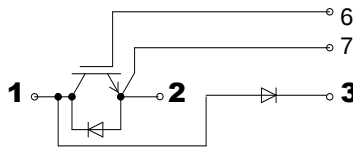


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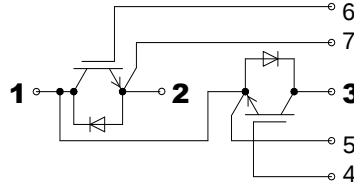
IGBT Modules



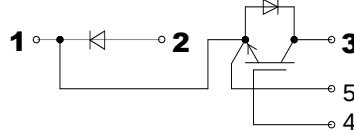
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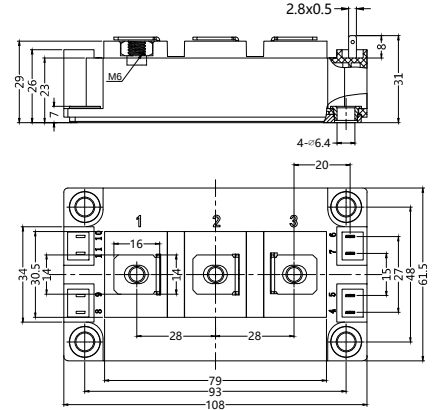
SGG400NF120UC2



SDG400NF120UC2



Dimensions in mm (1mm = 0.0394")



$T_C = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1200	V
I_{Cnom}		400	A
I_{CRM}	$T_C = 25^{\circ}\text{C}$, $t_P = 1\text{ms}$	1200	A
V_{GES}		± 20	V
T_{vj}		$-40 \dots +175$	$^{\circ}\text{C}$
Inverse Diode			
I_F	$T_C = 25(80)^{\circ}\text{C}$	440(330)	A
I_{FRM}	$T_C = 25^{\circ}\text{C}$, $t_P = 1\text{ms}$	1200	A
I_{FSM}	$t_P = 10\text{ms}$; sin.; $T_j = 150^{\circ}\text{C}$	1980	A
Module			
$I_t(\text{RMS})$	$T_{terminal} = 80^{\circ}\text{C}$	500	A
T_{stg}		$-40 \sim 125$	$^{\circ}\text{C}$
V_{isol}	AC, 1min	4000	V

Features

- Planar Gate Field Stop IGBT technology
- Low switching losses
- Switching frequency > 20kHz
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- Soft swithcing FWD Technology
- Package with copper base plate
- Isolation voltage 4000 V

Application

- AC and DC motor control
- AC servo and robot drives
- power supplies
- welding inverters

Advantages

- space and weight savings
- reduced protection circuits



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Characteristics

$T_C = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 15.2\text{mA}$	4.5	5.0	5.7	V
I_{CES}	$V_{GE} = 0$; $V_{CE} = V_{CES}$; $T_j = 25^{\circ}\text{C}$			0.5	mA
$V_{CE(TO)}$	$T_j = 25^{\circ}\text{C}$		1.4	1.6	V
r_{CE}	$V_{GE} = 15\text{V}$, $T_j = 25(150)^{\circ}\text{C}$		2.75(3.75)	3.51(4.75)	m Ω
$V_{CE(sat)}$	$I_C = 400\text{A}$; $V_{GE} = 15\text{V}$; chip level		2.30	2.55	V
C_{ies}	under following conditions $V_{GE} = 0$, $V_{CE} = 25\text{V}$, $f = 1\text{MHz}$		28.8		nF
C_{oes}			4.40		
C_{res}			2.52		
L_{CE}				30	nH
$R_{CC+EE'}$	res., terminal-chip $T_C = 25(125)^{\circ}\text{C}$		0.35(0.55)		m Ω
$t_{d(on)}$	under following conditions: $V_{CC} = 600\text{V}$, $I_C = 400\text{A}$ $R_{Gon} = R_{Goff} = 10\Omega$, $T_j = 125^{\circ}\text{C}$ $V_{GE} = \pm 15\text{V}$		25		ns
t_r			49		ns
$t_{d(off)}$			290		ns
t_f			88		ns
$E_{on}(E_{off})$	$T_C = 25^{\circ}\text{C}$		70(25)		mJ
Inverse Diode under following conditions:					
$V_F = V_{EC}$	$I_F = 400\text{A}$; $V_{GE} = 0\text{V}$; $T_j = 25^{\circ}\text{C}$		2.20	2.52	V
$V_{(FO)}$	$T_j = 25(150)^{\circ}\text{C}$		1.3(0.9)	1.5(1.1)	V
r_F	$T_j = 25(150)^{\circ}\text{C}$		2.3(3.1)	2.5(3.4)	m Ω
I_{RRM}	$I_F = 400\text{A}$; $T_j = 150^{\circ}\text{C}$		450		A
Q_{rr}	$di/dt = 8800\text{A/us}$		68		μC
E_{rr}	$V_{GE} = 15\text{V}$		30		mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0.072	K/W
$R_{th(j-c)D}$	per Inverse Diode			0.140	K/W
$R_{th(c-s)}$	per module			0.038	K/W
Mechanical Data					
M_s	to heatsink M6	3		5	Nm
M_t	to terminals M6	2.5		5	Nm
Weight	typical			325	g

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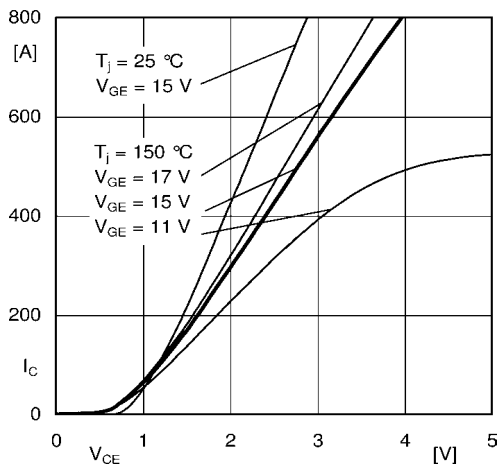


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

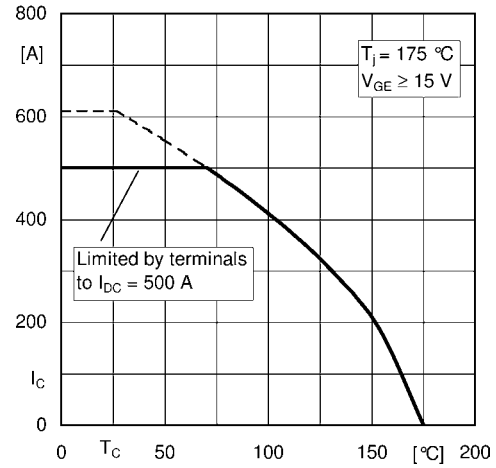


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

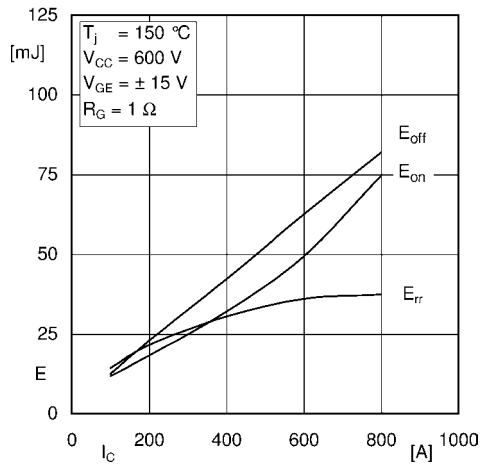


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

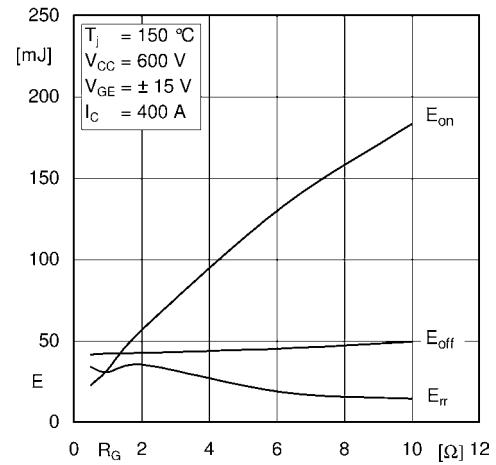


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

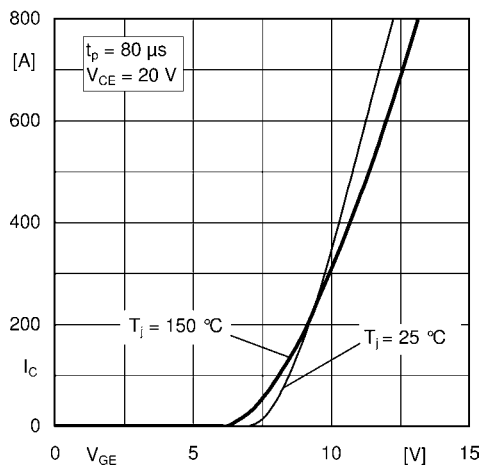


Fig. 5: Typ. transfer characteristic

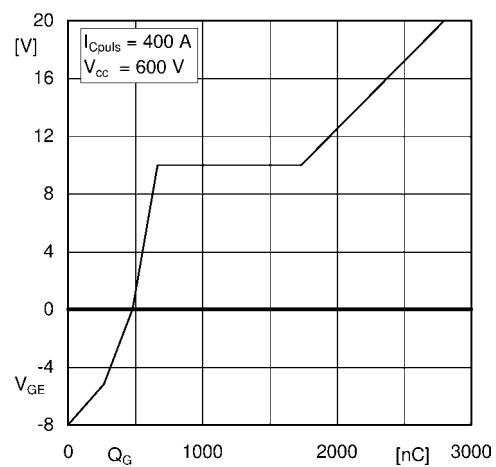


Fig. 6: Typ. gate charge characteristic

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