

SML300HB12GG

Attributes:

- Aerospace build standard
- High reliability
- Lightweight
- Cu and metal matrix base plate versions (pin finned versions available)
- AlN isolation
- Trench gate igbts


Outline TBC
Maximum rated values/Electrical Properties

Collector-emitter voltage		V_{ce}	1200	V
DC collector current	$T_c=70C, T_{vj}=175C$ $T_c=25C, T_{vj}=175C$	$I_{c, nom}$ I_c	320 455	A
Repetitive peak collector current	$t_p=1msec, T_c=80C$	I_{cm}	600	A
Total power dissipation	$T_c=25C$	P_{tot}	850	W
Gate-emitter peak voltage		V_{ges}	+/-20	V
DC forward diode current		I_f	400	A
Repetitive peak forward current	$t_p=1msec$	I_{frm}	800	A
I^2t value per diode	$V_r=0V, t_p=10msec,$ $T_{vj}=125C$ $T_{vj}=150C$	I^2_t	11000 10500	A^2sec
Isolation test voltage	RMS, 50Hz, $t=1min$	V_{isol}	2500	V

Collector-emitter saturation voltage	$I_c=300A, V_{ge}=15V, T_c=25C$ $I_c=300A, V_{ge}=15V, T_c=125C$ $I_c=300A, V_{ge}=15V, T_c=150C$	$V_{ce(sat)}$		1.7 2.0	2.15 2.45	V
Gate threshold voltage	$I_c=6.4mA, V_{ce}=V_{ge}, T_{vj}=25C$	$V_{ge(th)}$	5.0	5.8	6.5	V
Input capacitance	$f=1MHz, T_{vj}=25C, V_{ce}=25V,$ $V_{ge}=0V$	C_{ies}		21.5		nF
Reverse transfer capacitance	$f=1MHz, T_{vj}=25C, V_{ce}=25V,$ $V_{ge}=0V$	C_{res}		0.98		nF
Collector emitter cut off current	$V_{ce}=1200V, V_{ge}=0V, T_{vj}=25C$ $V_{ce}=1200, V_{ge}=0V, T_{vj}=125C$	I_{ces}			0.3	mA mA
Gate emitter cut off current	$V_{ce}=0V, V_{ge}=20V, T_{vj}=25C$	I_{ges}			400	nA



Turn on delay time	Ic=300A, Vcc=600V Vge=+/-15V, Rg=2Ω, Tvj=125C	t _{d,on}	280	nsec
Rise time	Ic=300A, Vcc=600V Vge=+/-15V, Rg=2Ω, Tvj=125C	t _r	65	nsec
Turn off delay time	Ic=300A, Vcc=600V Vge=+/-15V, Rg=2Ω, Tvj=125C	t _{d,off}	630	nsec
Fall time	Ic=300A, Vcc=600V Vge=+/-15V, Rg=2Ω, Tvj=125C	t _f	130	nsec
Turn on energy loss per pulse	Ic=300A, Vce=600V, Vge=15V Rge=2Ω, L=30nH Tvj=125C	E _{on}	35	mJ
Turn off energy loss per pulse	Ic=300A, Vce=600V, Vge=15V Rge=2Ω, L=30nH Tvj=125C	E _{off}	45	mJ
SC Data	tp≤10μsec, Vge≤15V Vcc=360V, Tvj=25C Vce(max)=Vces-Lσdi/dt Tvj=150C	I _{sc}	2800 2000	A A
Stray Module inductance		L _{σce}	18	nH
Terminal-chip resistance		R _c	1.0	mΩ

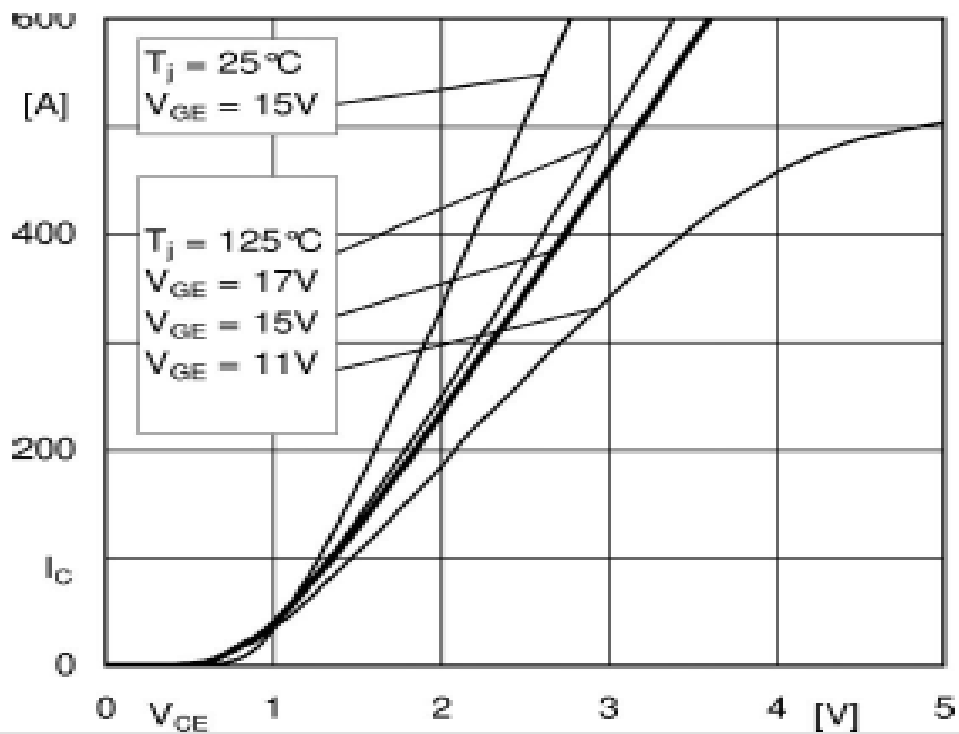
Diode characteristics

Forward voltage	Ic=300A, Vge=0V, Tc=25C Ic=300A, Vge=0V, Tc=125C	V _f	1.6 1.6	1.8 1.8	V V
Peak reverse recovery current	If=300A, -di/dt=6200A/μsec Vce=300V, Vge=-10V, Tvj=125C	I _{rm}	375		A
Recovered charge	If=300A, -di/dt=6200A/μsec Vce=600V, Vge=-10V, Tvj=125C	Q _r	75		μC
Reverse recovery energy	If=300A, -di/dt=6200A/μsec Vce=600V, Vge=-10V, Tvj=125C	E _{rec}	33		mJ

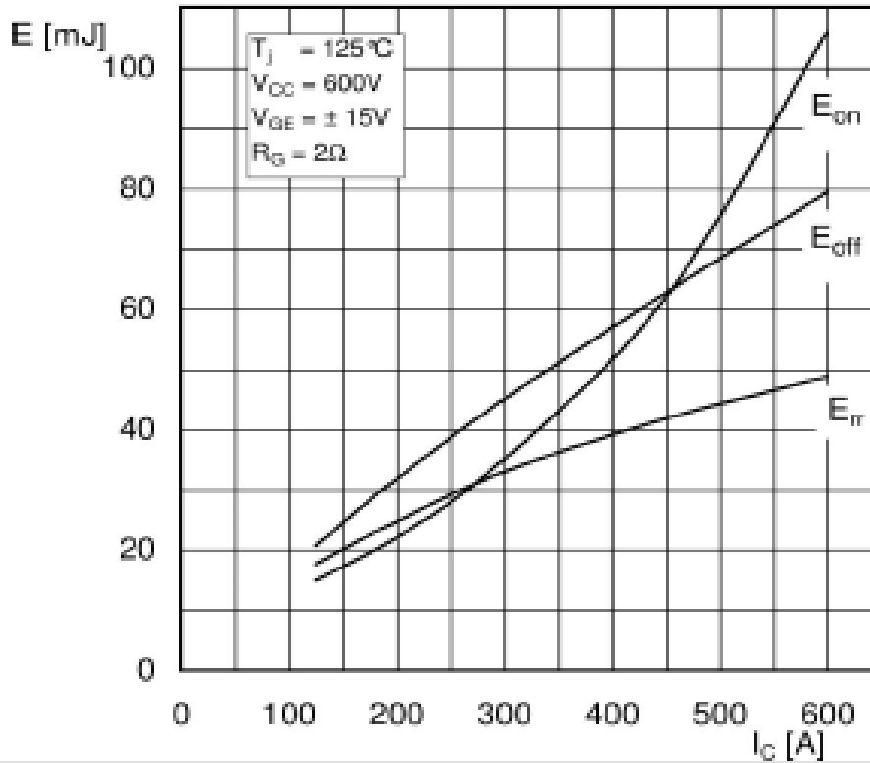


Thermal Properties

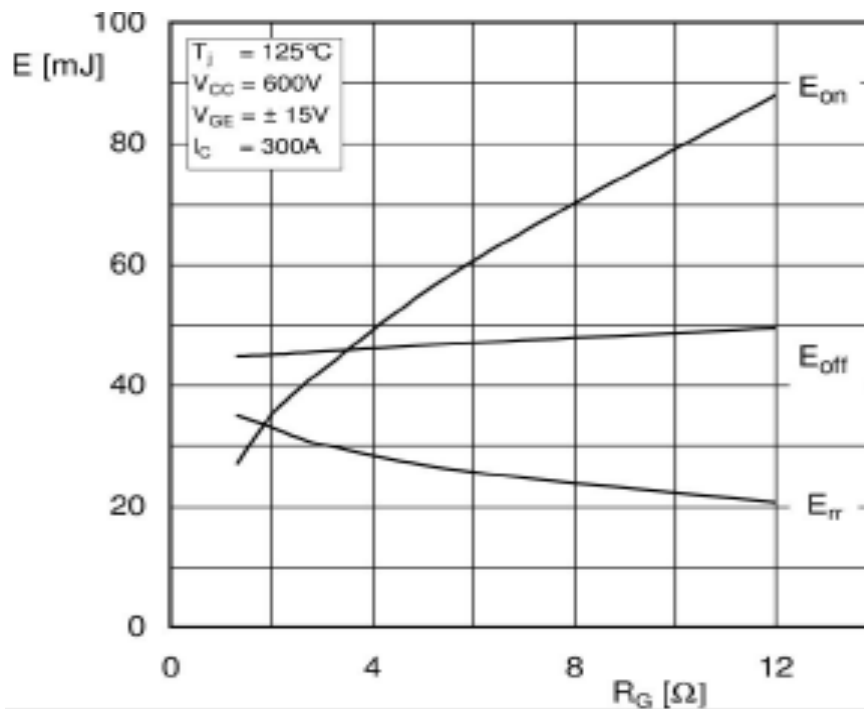
		Min	Typ	Max	
Thermal resistance junction to case (MMC)	Igibt Diode	$R_{\theta J-C}$		0.042 0.1	K/W
Thermal resistance case to heatsink		$R_{\theta C-HS}$	0.045		K/W
Maximum junction temperature		T_{vj}		175	C
Maximum operating temperature		T_{op}	-55	175	C
Storage Temperature		T_{stg}	-55	175	C



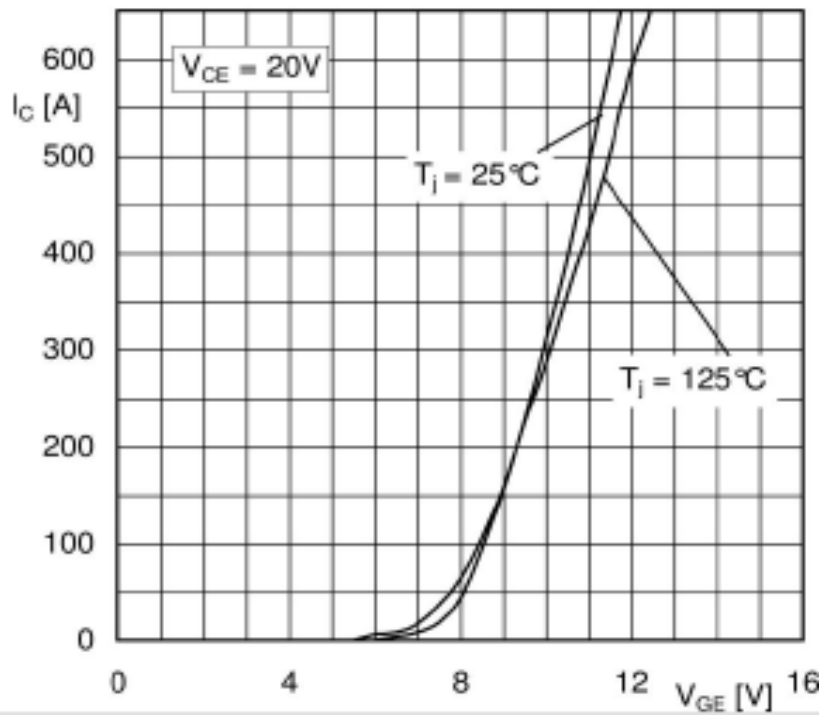
Typ. output characteristic, inclusive $R_{CC'+EE'}$



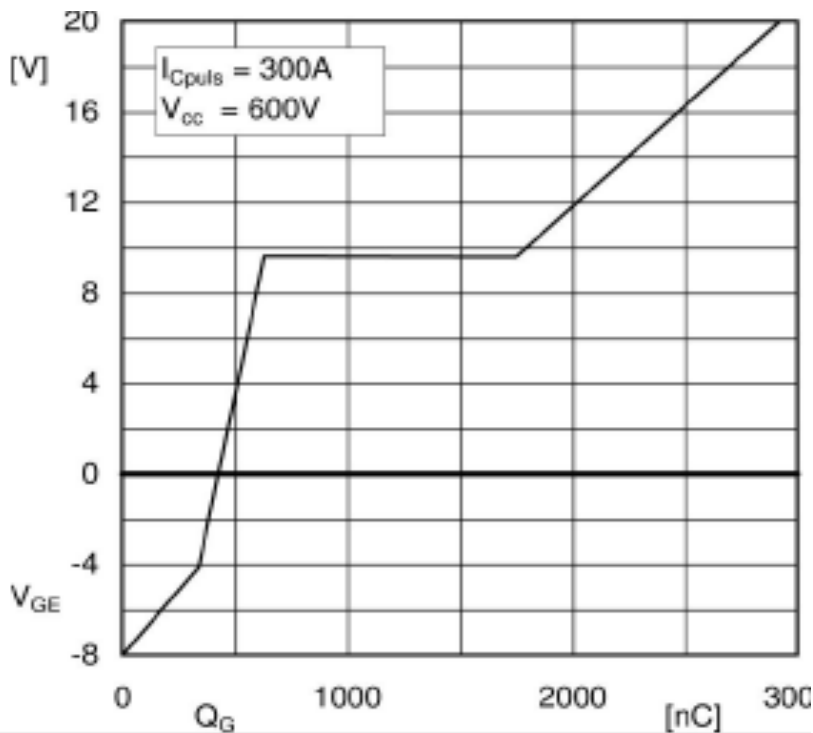
Typ. turn-on /-off energy = $f(I_c)$



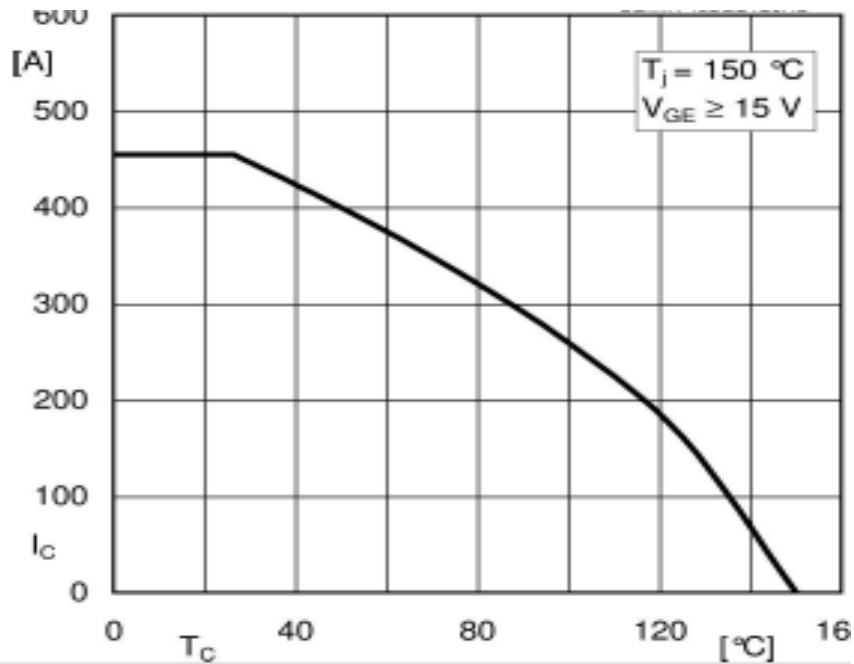
Typ. turn-on /-off energy = $f(R_g)$



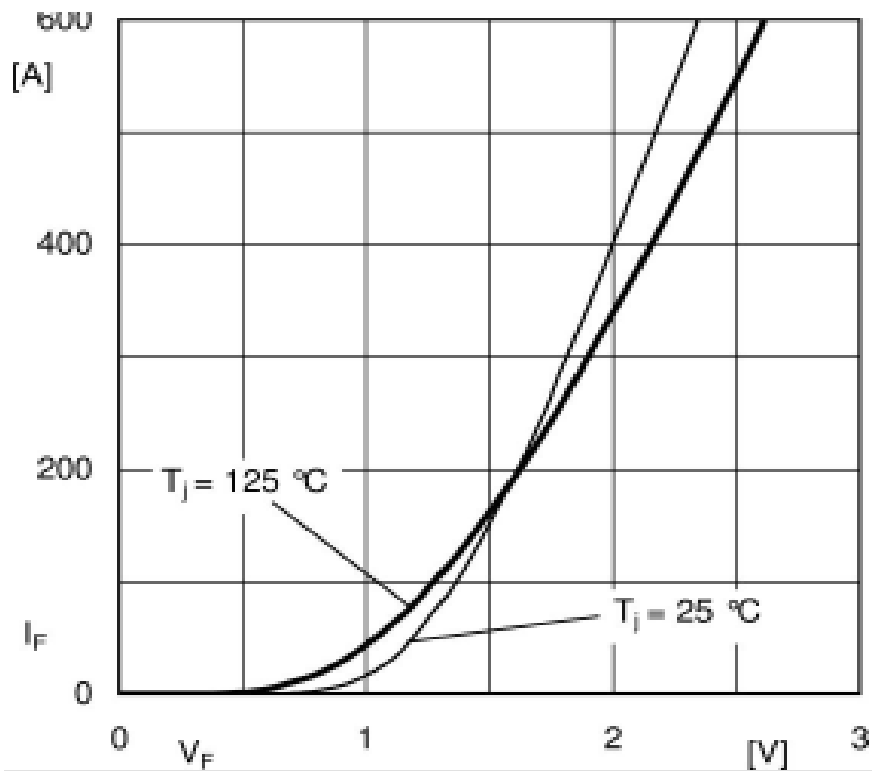
Typ. transfer characteristic



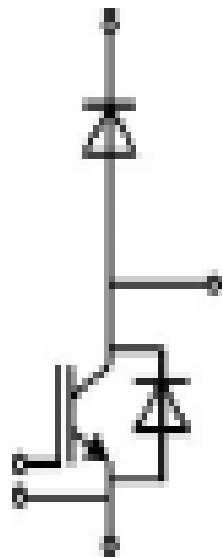
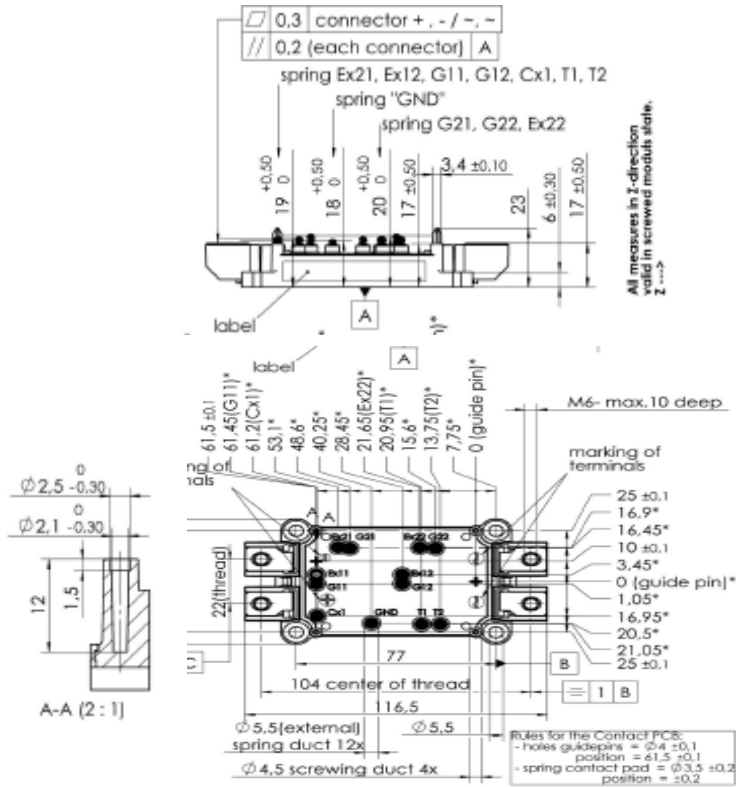
Typ. gate charge characteristic



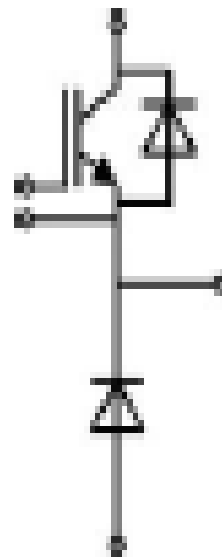
Rated current vs. temperature $I_C = f(T_C)$



Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$



GAL



GAR

CIRCUIT DIAGRAM