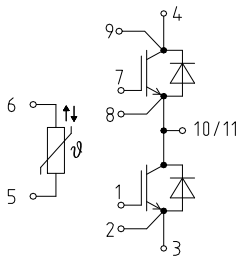


SGG700T120UC5

IGBT Modules



Features

- Infineon 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
- SEMIKRON CAL4 Ultra fast free wheeling diodes
- 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

T_C = 25°C, unless otherwise specified

Symbol	Conditions	Values	Units
IGBT			
V _{CES}		1200	V
I _C	T _C = 25(80)°C	909(700)	A
I _{CRM}	T _C = 25°C, t _P =1ms	1400	A
V _{GES}		±20	V
T _{Vj}		-40...+175	°C
Inverse Diode			
I _F = -I _C	T _C = 25(80)°C	799(600)	A
I _{FRM}	T _C = 25°C, t _P =1ms	1500	A
I _{FSM}	t _P =10ms; sin.; T _J =150°C	2750	A
Module			
T _{stg}		-40~125	°C
V _{Isol}	AC, 1min	4000	V
P _{tot}	T _J =T _{Jmax}	1400	W

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IGBT Modules

Characteristics

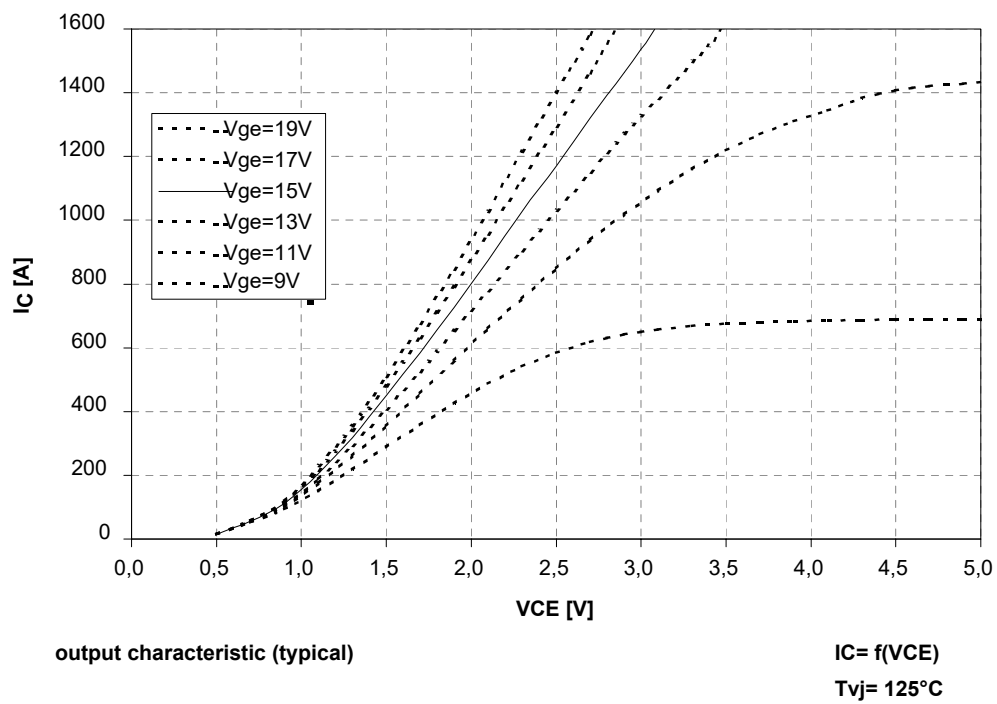
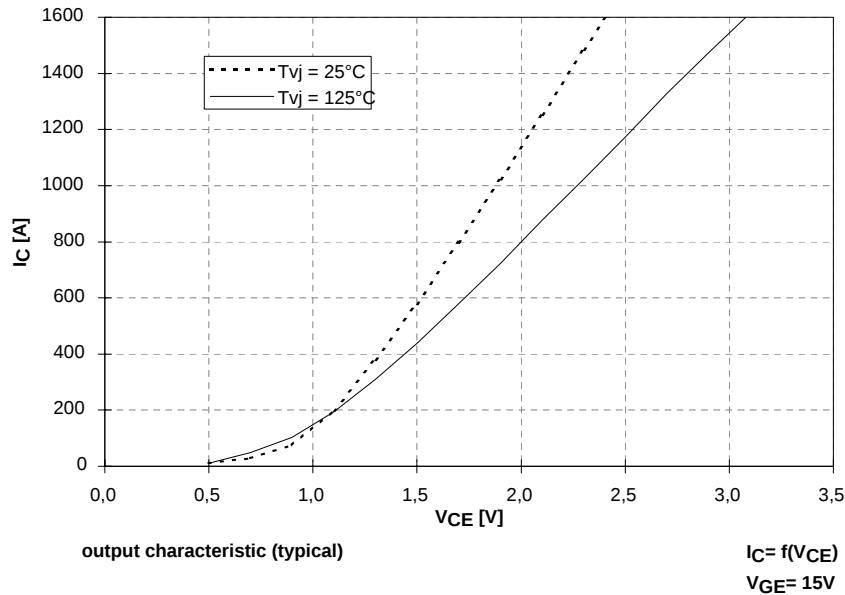
$T_c = 25^{\circ}\text{C}$, unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_c = 8\text{mA}$	5.0	5.8	6.5	V
I_{CES}	$V_{GE} = 0$; $V_{CE} = V_{CES}$; $T_j = 25^{\circ}\text{C}$			4.0	mA
$V_{CE(TO)}$	$T_j = 25^{\circ}\text{C}$		0.8	0.9	V
r_{CE}	$V_{GE} = 15\text{V}$, $T_j = 25(125)^{\circ}\text{C}$		3.30(5.00)	3.80(5.30)	$\text{m}\Omega$
$V_{CE(sat)}$	$I_c = 700\text{A}$; $V_{GE} = 15\text{V}$; chip level		1.80	2.05	V
C_{ies}	under following conditions $V_{GE} = 0$, $V_{CE} = 25\text{V}$, $f = 1\text{MHz}$		135		nF
C_{oes}			3.22		
C_{res}			1.54		
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25(125)^{\circ}\text{C}$		1.2(1.65)		$\text{m}\Omega$
$t_{d(on)}$	under following conditions: $V_{CC} = 600\text{V}$, $I_c = 700\text{A}$ $R_{Gon} = R_{Goff} = 2\Omega$, $T_j = 125^{\circ}\text{C}$ $V_{GE} = \pm 15\text{V}$		550		ns
t_r			95		ns
$t_{d(off)}$			450		ns
t_f			90		ns
$E_{on}(E_{off})$			80(65)		mJ
Inverse Diode under following conditions:					
$V_F = V_{EC}$	$I_F = 700\text{A}$; $V_{GE} = 0\text{V}$; $T_j = 25^{\circ}\text{C}$		2.10	2.52	V
$V_{(FO)}$	$T_j = 25^{\circ}\text{C}$		1.30	1.50	V
r_F	$T_j = 25^{\circ}\text{C}$		3.0	3.4	$\text{m}\Omega$
I_{RRM}	$I_F = 700\text{A}$; $T_j = 125^{\circ}\text{C}$		430		A
Q_{rr}	$di/dt = 8300\text{A/us}$		150		μC
E_{rr}	$V_{GE} = \pm 15\text{V}$		43		mJ
Thermal Characteristics					
$R_{th(j-c)}$	per IGBT			0.084	K/W
$R_{th(j-c)D}$	per Inverse Diode			0.110	K/W
$R_{th(c-s)}$	per module			0.048	K/W
Mechanical Data					
M_s	to heatsink M5	3		6	Nm
M_t	to terminals M6	3		6	Nm
Weight	typical			350	g
Temperature Sensor					
R_{100}	$T_c = 100^{\circ}\text{C}$ ($R_{25} = 5\text{ k}\Omega$)		493 $\pm$ 5%		Ω
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$; $T[\text{K}]$:		3550 $\pm$ 2%		K

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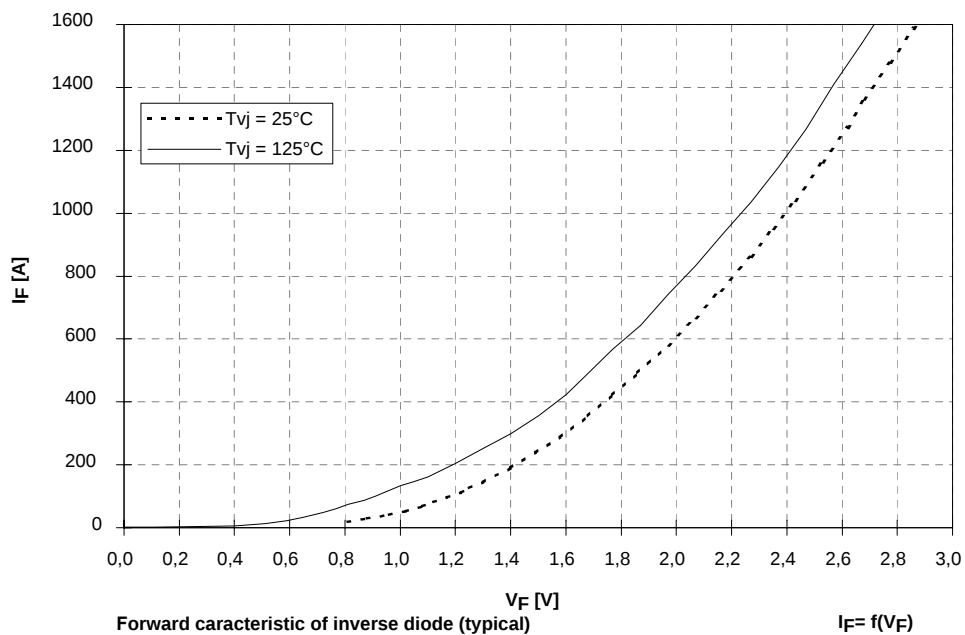
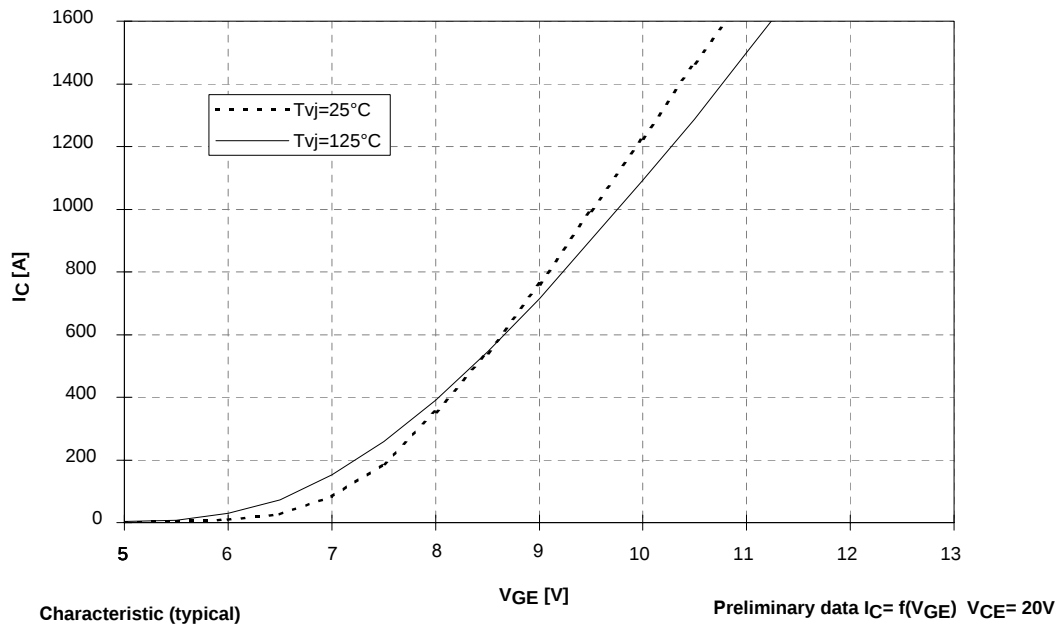
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IGBT Modules



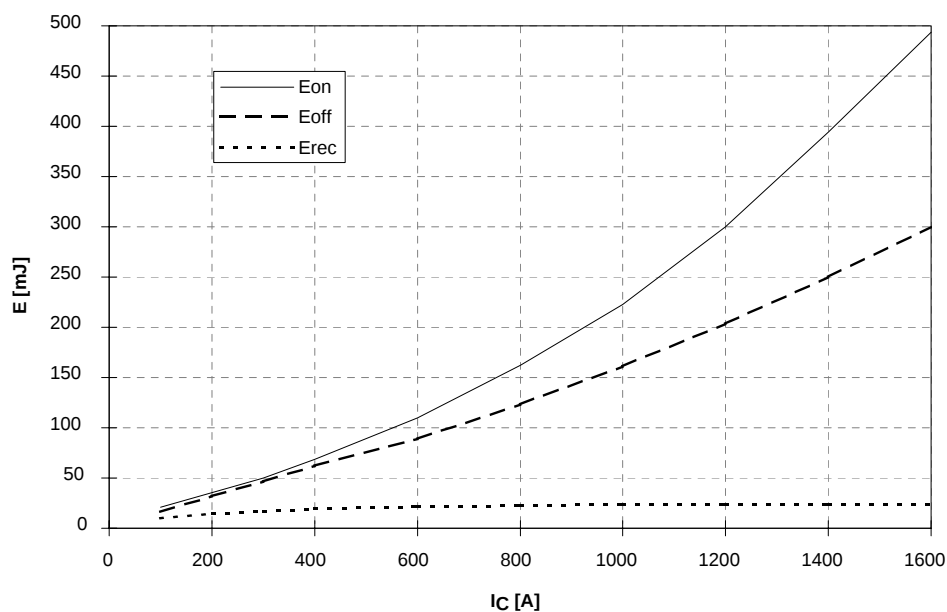
SGG700T120UC5

IGBT Modules



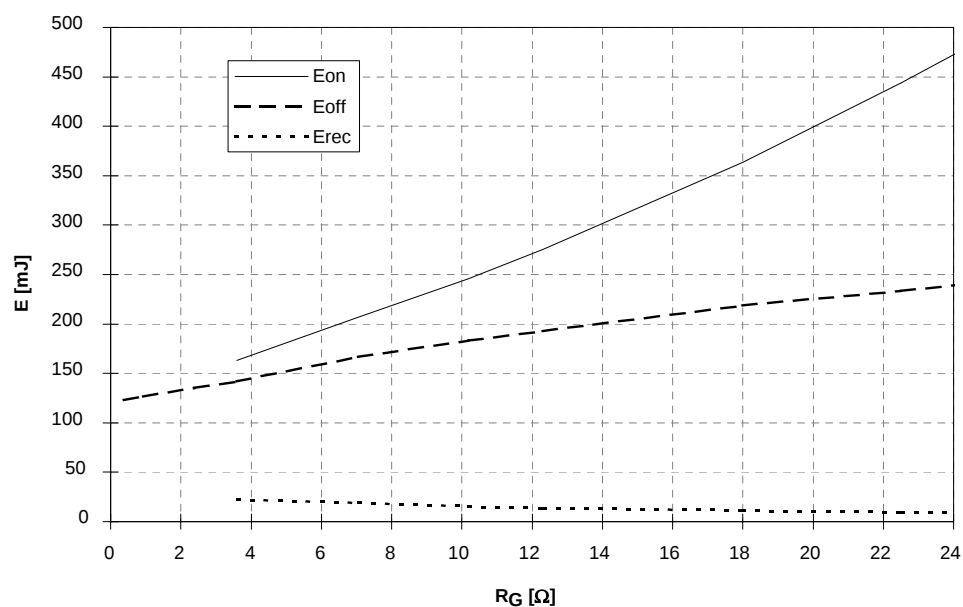
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IGBT Modules



Switching losses (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$ $V_{GE} = \pm 15V$,
 $R_{gon} = 3,3\Omega$, $R_{goff} = 0,39\Omega$, $V_{CE} = 600V$, $T_{vj} = 125^\circ C$

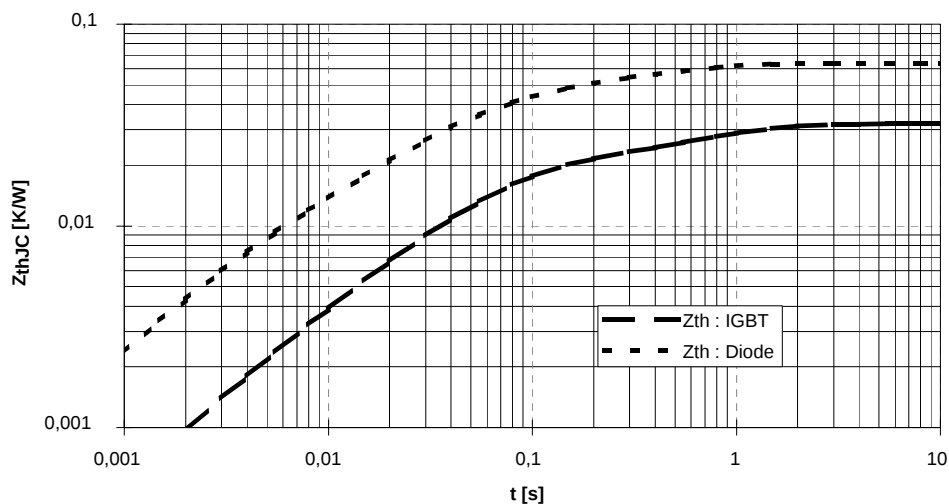


Switching losses (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$ $V_{GE} = \pm 15V$,
 $I_C = 800A$, $V_{CE} = 600V$, $T_{vj} = 125^\circ C$

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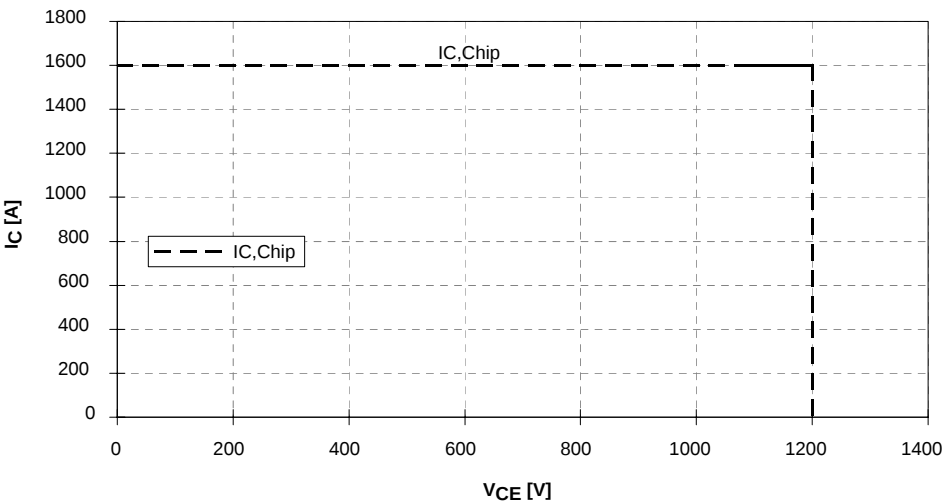
IGBT Modules



i	1	2	3	4
r_i [K/kW] : IGBT	13,45	16,12	1,83	0,60
τ_i [s] : IGBT	6,897E-01	5,634E-02	2,997E-02	3,820E-03
r_i [K/kW] : Diode	18,37	20,16	21,17	4,30
τ_i [s] : Diode	4,452E-01	7,451E-02	2,647E-02	2,850E-03

Transient thermal impedance

$Z_{thJC} = f(t)$



Reverse bias safe operation area (RBSOA)

$V_{GE} = \pm 15V, T_{vj} = 125^{\circ}C$

IGBT Modules

