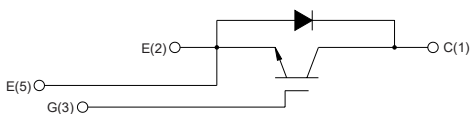


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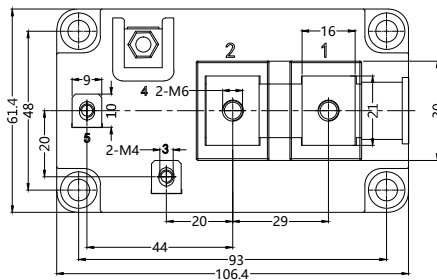
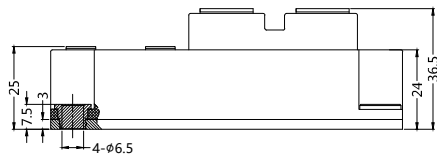
IGBT Modules



SGO400T120UC3



Dimensions in mm (1mm = 0.0394")



T_c = 25°C, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V _{CES}		1200	V
I _{Cnom}		400	A
I _{CRM}	T _C =25°C, t _P = 1ms	800	A
V _{GES}		±20	V
T _{Vj}		-40...+175	°C
Inverse Diode			
I _F	T _C =25(80)°C	600(400)	A
I _{FRM}	T _C =25°C, t _P = 1ms	800	A
I _{FSM}	t _P =10ms; sin180°; T _J =45°C	2500	A
Module			
I _{t(RMS)}	T _{terminal} =80°C	500	A
T _{stg}		-40~125	°C
V _{Isol}	AC, 1min	4000	V

Features

- Trench Field Stop IGBT4 technology
- Low switching losses
- Switching frequency up to 20kHz
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- Soft switching free wheeling diode Technology
- Package with copper base plate
- Isolation voltage 4000V

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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IGBT Modules

Characteristics

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

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=15\text{mA}$	5.0	5.8	6.5	V
I_{CES}	$V_{GE}=0; V_{CE}=V_{CES}; T_j=125^{\circ}\text{C}$			5	mA
$V_{CE(TO)}$	$T_j=25^{\circ}\text{C}$		0.8	0.9	V
r_{CE}	$V_{GE}=15\text{V}, T_j=25(150)^{\circ}\text{C}$		2.5(3.7)	2.8(4.0)	m Ω
$V_{CE(sat)}$	$I_C=400\text{A}; V_{GE}=15\text{V}; \text{chip level}$		1.95	2.35	V
C_{ies}	under following conditions $V_{GE}=0, V_{CE}=25\text{V}, f=1\text{MHz}$		24.3		nF
C_{oes}			1.61		
C_{res}			1.38		
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c=25(125)^{\circ}\text{C}$		0.25(0.5)		m Ω
$t_{d(on)}$	under following conditions: $V_{CC}=600\text{V}, I_C=400\text{A}$ $R_{Gon}=R_{Goff}=1\Omega, T_j=150^{\circ}\text{C}$ $V_{GE}=\pm 15\text{V}$		235		ns
t_r			50		ns
$t_{d(off)}$			495		ns
t_f			88		ns
$E_{on}(E_{off})$			27(45)		mJ
Inverse Diode under following conditions:					
$V_F = V_{EC}$	$I_F=400\text{A}; V_{GE}=0\text{V}; T_j=25(150)^{\circ}\text{C}$		2.20(2.15)	2.52(2.47)	V
$V_{(FO)}$	$T_j=25(150)^{\circ}\text{C}$		1.30(0.90)	1.50(1.10)	V
r_F	$T_j=25(150)^{\circ}\text{C}$		2.3(3.3)	2.5(3.4)	m Ω
I_{RRM}	$I_F=400\text{A}; T_j=150^{\circ}\text{C}$		440		A
Q_{rr}	$di/dt = 7200\text{A/us}$		77		μC
E_{rr}	$V_{GE}=15\text{V}$		36		mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0.072	K/W
$R_{th(j-c)D}$	per Inverse Diode			0.14	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
	to terminals M4	1.1		2	
Weight	typical			328	g

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IGBT Modules

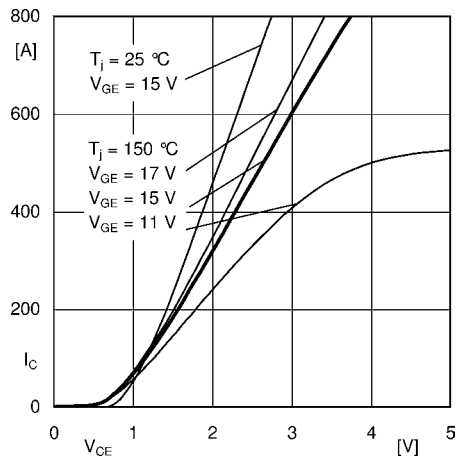


Fig. 1: Typ. output characteristic, inclusive $R_{CC+EE'}$

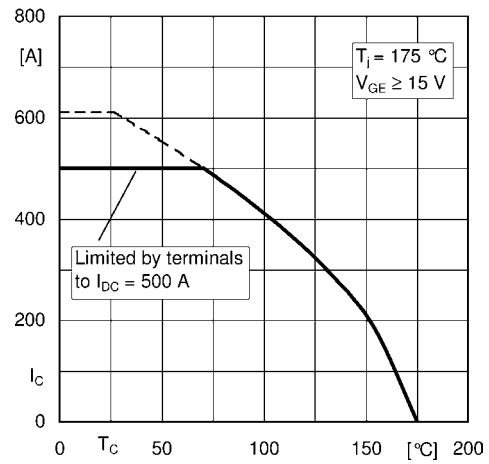


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

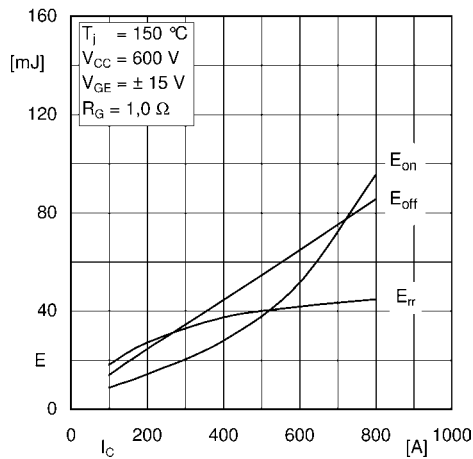


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

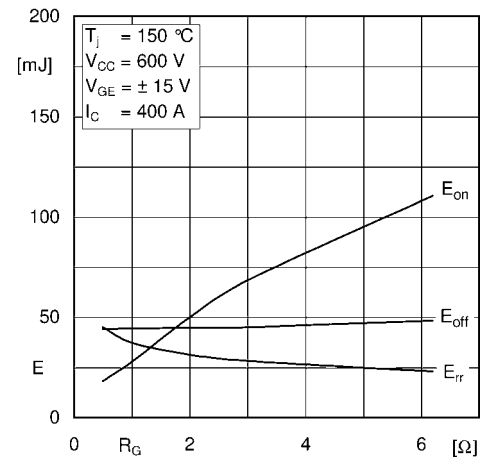


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

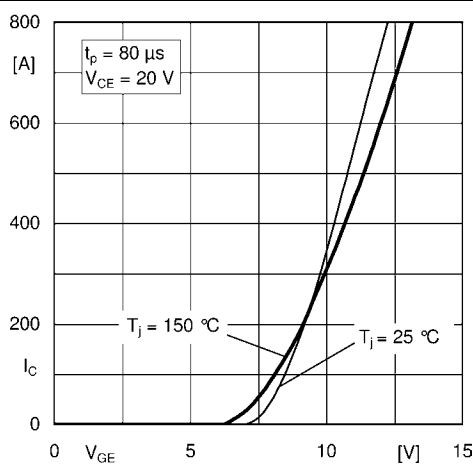


Fig. 5: Typ. transfer characteristic

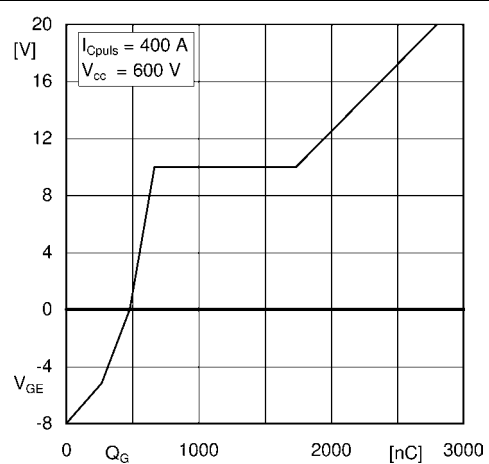


Fig. 6: Typ. gate charge characteristic

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IGBT Modules

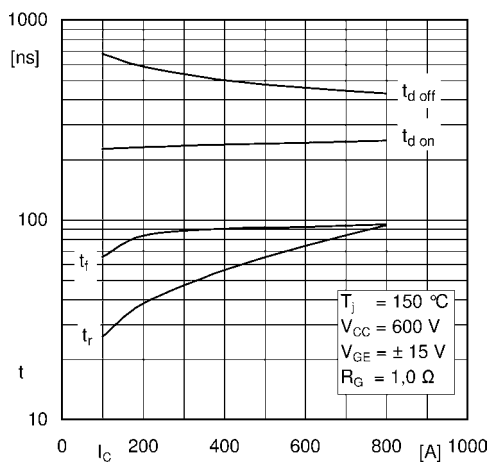


Fig. 7: Typ. switching times vs. I_C

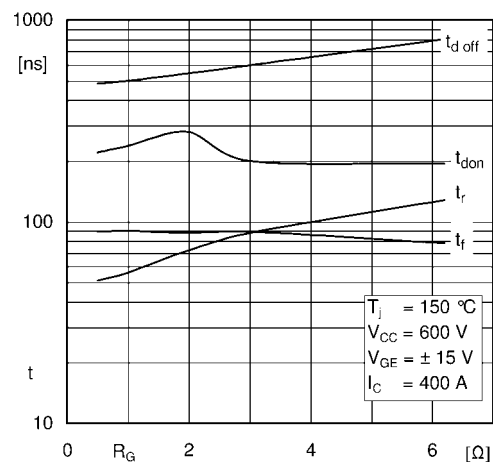


Fig. 8: Typ. switching times vs. gate resistor R_G

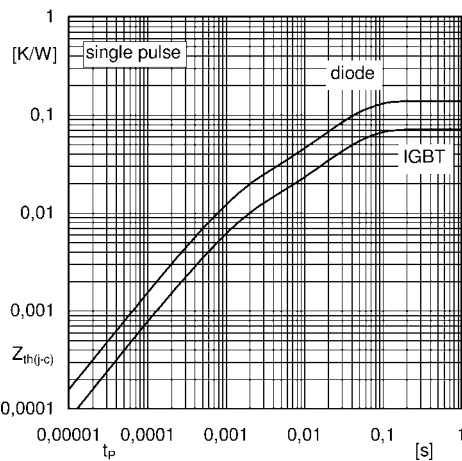


Fig. 9: Transient thermal impedance

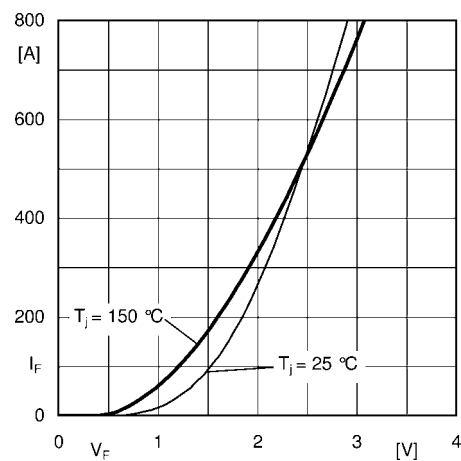


Fig. 10: Typ. FWD diode forward charact., incl. $R_{CC'} + EE'$

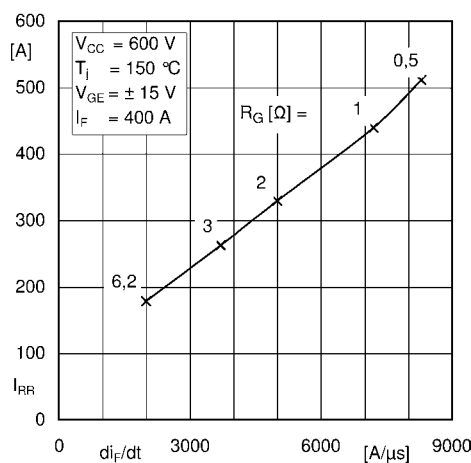


Fig. 11: FWD diode peak reverse recovery current

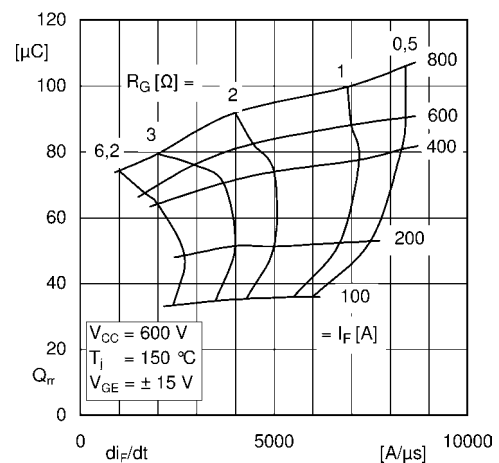


Fig. 12: Typ. FWD diode peak reverse recovery charge