SML300HB12

Attributes:
-aerospace build standard
-high reliability
-lightweight
-metal matrix base plate
-AlN isolation
-trench gate igbts

Maximum rated values/Electrical Properties

Collector-emitter Voltage		V_{ce}	1200	V
DC Collector Current	Tc=70C, Tvj=175C Tc=25C,Tvj=175C	I_c, nom Ic	300 440	A
Repetitive peak Collector Current	tp=1msec,Tc=80C	I_{crm}	600	A
Total Power Dissipation	Tc=25C	P_{tot}	2380	W
Gate-emitter peak voltage		V_{ges}	+/-20	V
DC Forward Diode Current		I_f	300	A
Repetitive Peak Forward Current	tp=1msec	I_{frm}	600	A
I^2t value per diode	Vr=0V, tp=10msec, Tvj=125C	$I^2{}_t$	19000	A^2sec
Isolation voltage	RMS, 50Hz, t=1min	V_{isol}	2500	V

Collector-emitter saturation voltage	Ic=300A,Vge=15V, Tc=25C Ic=300A,Vge=15V,Tc=125C	$V_{ce(sat)}$		1.7 2.0	2.15	V
Gate Threshold voltage	Ic=4.8mA,Vce=Vge, Tvj=25C	$Vge_{(th)}$	5.0	5.8	6.5	V
Input capacitance	f=1MHz,Tvj=25C,Vce=25V, Vge=0V	C_{ies}		21		nF
Reverse transfer Capacitance	f=1MHz,Tvj=25C,Vce=25V, Vge=0V	C_{res}		0.85		nF
Collector emitter cut off current	Vce=1200V,Vge=0V,Tvj=25C	I_{ces}		1	5	mA
Gate emitter cut off current	Vce=0V,Vge=20V,Tvj=25C	I_{ges}			400	nA

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Turn on delay time	Ic=300A, Vcc=600V Vge=+/15V,Rg=2.4Ω,Tvj=25C Vge=+/-15V,Rg=2.4Ω,Tvj=125C	$t_{d,on}$		250 300		nsec nsec nsec
Rise time	Ic=300A, Vcc=600V Vge=+/-15V,Rg=2.4Ω,Tvj=25C Vge=+/-15V,Rg=2.4Ω,Tvj=125C	tr		90 100		nsec nsec nsec
Turn off delay time	Ic=300A, Vcc=600V Vge=+/-15V,Rg=2.4Ω,Tvj=25C Vge=+/-15V,Rg=2.4Ω,Tvj=125C	$t_{d,off}$		550 650		nsec nsec nsec
Fall time	Ic=300A, Vcc=600V Vge=+/-15V,Rg=2.4Ω,Tvj=25C Vge=+/-15V,Rg=2.4Ω,Tvj=125C	t_f		130 180		nsec nsec nsec
Turn on energy loss per pulse	Ic=300A,Vce=600V,Vge=+/-15V Rge=2.4Ω,L=30nH Tvj=25C di/dt=6000A/µsec Tvj=125C	E_{on}		17 25		mJ mJ
Turn off energy loss per pulse	Ic=300A,Vce=600V,Vge=+/-15V Rge=2.4Ω,L=30nH Tvj=25C di/dt=4000A/µsec Tvj=125C	E_{off}		29.5 44.0		mJ mJ
SC Data	tp≤10µsec, Vge≤15V Vcc=900V, $Vce_{(max)}$=Vces-Lσdi/dt Tvj=125C	I_{sc}		1200		A
Stray Module inductance		$L_{\sigma ce}$		30		nH
Terminal-chip resistance		R_c		1.0		mΩ

Diode characteristics

Forward voltage	Ic=300A,Vge=0V, Tc=25C Ic=300A,Vge=0V, Tc=125C	V_f		1.65 1.65	2.15	V V
Peak reverse recovery current	If=300A, -di/dt=6000A/µsec Vce=300V,Vge=-15V,Tvj=25C Vce=300V,Vge=-15V,Tvj=125C	I_{rm}		210 270		A A
Recovered charge	If=300A, -di/dt=6000A/µsec Vce=300V,Vge=-15V,Tvj=25C Vce=300V,Vge=-15V,Tvj=125C	Qr		30 56		µC µC
Reverse recovery energy	If=300A, -di/dt=6000A/µsec Vce=300V,Vge=-15V,Tvj=25C Vce=300V,Vge=-15V,Tvj=125C	E_{rec}		14 26		mJ mJ

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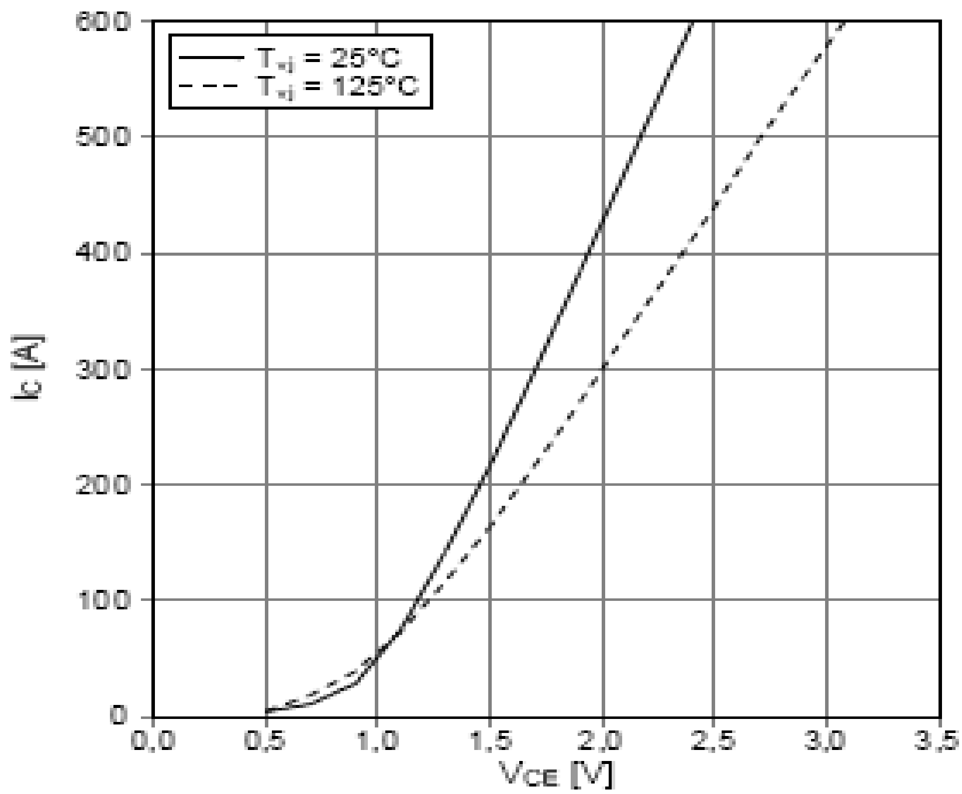
Thermal Properties			Min	Typ	Max	
Thermal resistance junction to case	Igbt Diode	$R_{\theta J\text{-}C}$			0.063 0.11	K/W
Thermal resistance case to heatsink		$R_{\theta C\text{-}hs}$		0.03		K/W
Maximum junction temperature		Tvj			175	C
Maximum operating temperature		Top	-55		175	C
Storage Temperature		Tstg	-55		175	C

output characteristic IGBT-Inverter (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



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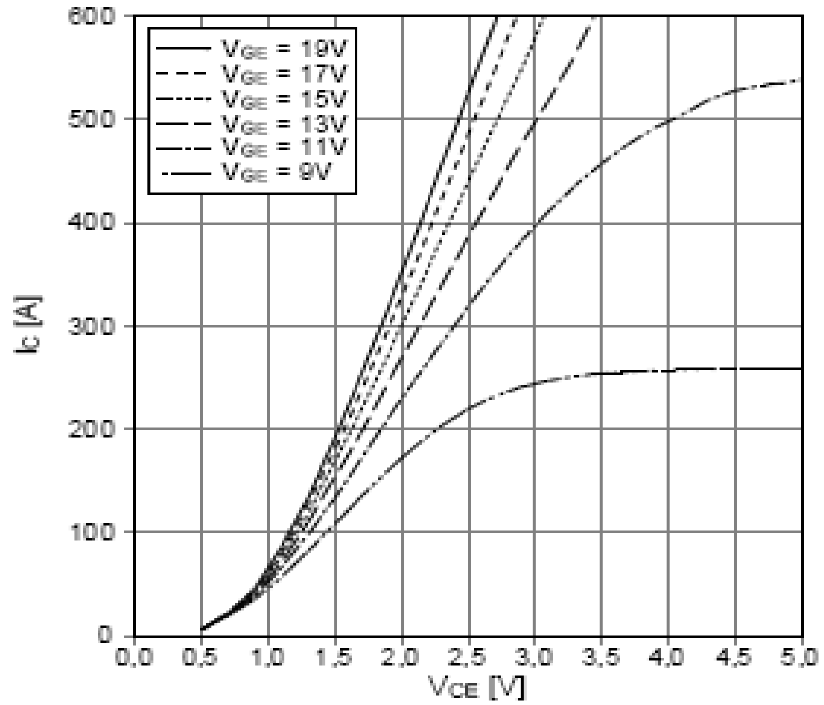
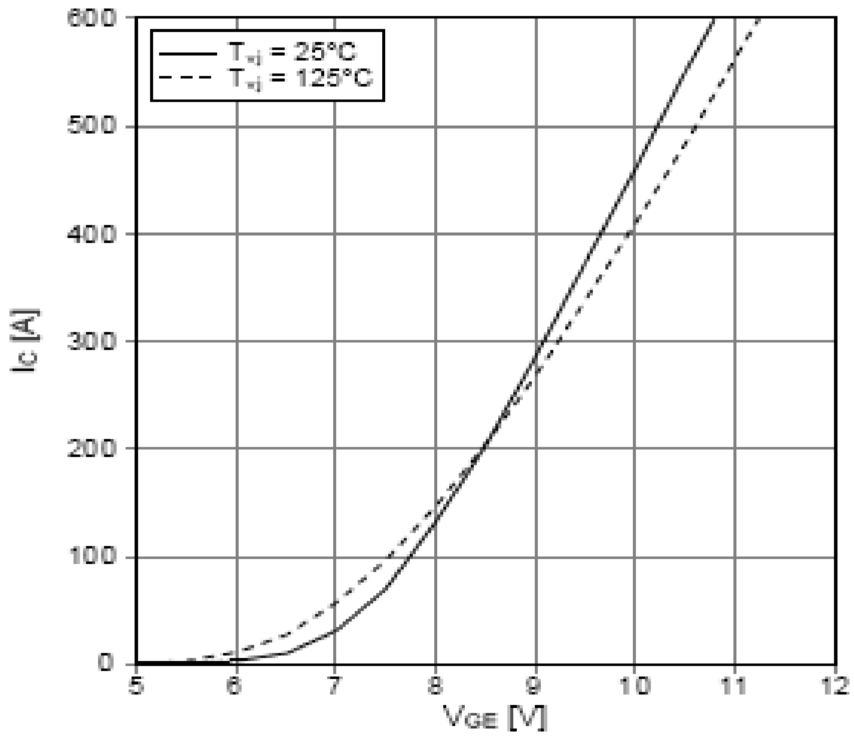
output characteristic IGBT-inverter (typical)
$I_C = f(V_{CE})$
$T_{vj} = 125°C$



transfer characteristic IGBT-inverter (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20$ V



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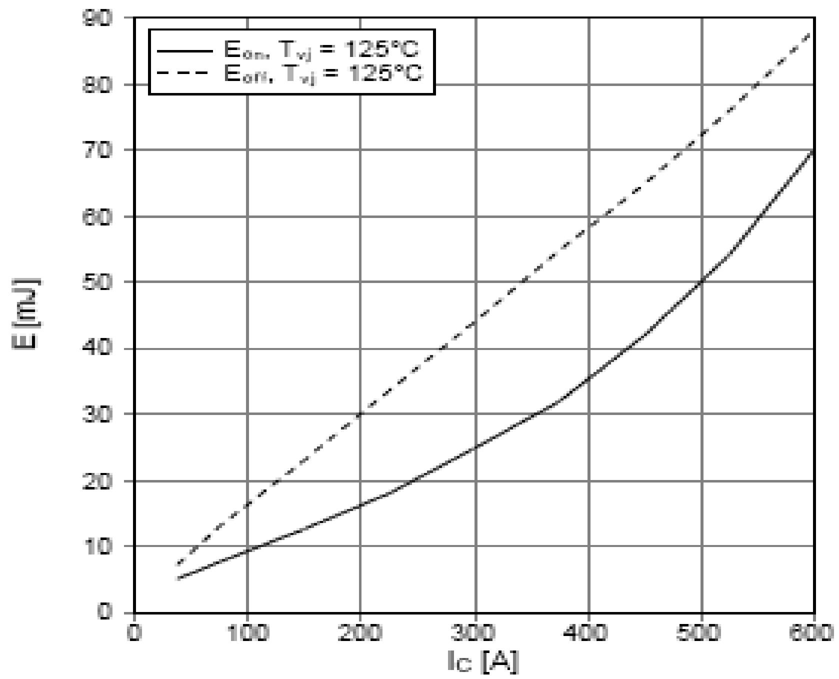
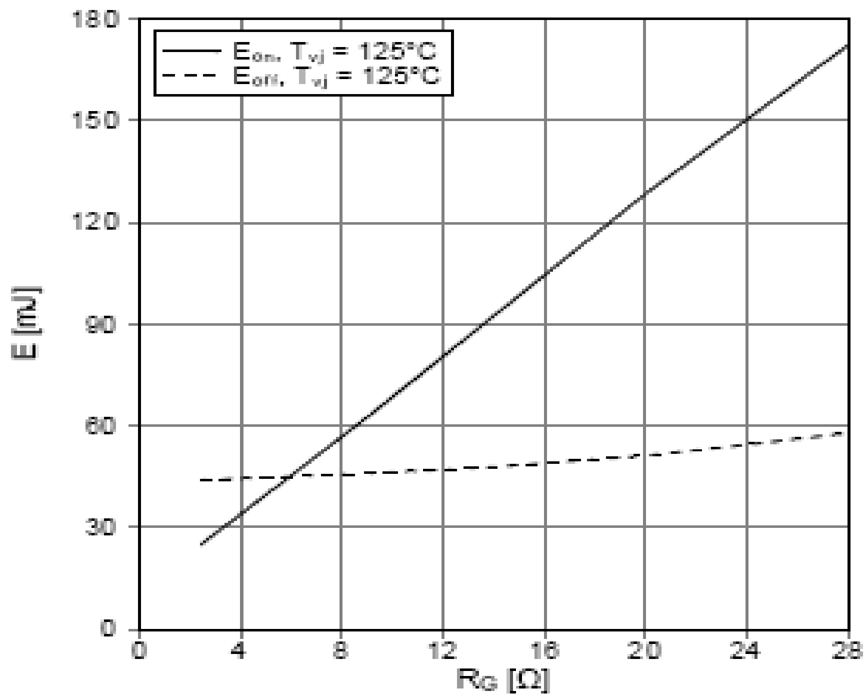
switching losses IGBT-inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15$ V, $R_{Gon} = 2.4\ \Omega$, $R_{Goff} = 2.4\ \Omega$, $V_{CE} = 600$ V



switching losses IGBT-Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 300$ A, $V_{CE} = 600$ V



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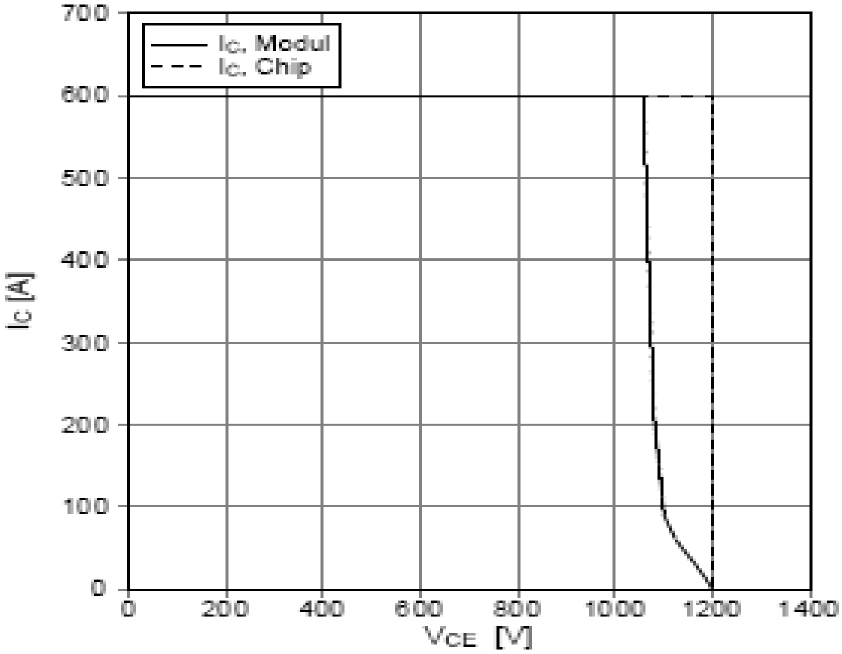
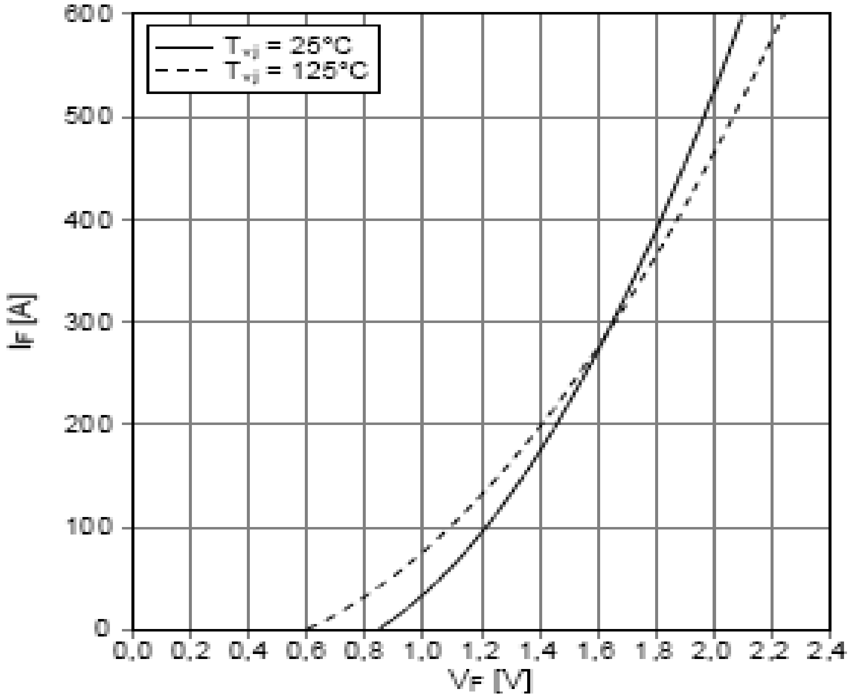
reverse bias safe operating area IGBT-inv. (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 2.4\ \Omega$, $T_{vj} = 125°C$



forward characteristic of diode-inverter (typical)
$I_F = f(V_F)$



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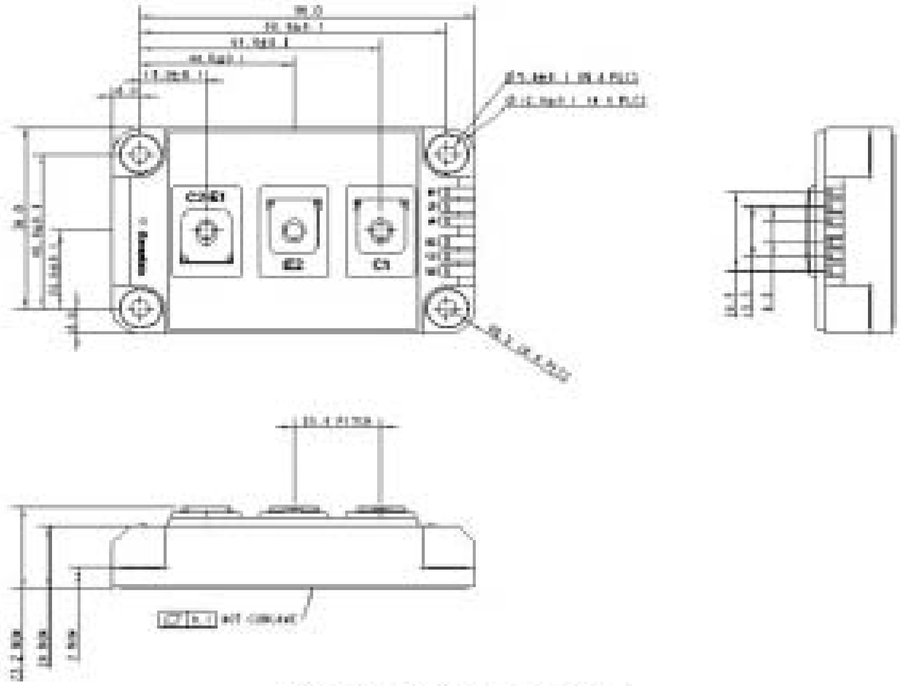
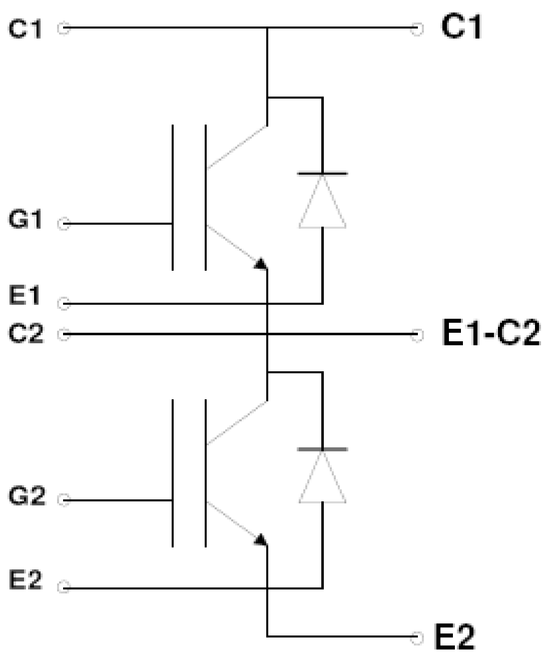


All dimensions in mm



CIRCUIT DIAGRAM

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