

Free-Wheel Diode

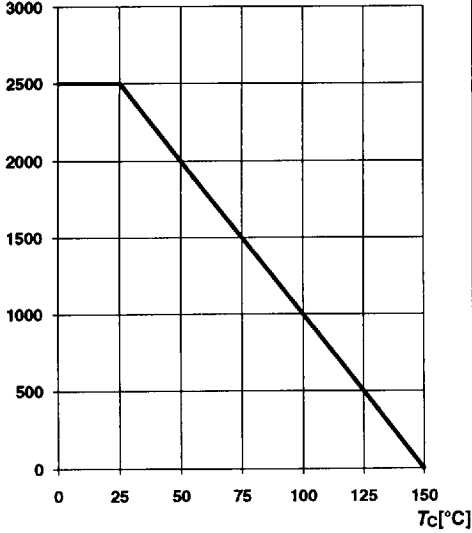
Diode forward voltage $I_F=300\text{A}, V_{GE}=0\text{V}$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$	V_F	--	4,2 3,8	--	V
Reverse recovery time $I_F=300\text{A}, V_R=-1200\text{V}$ $V_{GE}=0\text{V}, diF/dt=-1000\text{A}/\mu\text{s}$ $T_j=125^\circ\text{C}$	t_{rr}	--	0.7	--	μs
Reverse recovery Charge $I_F=300\text{A}, V_R=-1200\text{V}$ $V_{GE}=0\text{V}, diF/dt=-1000\text{A}/\mu\text{s}$ $T_j=125^\circ\text{C}$	Q_{rr}	--	--	--	μC
Thermal resistance Chip-Case	R_{thJC}	--	--	0,18	K/W

Power dissipation

$P_{tot} = f(T_C)$

P_{tot} [W]

3001 pt xlc

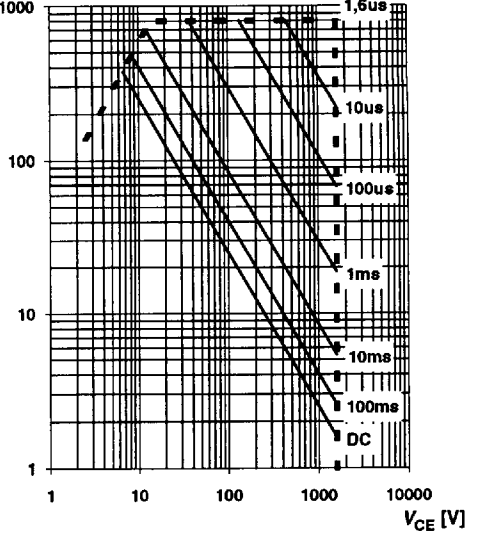


Safe operating area $I_C = f(V_{CE})$

parameter: single pulse, $T_C = 25^\circ\text{C}$, $T_J \leq 150^\circ\text{C}$

I_C [A]

3001 u xlc

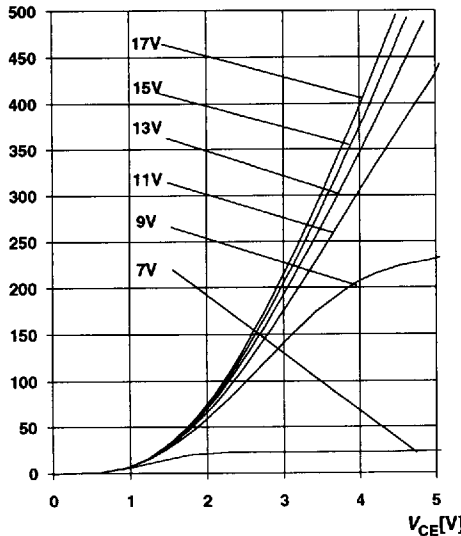


Typ output characteristics $I_C = f(V_{CE})$

parameter: $t_p = 80 \mu\text{s}$; $T_J = 25^\circ\text{C}$

I_C [A]

3001 us3 xlc

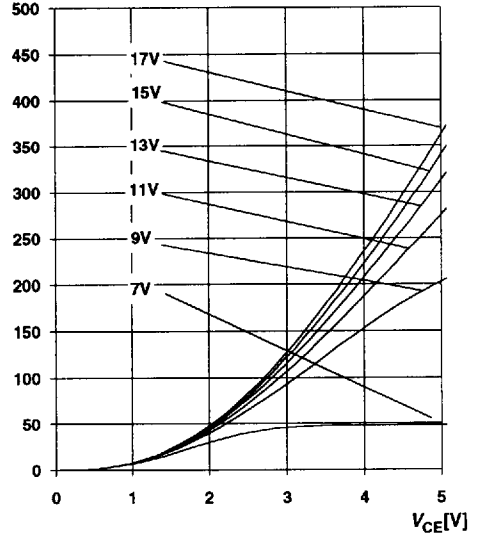


Typ output characteristics $I_C = f(V_{CE})$

parameter: $t_p = 80 \mu\text{s}$; $T_J < 125^\circ\text{C}$

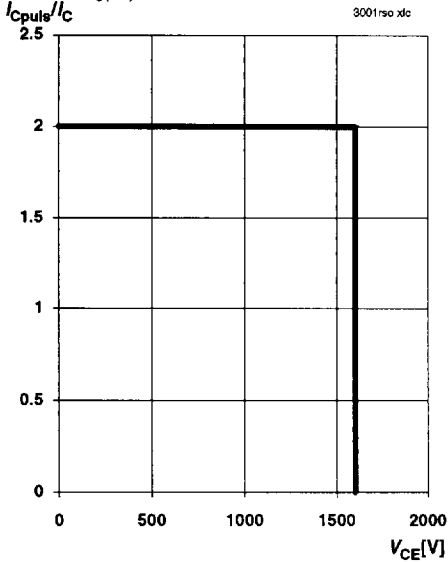
I_C [A]

3001 us7 xlc



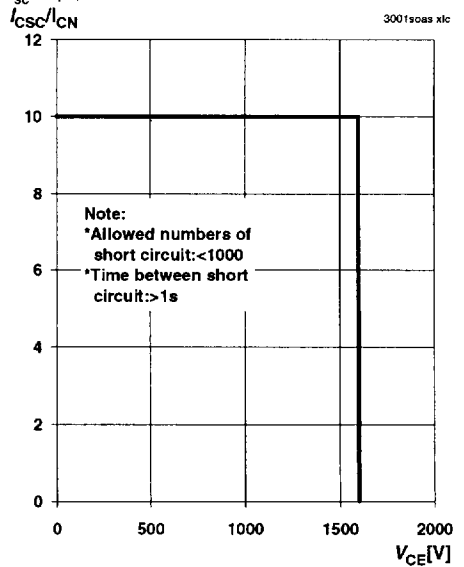
Reverse biased safe operating area

$I_C = f(V_{CE})$, parameter: $T_J = 150^\circ\text{C}$
 $V_{GE} = 15\text{V}$, $R_{g(\text{off})} = 3,3\Omega$



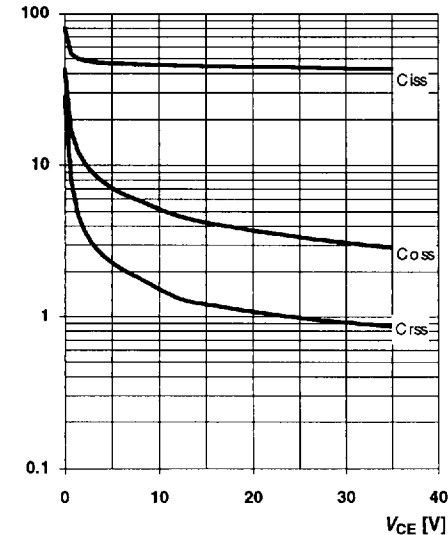
Safe operating area, SHORT CIRCUIT

$I_C = f(V_{CE})$, $V_{GE} = \pm 15\text{V}$, $T_J \leq 150^\circ\text{C}$
 $t_{sc} \leq 10\mu\text{s}$, $L < 50\text{nH}$



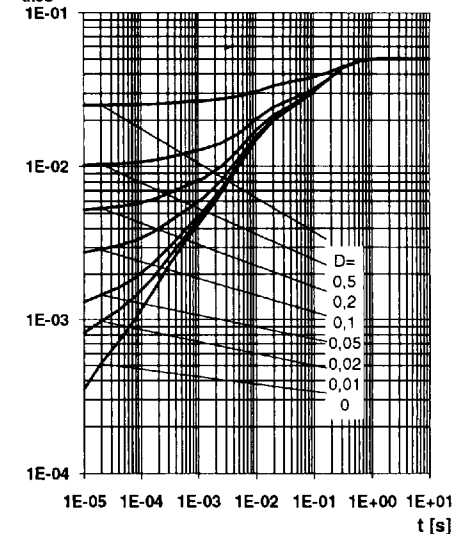
Typ. capacitances

Parameter: $V_{GE} = 0$, $f = 1\text{ MHz}$
 $C[\text{nF}]$



Transient thermal impedance

$Z_{thJC} = f(t_p)$, parameter: $D = t_p/T$
 $Z_{thJC} [\text{K/W}]$

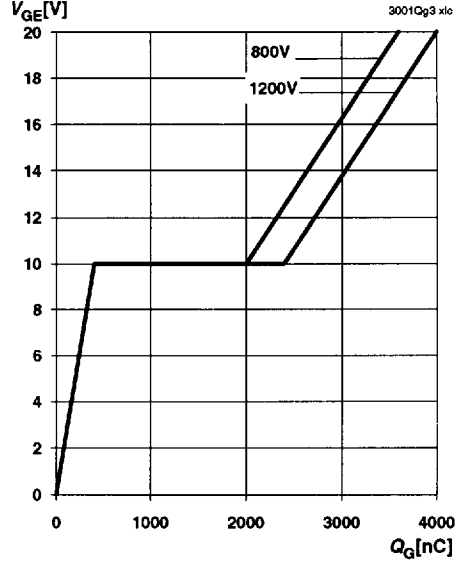


Collector current $I_C=f(T_C)$

parameter: $V_{GE} \geq 15V, T_J = 150^\circ$

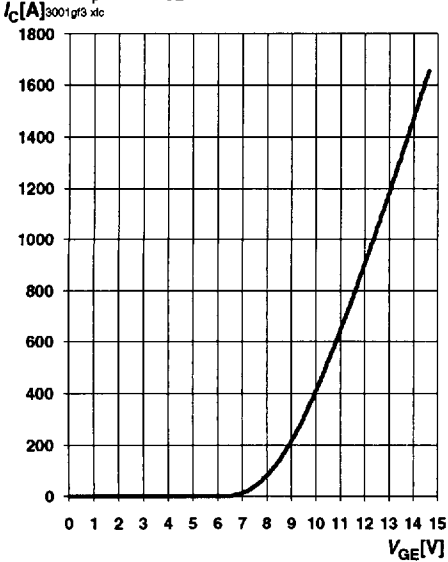


Typ. gate charge, $V_{GE}(Q_G)$



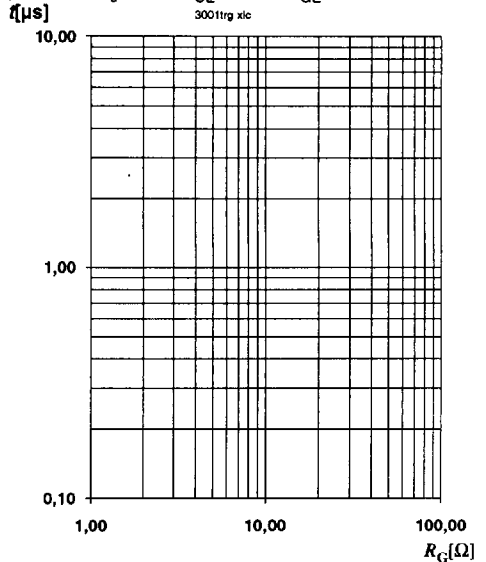
Typ. transfer characteristics $I_C=f(V_{GE})$

parameter: $t_p = 80\mu s, V_{CE} = 20V$



Typ. switching time $t=f(R_G)$ Inductive load

parameter: $T_J = 125^\circ C, V_{CE} = 1200V, V_{GE} = \pm 15V$



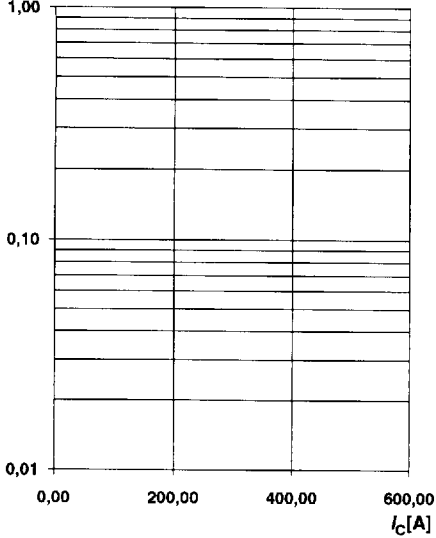
Typ. switching time $t = f(I_C)$

Inductive load, parameter: $T_J = 125^\circ\text{C}$

$V_{CE} = 1200\text{V}, V_{GE} = \pm 15\text{V}, R_{Gon} = 10\Omega, R_{Goff} = 3,3\Omega$

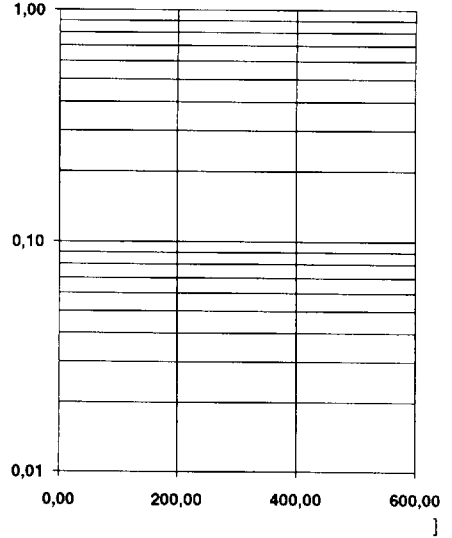
$t_f [\mu\text{s}]$

30011c xlc



T.

30011c xlc

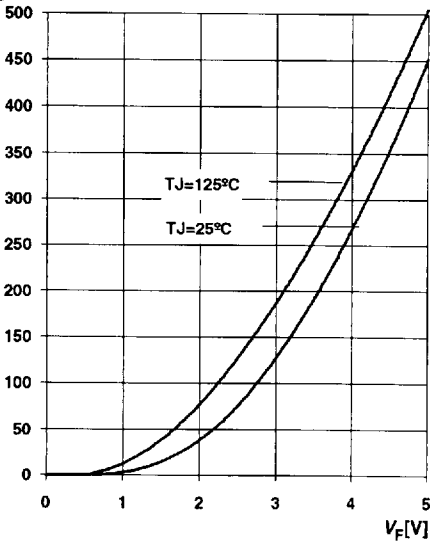


Forward characteristics of fast recovery reverse diode

$I_F = f(V_F)$, parameter: T_J

$I_C [\text{A}]$

30011f xlc



Package Outlines and Configuration

