

SML150FB12

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



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	150 200	A
Repetitive peak Collector Current	$t_p=1msec, T_c=80C$	I_{crm}	300	A
Total PowerDissipation	$T_c=25C$	P_{tot}	850	W
Gate-emitter peak voltage		V_{ges}	+/-20	V
DC Forward Diode Current		I_f	150	A
Repetitive Peak Forward Current	$t_p=1msec$	I_{frm}	300	A
I^2t value per diode	$V_r=0V, t_p=10msec, T_{vj}=125C$	I^2_t	4600	A^2sec
Isolation test voltage	RMS, 50Hz, $t=1min$	V_{isol}	2500	V

Collector-emitter saturation voltage	$I_c=150A, V_{ge}=15V, T_c=25C$ $I_c=150A, V_{ge}=15V, T_c=125C$	$V_{ce(sat)}$		1.70 2.0	2.15	V 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}		10.5		nF
Reverse transfer Capacitance	$f=1MHz, T_{vj}=25C, V_{ce}=25V, V_{ge}=0V$	C_{res}		0.5		nF
Collector emitter cut off current	$V_{ce}=600V, V_{ge}=0V, T_{vj}=25C$ $V_{ce}=600V, V_{ge}=0V, T_{vj}=125C$	I_{ces}		1 1	5	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=150A, Vcc=600V Vge=+/-15V, Rg=8.2Ω, Tvj=25C Vge=+/-15V, Rg=8.2Ω, Tvj=125C	t _{d,on}		250 300		nsec nsec
Rise time	Ic=150A, Vcc=600V Vge=+/-15V, Rg=8.2Ω, Tvj=25C Vge=+/-15V, Rg=8.2Ω, Tvj=125C	t _r		90 100		nsec nsec
Turn off delay time	Ic=150A, Vcc=600V Vge=+/-15V, Rg=8.2Ω, Tvj=25C Vge=+/-15V, Rg=8.2Ω, Tvj=125C	t _{d,off}		550 650		nsec nsec
Fall time	Ic=150A, Vcc=600V Vge=+/-15V, Rg=8.2Ω, Tvj=25C Vge=+/-15V, Rg=8.2Ω, Tvj=125C	t _f		130 160		nsec nsec
Turn energy loss per pulse	Ic=150A, Vce=600V, Vge=15V Rge=8.2Ω, L=80nH Tvj=125C	E _{on}		11		mJ
Turn off energy loss per pulse	Ic=150A, Vce=600V, Vge=15V Rge=8.2Ω, L=80nH Tvj=125C	E _{off}		24		mJ
SC Data	tp≤10μsec, Vge≤15V Vcc=900V, Vce _(max) =Vces-Lσdi/dt Tvj=125C	I _{sc}		600		A
Stray Module inductance		L _{σce}		40		nH
Terminal-chip resistance		R _c		1.2		mΩ

Diode characteristics

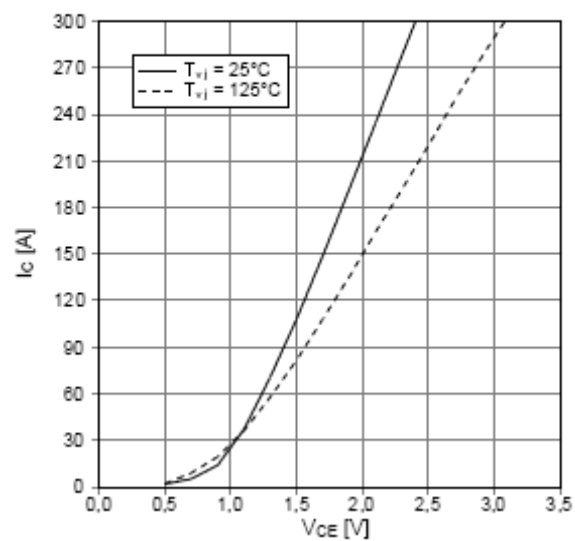
Forward voltage	Ic=150A, Vge=0V, Tc=25C Ic=150A, Vge=0V, Tc=125C	V _f		1.65 1.65	2.1	V V
Peak reverse recovery current	If=150A, -di/dt=1500A/μsec Vce=600V, Vge=-15V, Tvj=25C Vce=600V, Vge=-15V, Tvj=125C	I _{rm}		110 140		A A
Recovered charge	If=150A, -di/dt=1500A/μsec Vce=600V, Vge=-15V, Tvj=25C Vce=600V, Vge=-15V, Tvj=125C	Q _r		15 28		μC μC
Reverse recovery energy	If=150A, -di/dt=1500A/μsec Vce=600V, Vge=-10V, Tvj=25C Vce=600V, Vge=-10V, Tvj=125C	E _{rec}		7.0 14		mJ mJ



Thermal Properties

			Min	Typ	Max	
Thermal resistance junction to case	Igibt Diode	$R_{\theta J-C}$			0.15 0.26	K/W
Thermal resistance case to heatsink		$R_{\theta C-HS}$		0.03		K/W
Maximum junction temperature		T_{vj}			175	C
Maximum operating temperature		T_{op}	-55		175	C
Storage Temperature		T_{stg}	-55		175	C

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

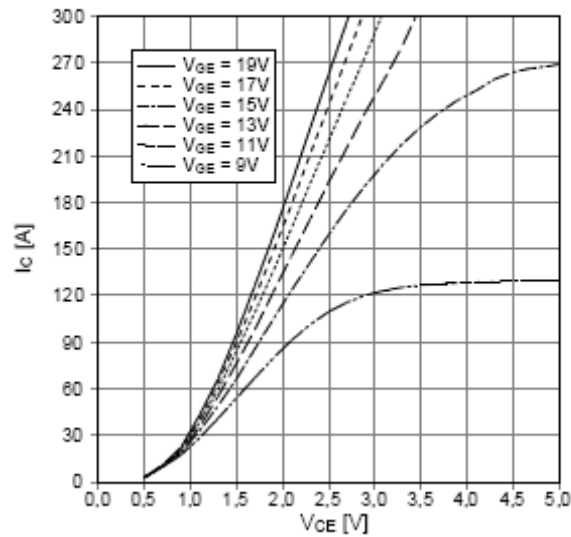




output characteristic IGBT-inverter (typical)

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

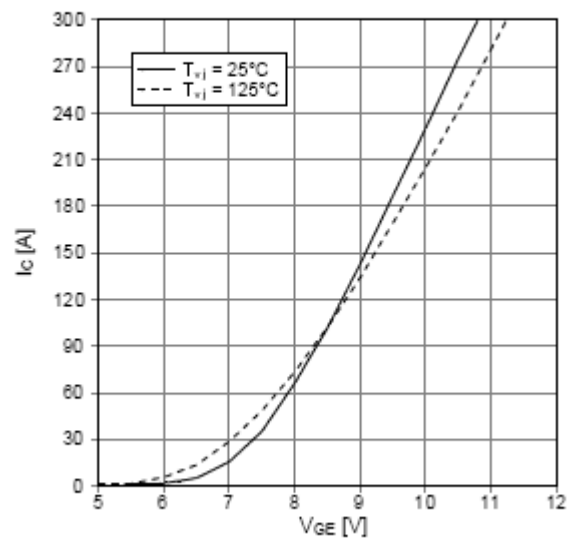
$$T_{vj} = 125^{\circ}\text{C}$$



transfer characteristic IGBT-inverter (typical)

$$I_C = f(V_{GE})$$

$$V_{CE} = 20\text{ V}$$

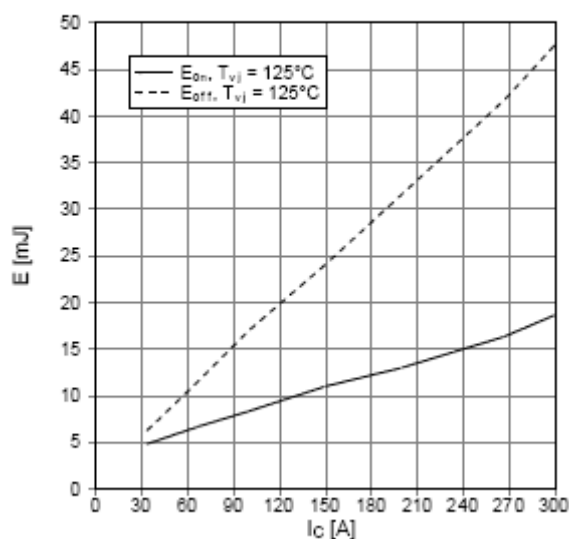




switching losses IGBT-inverter (typical)

$$E_{on} = f(I_C), E_{off} = f(I_C)$$

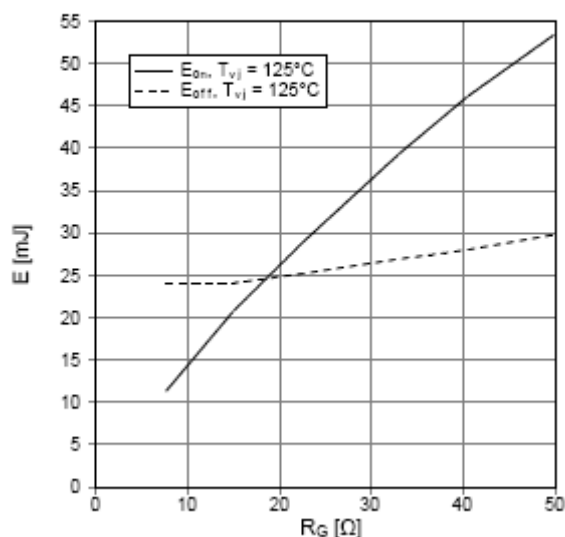
$$V_{GE} = \pm 15 \text{ V}, R_{Gon} = 8,2 \Omega, R_{Goff} = 8,2 \Omega, V_{CE} = 600 \text{ V}$$



switching losses IGBT-Inverter (typical)

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

$$V_{GE} = \pm 15 \text{ V}, I_C = 150 \text{ A}, V_{CE} = 600 \text{ V}$$

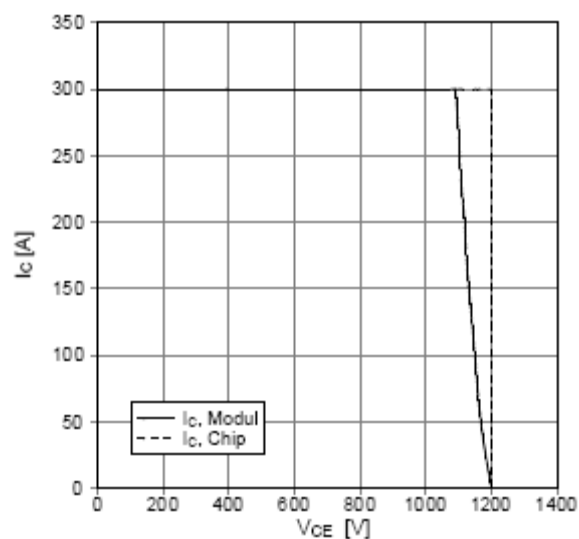




reverse bias safe operating area IGBT-inv. (RBSOA)

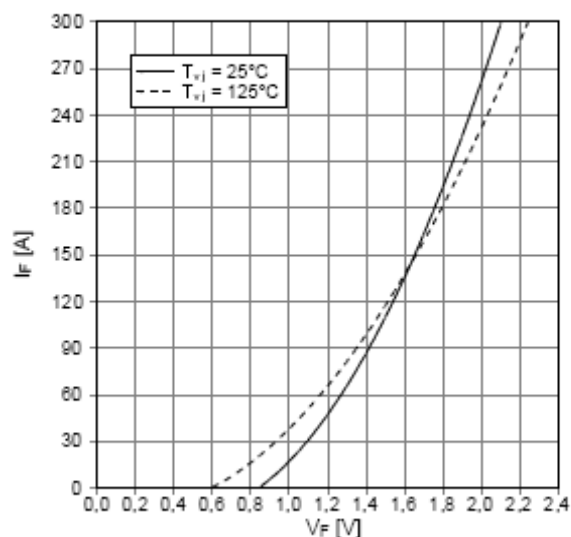
$I_C = f(V_{CE})$

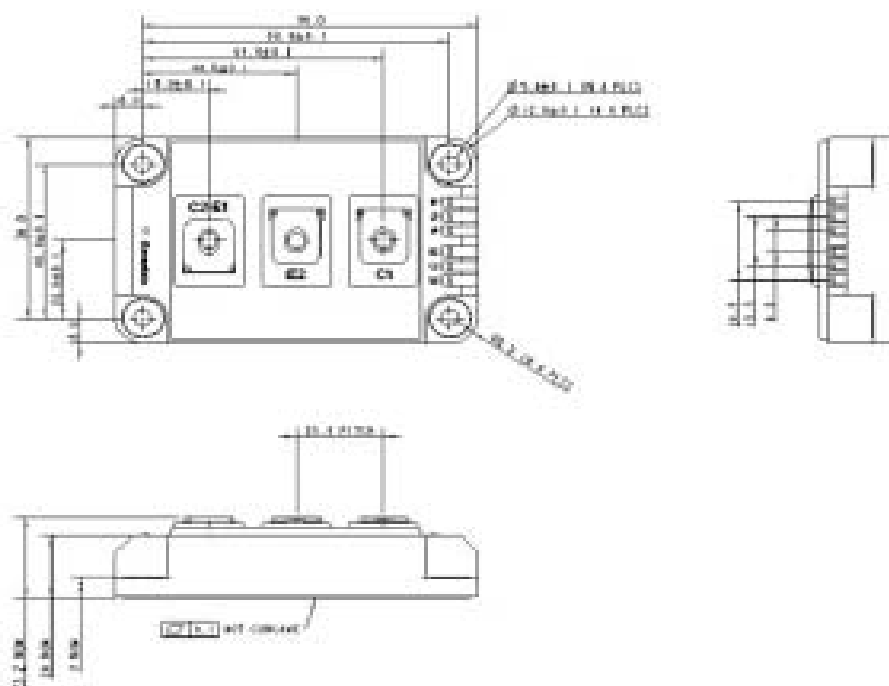
$V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 8,2 \text{ } \Omega$, $T_{vj} = 125^\circ\text{C}$



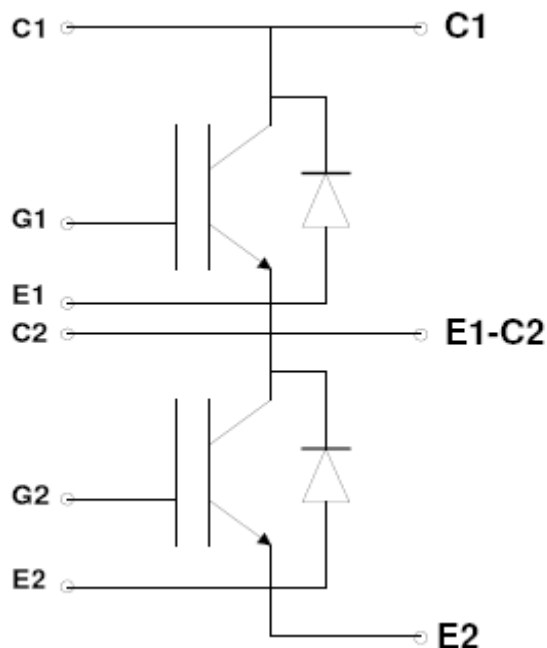
forward characteristic of diode-inverter (typical)

$I_F = f(V_F)$





All dimensions in mm



CIRCUIT DIAGRAM