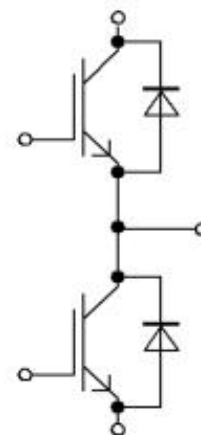


ESJ100SH120AN

Feature

- $I_C=100A$
- $V_{CES}=1200V$
- $V_{CE(sat)}-typ(V_{GE}=15V)=1.82V$
- $T_{vjop}=-40\sim150^{\circ}C$, and short-time extended operation Temperature to $175^{\circ}C$
- Low switching losses
- $V_{CE(sat)}$ with positive temperature coefficient
- Low gate charge



Applications

- Welders
- Plating

Absolute Maximum Ratings @ $T_c = 25^{\circ}C$ (Per Leg)

Symbol	Parameter	Conditions	Ratings	Unit
IGBT Inverter				
V_{CES}	Collector-emitter voltage		1200	V
I_C	Continuous collector current	$T_c=100^{\circ}C$, $T_{vj(max)}=175^{\circ}C$	100	A
I_{CRM}	Repetitive peak collector current ¹	$t_p=1ms$	200	A
t_{PSC}	Short circuit data ²	$V_{GE}=15V, V_{CC}=800V, T_{vj}=150^{\circ}C$	10	us
V_{GES}	Gate-emitter voltage		± 20	V
P_{tot}	Total power dissipation	$T_c=25^{\circ}C$, $T_{vj(max)}=175^{\circ}C$	555	W
T_{vj}	Junction temperature		$-40\sim175$	$^{\circ}C$
Diode Inverter				
V_{RRM}	Repetitive peak reverse voltage		1200	V
I_{FRM}	Repetitive peak forward current	$t_p=1ms$	200	A
I_F	Forward current		100	A
T_{vj}	Operation junction temperature		$-40\sim175$	$^{\circ}C$
Module				
T_{stg}	Storage temperature		$-40\sim125$	$^{\circ}C$
V_{isol}	Isolation test voltage	AC sinus 50HZ, $t=1min$	4000	V

1.Verified by design/characterization

2.Allowed number of short circuits:<1000;time between short circuit:>1S

Electrical Characteristics @T_c = 25°C (unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
IGBT, Inverter						
V _{CEsat}	Collector emitter saturation voltage	V _{GE} =15V, I _C =100A	T _{vj} =25°C T _{vj} =150°C	1.82 2.34		V
V _{GE(th)}	Gate emitter threshold voltage	V _{CE} =V _{GE} , I _C =3.8mA		5.95		V
I _{CES}	Collector emitter cut-off voltage	V _{CE} =1200V, V _{GE} =0V			1	uA
C _{ies}	Input capacitance	V _{CE} =25V V _{GE} =0V f=1.0MHz		6.28		nF
C _{oes}	Output capacitance			0.55		nF
C _{res}	Reverse transfer capacitance			0.34		nF
Q _g	Gate charge	V _{GE} =-15...+15V		800		nC
r _g	Internal gate resistance	V _{GE} =15V, f=100KHz		5.1		Ω
T _{d(on)}	Turn-on delay time	I _C =100A V _{CC} =600V V _{GE} =±15V R _{G(on)} =1.6Ω R _{G(off)} =1.6Ω	T _{vj} =25°C T _{vj} =150°C	130 150		ns
t _r	Rise time		T _{vj} =25°C T _{vj} =150°C	20 35		ns
T _{d(off)}	Turn-off delay time		T _{vj} =25°C T _{vj} =150°C	300 400		ns
t _f	Fall time		T _{vj} =25°C T _{vj} =150°C	45 90		ns
E _{on}	Turn-on energy		T _{vj} =25°C T _{vj} =150°C	6.5 10.5		mJ
E _{off}	Turn-off energy		T _{vj} =25°C T _{vj} =150°C	6 10		mJ
I _{SC}	Short-circuit current	V _{GE} ≤ 15 V, V _{CC} = 800 V, V _{CE(max)} = V _{CES} - L _{sCE} *di/dt, t _{pSC} < 10 μs, T _{vj} = 150 °C		400		A
Diode Inverter						
V _F	Forward voltage	I _F = 75A	T _{vj} =25°C T _{vj} =150°C	1.87 1.46		V
V _F	Reverse recovery current	V _{GE} =-15V V _R =600V I _F =75A dI _F /dt=2800A/us	T _{vj} =25°C T _{vj} =150°C	100 110		mJ
E _{rr}	Reverse recovery energy		T _{vj} =25°C T _{vj} =150°C	3.5 7.0		uC
Q _r	Recovered charge		T _{vj} =25°C T _{vj} =150°C	10 19		A
I ² t	I ² t value	V _R = 0 V, t _p = 10 ms, T _{vj} = 150 °C		1800		A ² S

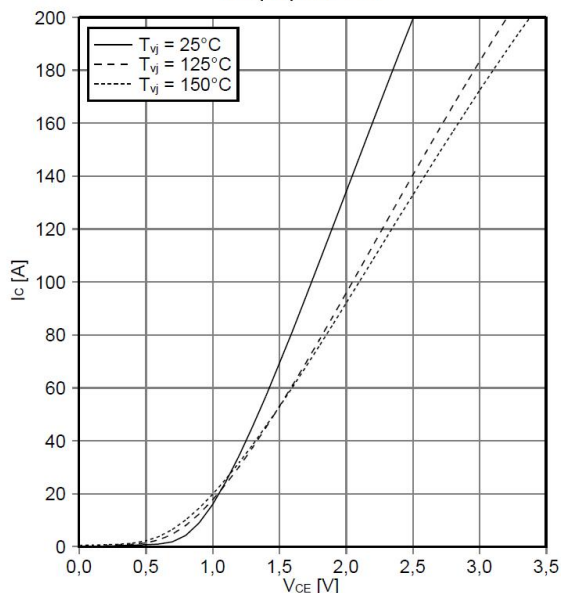
Thermal Characteristics

Symbol	Parameter	Conditions	Valu			Unit
			Min	Typ	Max	
$R_{(thjc)I}$	Thermal Resistance junction to case (IGBT)	Per IGBT	-	-	0.27	°C/W
$R_{(thjc)D}$	Thermal Resistance junction to case (Diode)	Per Diode	-	-	0.48	°C/W
Module						
	Material of module baseplate		Cu			
	Internal isolation	Basic insulation(class 1,IEC61140)	Al2O3			
L_{SCE}	Stray inductance module			28.5		nH
	Creepage distance	terminal - heatsink terminal - terminal		19.0 16.5		
	Clearance	terminal - heatsink terminal - terminal		16.0 10.0		
CTI	Comperative tracking index		175			250
M	Mounting torque	Fixing screw M6 Terminals M5	3.0 2.5		5.0 5.0	N.m
G	Weight			156		g

Thermal characteristics(Curves)

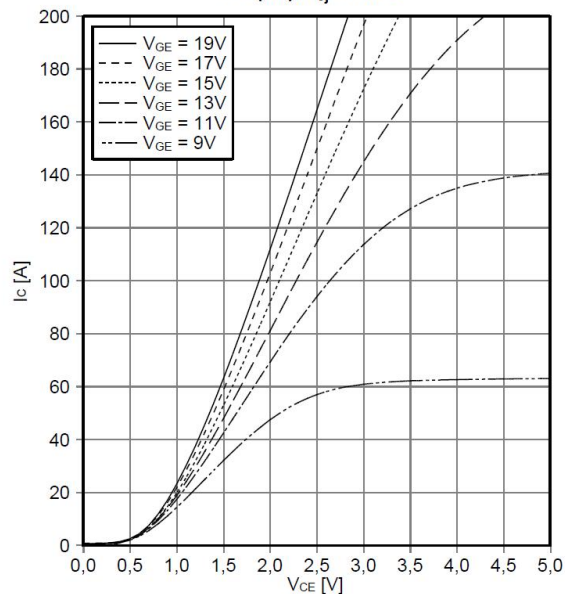
Output characteristic IGBT, Inverter (typical)

$$I_c = f(V_{CE}), V_{GE} = 15V$$



Output characteristic IGBT, Inverter (typical)

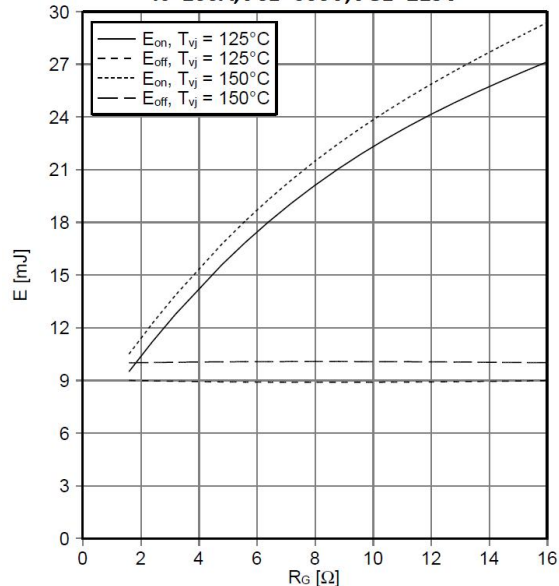
$$I_c = f(V_{CE}), T_{vj} = 150^\circ C$$



Switching losses IGBT, Inverter (typical)

$$E_{on} = f(R_G), E_{of} = f(R_G)$$

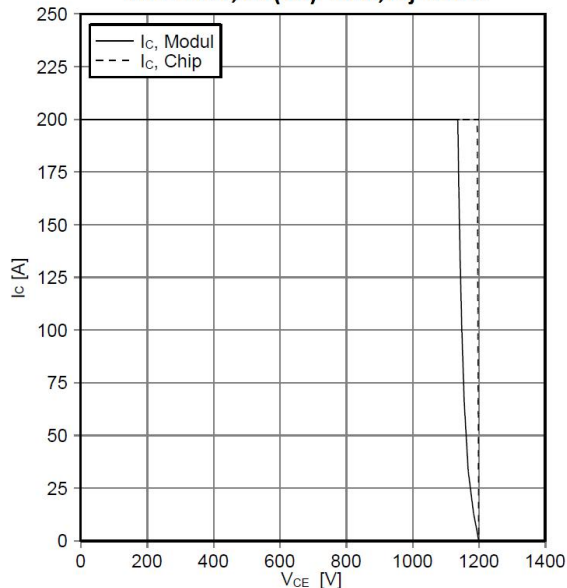
$$I_c = 100A, V_{CE} = 600V, V_{GE} = \pm 15V$$



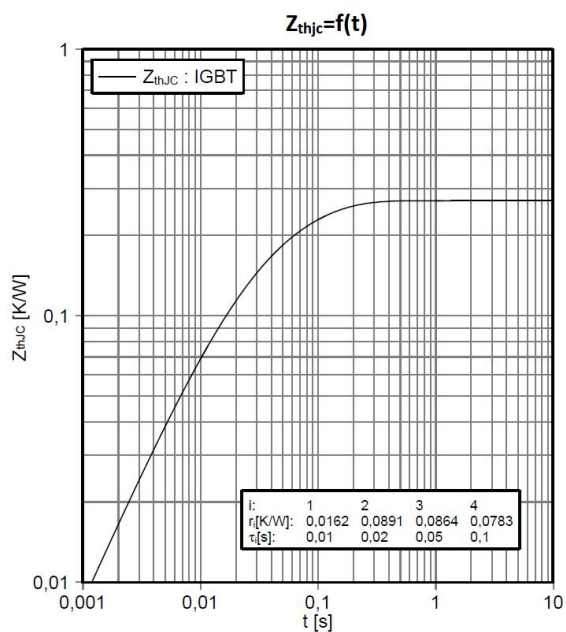
Reverse Bias safe operating IGBT, Inverter (RBSOA)

$$I_c = f(V_{CE})$$

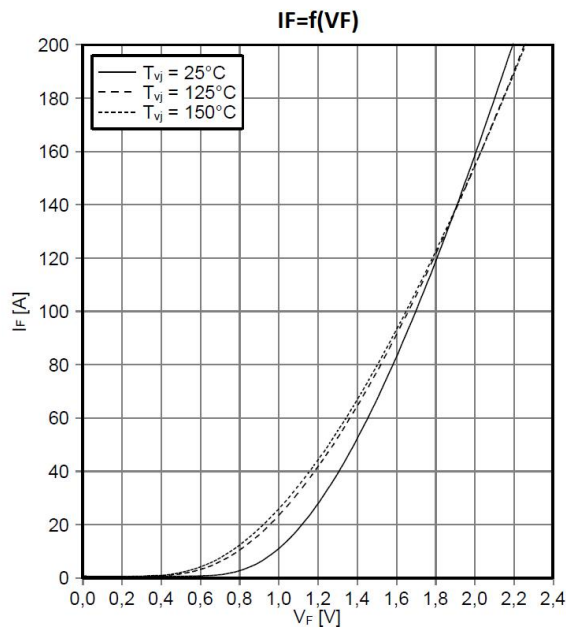
$$V_{GE} = \pm 15V, R_G(off) = 1.6\Omega, T_{vj} = 150^\circ C$$



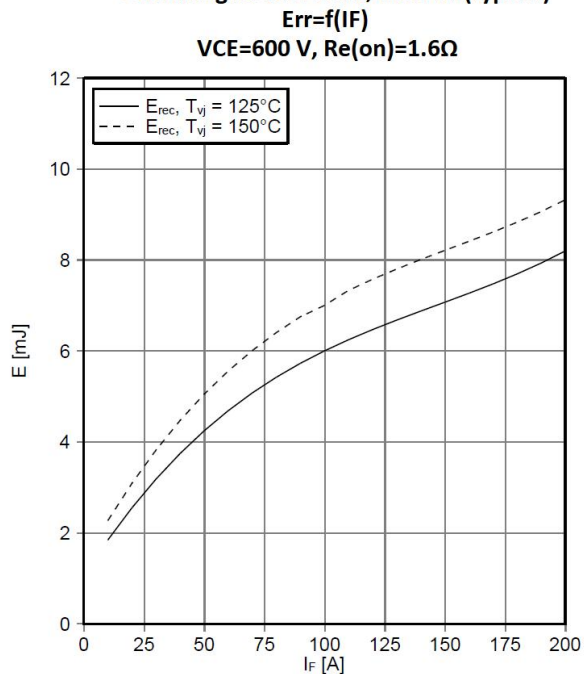
Transient thermal impedance IGBT, Inverter



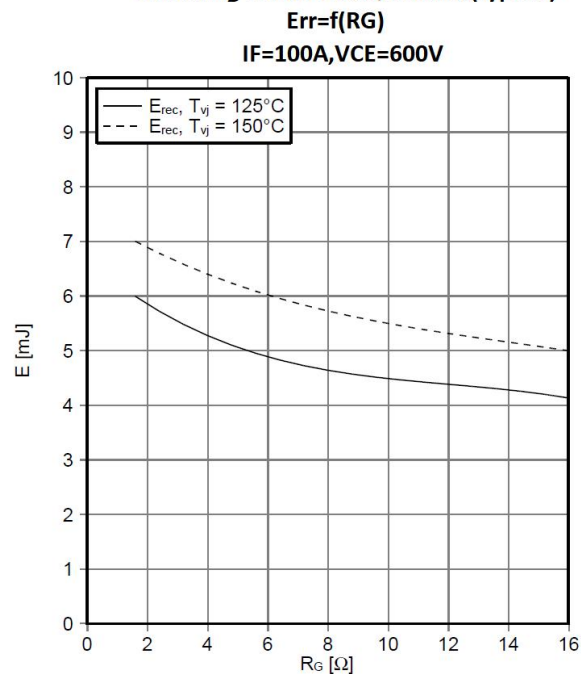
Forward characteristic Diode, Inverter (typical)

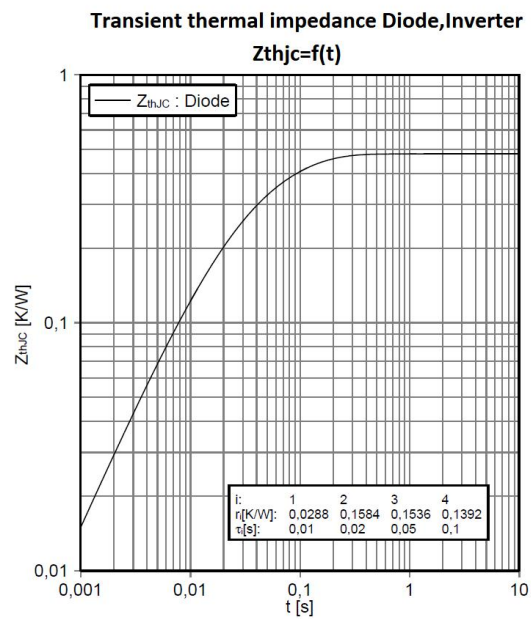


Switching losses Diode, Inverter (typical)

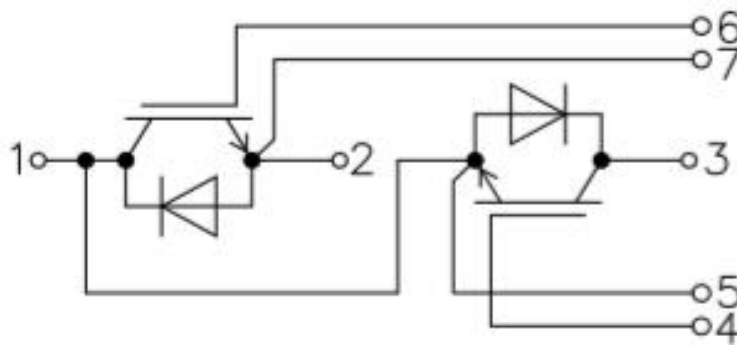


Switching losses Diode, Inverter (typical)





Circuit Diagram



Technical drawing of a mechanical part showing a cross-section with dimensions. The drawing includes the following dimensions:

- Overall width: 92.00×32.00
- Overall height: 30.20 ± 0.30
- Height of the base: 29.50 ± 0.50
- Height of the first step: 22.00
- Height of the second step: 2.00
- Width of the first step: 2.80×0.50
- Distance between the first and second steps: 22.52 ± 0.3
- Distance between the second and third steps: 22.52 ± 0.3
- Height of the third step: 6.80
- Height of the fourth step: 7.80 ± 0.1
- Overall height of the part: 28.80

