

SML150FB12

Attributes:

- -aerospace build standard
- -high reliability
- -lightweight
- -metal matrix base plate
- -AIN isolation



Maximum rated values/Electrical Properties

					4				
Tc=25C,Tvj=175C Ic 200 Repetitive peak Collector Current tp=1msec,Tc=80C I_{crm} 300 A Total PowerDissipation Tc=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 I_f 300 A I²t value per diod V_f V_f V_f V_f Isolation test voltage RMS, 50Hz, t=1min V_{isol} V_f V_f Collector-emitter saturation voltage Ic=150A,Vge=15V, Tc=25C Ic=150A,Vge=15V, Tc=125C $V_{ce(sat)}$ V_f V_f Gate Threshold voltage Ic=6.4mA,Vce=Vge, Tvj=25C V_f V_f V_f Input capacitance V_f V_f V_f V_f V_f Reverse transfer Capacitance V_f V_f V_f V_f V_f V_f Collector emitter cut off V_f V_f V_f V_f	Collector-emitter Voltage				Vce	12	200	V	
Total PowerDissipation $Tc=25C$ P_{tot} 850 W Gate-emitter peak voltage P_{tot} P_{to	DC Collector Current							A	
Gate-emitter peak voltage			tp=1msec,Tc=80C		I _{crm}	300		A	
DC Forward Diode Current Repetitive Peak Forward Current $I_{fm} = I_{fm} = I_{fm$	Total PowerDissipation		Tc=25C		P _{tot}	850		W	
Current Repetitive Peak Forward Current I^2t value per diod $Vr=0V$, $tp=10$ msec, $Tvj=125C$ I^2t RMS, 50 Hz, $t=1$ min V_{isol} I^2t value per diod $Vr=0V$, $tp=10$ msec, T^2t I^2t I	Gate-emitter peak voltage	•	11/4 C		ges	+/-20		V	
Forward Current I²t value per diod $Vr=0V$, tp=10msec, $Tvj=125C$ Isolation test voltage RMS, 50Hz, t=1min V _{isol} 2500 V Collector-emitter saturation voltage Ic=150A,Vge=15V,Tc=25C Ic=150A,Vge=15V,Tc=125C Gate Threshold voltage Ic=6.4mA,Vce=Vge, Tvj=25C Input capacitance f=1MHz,Tvj=25C,Vce=25V, V _{ies} V _{isol} 1.70 2.15 V V V Reverse transfer Capacitance f=1MHz,Tvj=25C,Vce=25V, V _{ies} V _{ies} 10.5 InFut Collector emitter cut off Vce=600V,Vge=0V,Tvj=25C Vres I 5 m/F			Y _ O \		I_{f}	1.	50	A	
			tp=1m ec		I_{frm}	300		A	
Collector-emitter saturation voltage $Ic=150A, Vge=15V, Tc=25C$ $Ic=150A, Vge=15V, Tc=125C$ $Ic=150A, Tc=125C$ $Ic=1250A, Tc=125C$ $Ic=1250A, Tc=125C$ $Ic=1250A, Tc=125C$ $Ic=1250A, Tc=125C$ $Ic=1250A, Tc=125C$ $Ic=1250A, Tc=125C$ Ic	I ² t value per dioce				I ² _t	4600		A ² sec	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Isolation test voltage		RMS, 50Hz, t=1min		V_{isol}	2500		V	
Input capacitance $f=1MHz, Tvj=25C, Vce=25V, C_{ies}$ 10.5 nF $Vge=0V$				V _{ce(sat)}			2.15	V V	
	Gate Threshold voltage	Ic=	6.4mA,Vce=Vge, Tvj=2	Vge _(th)	5.0	5.8	6.5	V	
Vge=0V Collector emitter cut off Vce=600V,Vge=0V,Tvj=25C I _{ces} 1 5 mA	Input capacitance				C _{ies}		10.5		nF
	Reverse transfer Capacitance				C _{res}		0.5		nF
					I _{ces}		_	5	mA mA
Gate emitter cut off current $Vce=0V,Vge=20V,Tvj=25C$ I_{ges} 400 nA	Gate emitter cut off current	Vce=0V,Vge=20V,Tvj=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	$t_{ m d,on}$	250 300	nsec nsec
Rise time	Ic=150A, Vcc=600V Vge=+/-15V,Rg=8.2Ω,Tvj=25C Vge=+/-15V,Rg=8.2Ω,Tvj=125C	tr	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	$t_{ m d,off}$	550 650	nsec nsec
Fall time	Ic=150A, Vcc=600V Vge=+/-15V,Rg=8.2Ω,Tvj=25C Vge=+/-15V,Rg=8.2Ω,Tvj-12	$t_{ m f}$	130 160	nsec nsec
Turn energy loss per pulse	Ic=150A,Vce=600V,Vge=5V Rge=8.2Ω,L=80nH 1 vj=125C	E _{on}	11	mJ
Turn off energy loss per pulse	Ic=150A,V e=c00 V Vge=15V Rge=8 2Ω,L=20n.I Tyi=1.5C	E _{off}	24	mJ
SC Data	tp≤1 cuse Vge≤15V √c =900V, Vce _{(max)=} Vces-Lσdi/d Tvj=125C	I_{sc}	600	A
Stray Module inductance	100	$L_{\sigma ce}$	40	nН
Terminal-chip room tange		R _c	1.2	mΩ

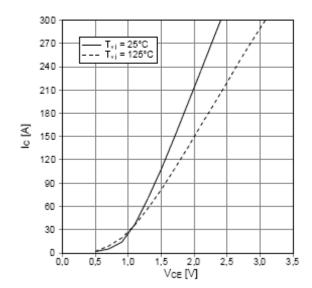
Diode characteristics

Forward voltage	Ic=150A,Vge=0V, Tc=25C Ic=150A,Vge=0V, Tc=125C	$V_{\rm f}$	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	Qr	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

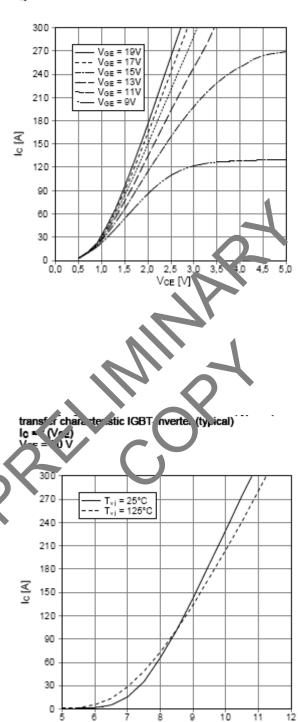


Thermal Properties			Min	Typ	Max	
Thermal resistance junction to case	Igbt Diode	$R_{ heta J ext{-}C}$			0.15 0.26	K/W
Thermal resistance case to heatsink		R _{0C-hs}		0.03		K/W
Maximum junction temperature		Tvj			175	С
Maximum operating temperature		Тор	-55		175	С
Storage Temperature		Tstg	-55	7	175	С
			5/			





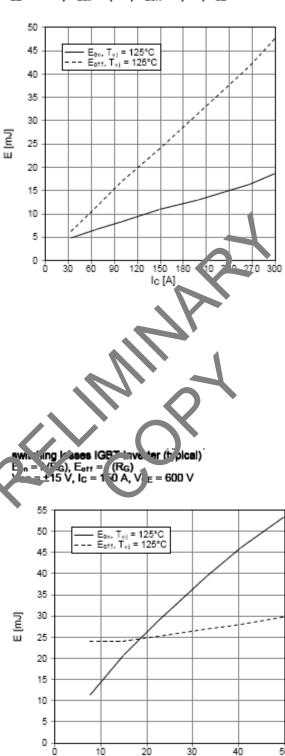
output characteristic IGBT-inverter (typical) $I_C = f(V_{CE})$ $T_{vJ} = 125^{\circ}C$



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Vge [V]

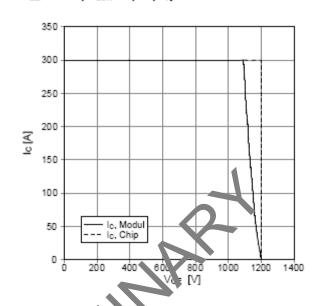
switching losses IGBT-inverter (typical) E_{on} = f (Ic), E_{off} = f (Ic) V_{GE} = ± 15 V, R_{Gon} = 8,2 Ω , R_{Goff} = 8,2 Ω , V_{CE} = 600 V



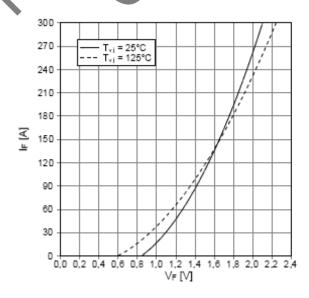
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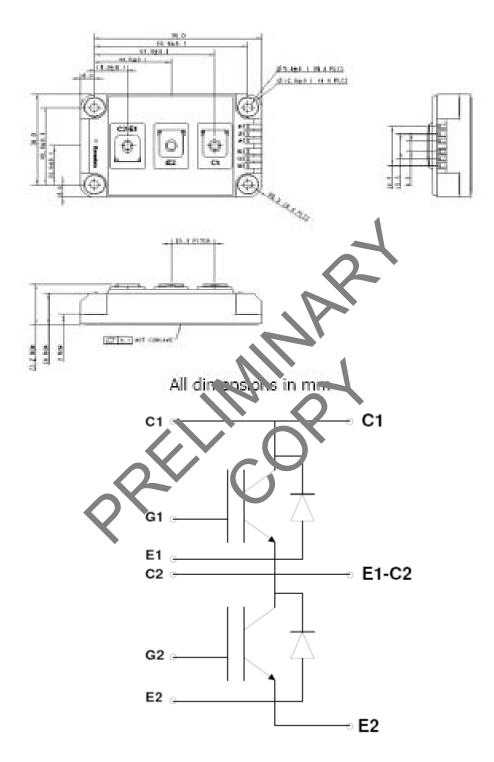
R_G [Ω]

reverse bias safe operating area IGBT-inv. (RBSOA) Ic = f (Vcz) $V_{GE} = \pm 15 V$, $R_{Goff} = 8,2 \Omega$, $T_{vI} = 125^{\circ}C$



forward maracterinac of dical miverter (typical)





CIRCUIT DIAGRAM