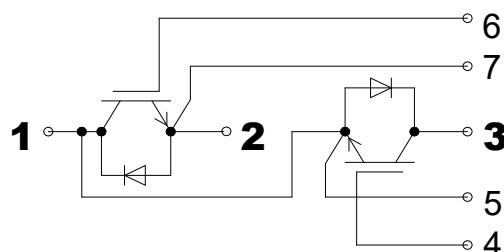


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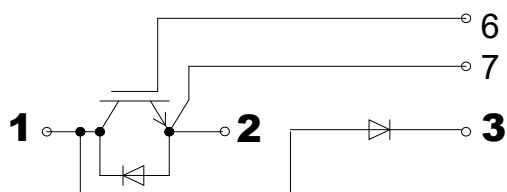
IGBT Modules



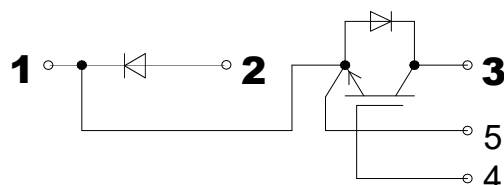
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SGD145NF120UC1



SDG145NF120UC1



Symbol	Test Condition	Value	Unit
IGBT			
V_{CES}		1200	V
I_C	$T_C = 100^{\circ}\text{C}$ per chip	145	A
V_{GES}		± 20	V
T_{vj} (T_{stg})		$-40 \sim +150(125)$	$^{\circ}\text{C}$
P_{tot}		500	W
INVERSE DIODE			
I_F	$T_C = 25^{\circ}\text{C}$ per chip	145	A
I_{FSM}		290	A
V_{RRM}		1200	V
I^2t	$T_J = 125^{\circ}\text{C}$, $t = 10\text{ms}$, $V_R = 0\text{V}$	4500	A^2S

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Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Tc = 25°C unless otherwise specified					
V _{GE(th)}	V _{GE} =V _{CE} , IC = 1mA	4.5	5.5	6.7	V
I _{CES}	V _{GE} = 0; V _{CE} =V _{CES} ; T _j =25(125)°C			1	mA
V _{CE(TO)}	T _j =25(125)°C		1.0(0.9)	1.2(1.1)	V
r _{CE}	V _{GE} =15V		9(12)	12(15)	mΩ
V _{CE(sat)}	IC=145A; V _{GE} =15V; chip level		2.1	2.5	V
C _{ies}	V _{GE} =0V, V _{CE} =25V, f=1MHz		9.20		nF
C _{oes}			1.00		
C _{res}			0.93		
L _{CE}				29	nH
R _{CC'+EE'}	Termial to Case, Tc=25°C		0.75		mΩ
t _{d(on)}	V _{cc} = 600V, IC = 145A R _{GON} = R _G OFF = 10Ω T _j =125°C V _{GE} =±15V		185		ns
			50		ns
t _{d(off)}			590		ns
			50		ns
E _{on} /E _{off}			11.50/9.30		mJ
INVERSE DIODE Tc = 25°C unless otherwise specified					
V _F	I _F =145A; V _{GE} =0V; T _j = 25°C		2.0	2.5	V
Q _{rr}	I _F =145A; V _R =300V; T _j =25°C di/dt = 3500A/us, V _{GE} =-15V		14.5		μC
I _{RRM}			130		A
E _{rec}			4.80		mJ
THERMAL CHARACTERISTICS					
R _{th(j-c)}	per IGBT			0.165	K/W
R _{th(j-c)D}	per FRD			0.350	K/W
Mechanical Data					
Ms		2.5		4	Nm
Weight			158		g

Features

- Planar Gate Field Stop (SPT⁺) Technology IGBT
- Fast Recovery Free Wheeling Diode
- Low Switching Losses
- V_{ce(sat)} with positive temperature coefficient
- Fast Switching and short tail current
- Switched mode power supplies at f_{sw}>20KHz
- Resonant inverters up to 100KHz
- Electronic Welders at f_{sw}>20KHz

Application

- Welding inverters
- Inductive Heating

Advantages

- Space and weight savings
- Reduced protection circuits

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IGBT Modules

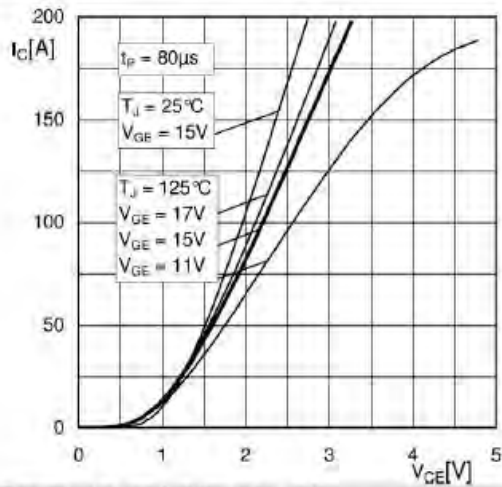


Fig. 1 Typ. output characteristic, inclusive R_{CC+EE}

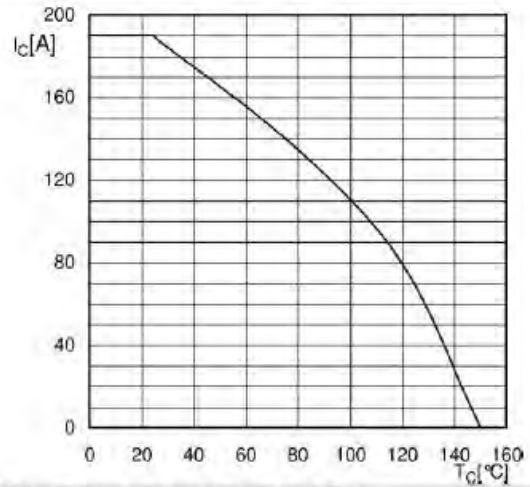


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

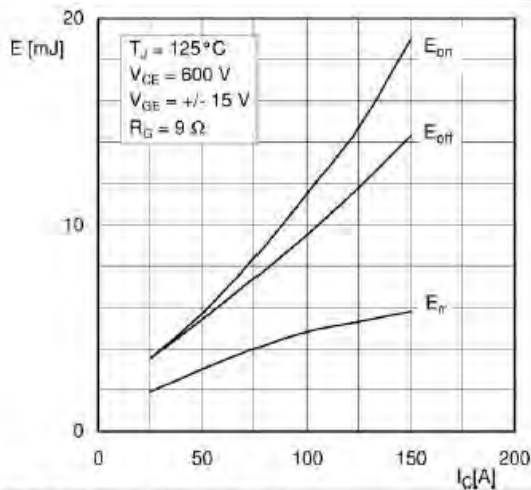


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

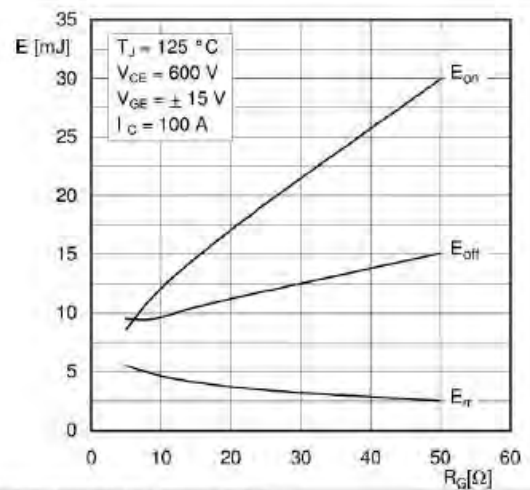


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

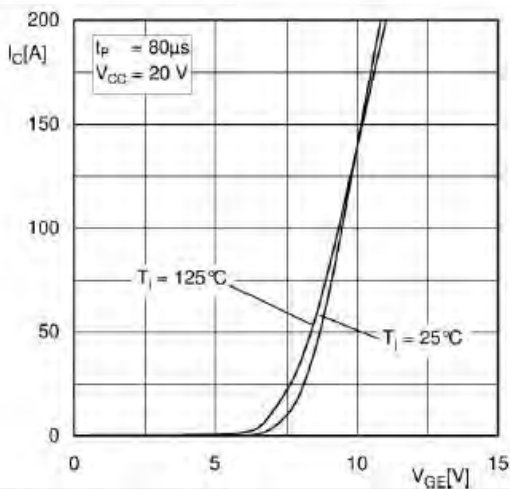


Fig. 5 Typ. transfer characteristic

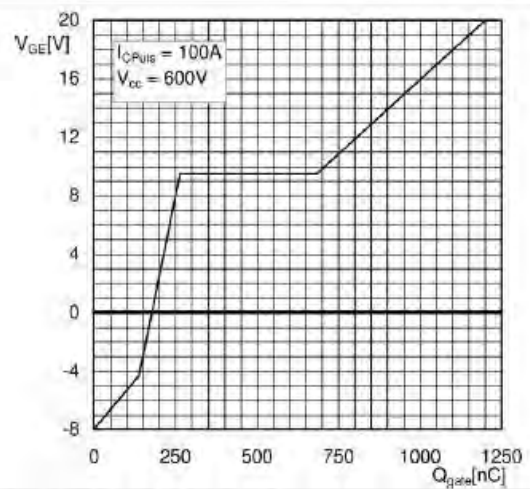


Fig. 6 Typ. gate charge characteristic

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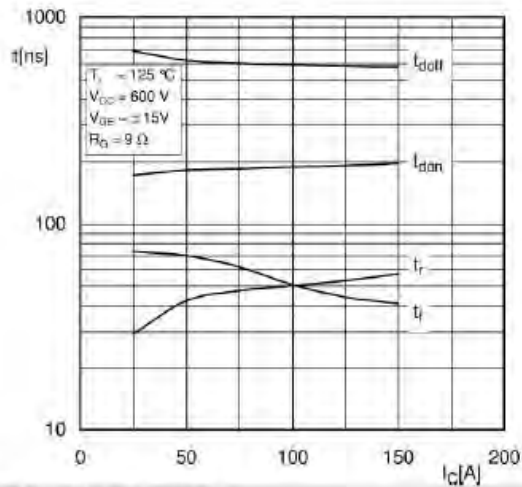


Fig. 7 Typ. switching times vs. I_C

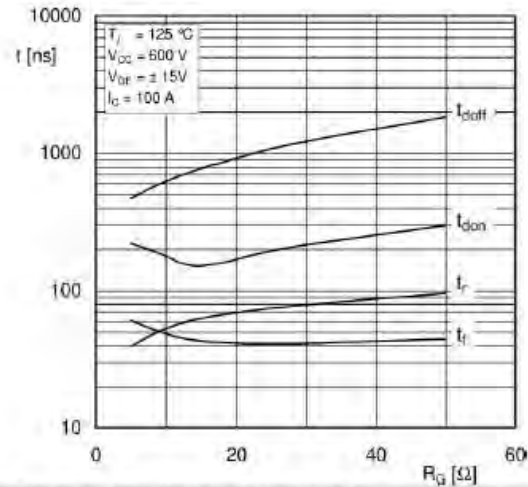


Fig. 8 Typ. switching times vs. gate resistor R_G

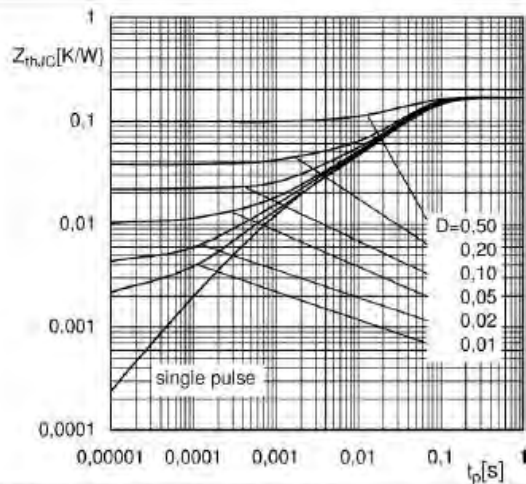


Fig. 9 Transient thermal impedance of IGBT

$$Z_{th(j-c)} = f(t_p); D = t_p/t_c = t_p \cdot f$$

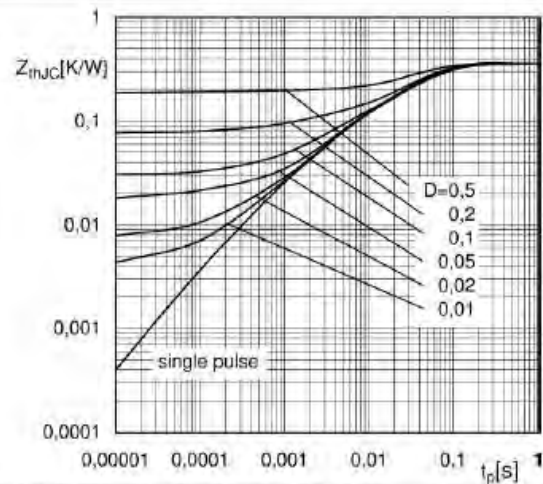


Fig. 10 Transient thermal impedance of FWD

$$Z_{th(j-c)} = f(t_p); D = t_p/t_c = t_p \cdot f$$

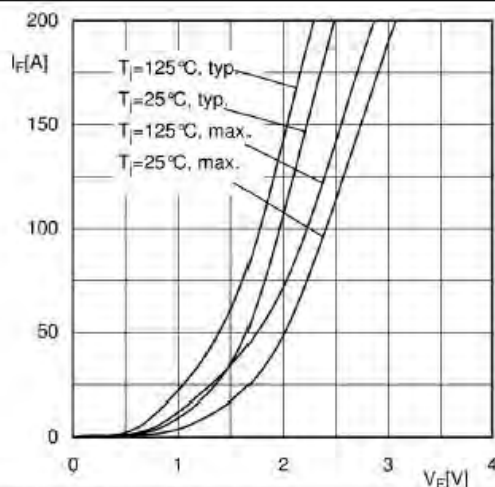


Fig. 11 FWD diode forward characteristic

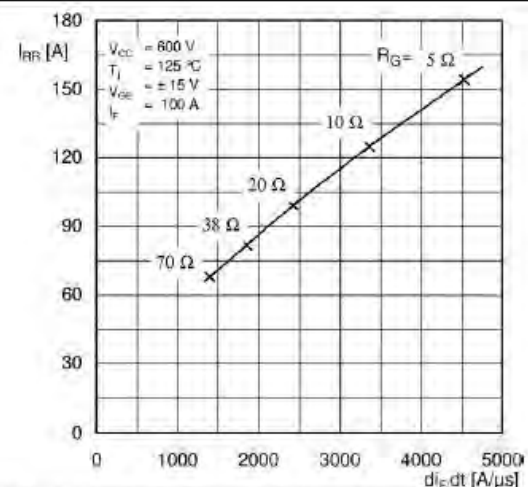


Fig. 12 Typ. FWD diode peak reverse recovery current

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