SML50HB06

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

Maximum rated values/ Electrical Properties

Collector-emitter Voltage		V_{ce}	600	V
DC Collector Current	Tc=80C Tc=25C	I_c, nom Ic	50 75	A
Repetitive peak Collector Current	tp=1msec,Tc=80C	I_{crm}	100	A
Total PowerDissipation	Tc=25C	P_{tot}	280	W
Gate-emitter peak voltage		V_{ges}	+/-20	V
DC Forward Diode Current		I_f	50	A
Repetitive Peak Forward Current	tp=1msec	I_{frm}	100	A
I^2t value per diode	Vr=0V, tp=10msec, Tvj=125C	I^2_t	450	A^2sec
Isolation test voltage	RMS, 50Hz, t=1min	V_{isol}	2500	V

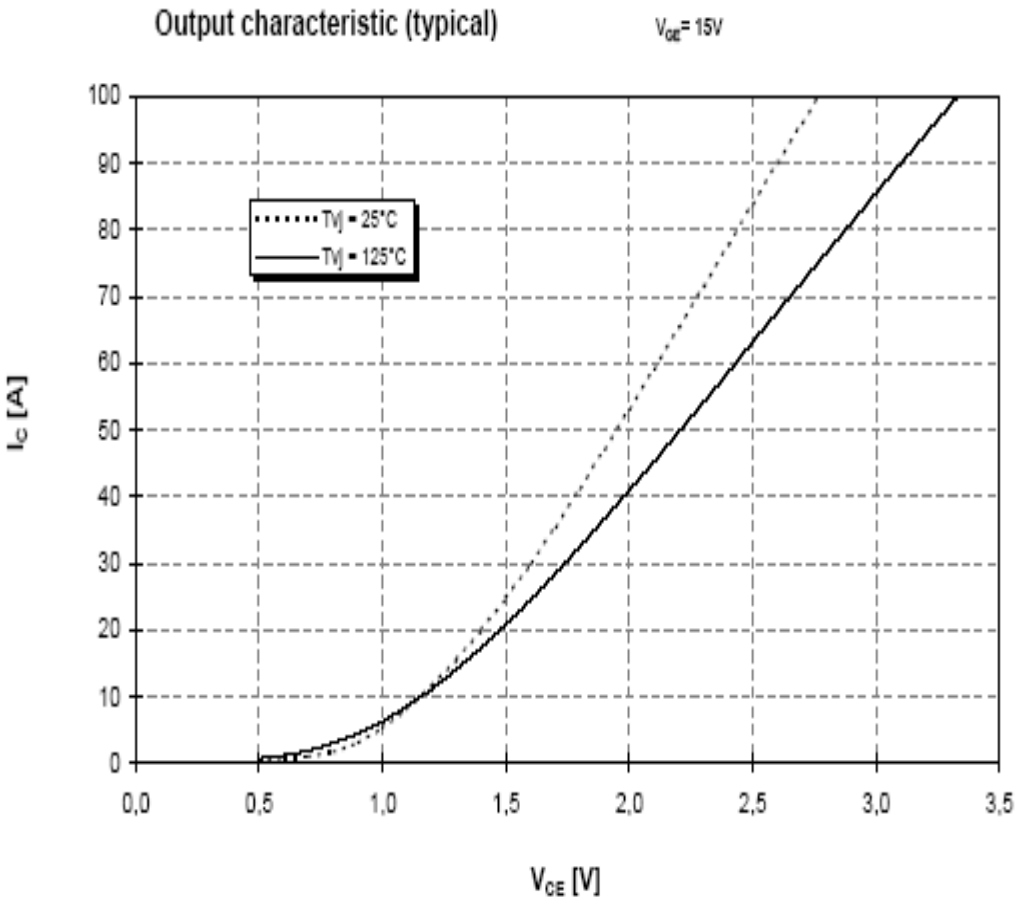
Collector-emitter saturation voltage	Ic=50A,Vge=15V, Tc=25C Ic=50A,Vge=15V,Tc=125C	$V_{ce(sat)}$		1.95 2.2	2.45	V
Gate Threshold voltage	Ic=50A,Vce=Vge, Tvj=25C	$Vge_{(th)}$	4.5	5.5	6.5	V
Input capacitance	f=1MHz,Tvj=25C,Vce=25V, Vge=0V	C_{ies}		2.2		nF
Reverse transfer Capacitance	f=1MHz,Tvj=25C,Vce=25V, Vge=0V	C_{res}		0.2		nF
Collector emitter cut off current	Vce=600V,Vge=0V,Tvj=25C Vce=600V,Vge=0V,Tvj=125C	I_{ces}		1 1	500	µA
Gate emitter cut off current	Vce=0V,Vge=20V,Tvj=25C	I_{ges}			400	µA

Turn on delay time	Ic=50A, Vcc=300V Vge=+/15V,Rg=2.7Ω,Tvj=25C Vge=+/-15V,Rg=2.7Ω,Tvj=125C	$t_{d,on}$		40 42		nsec nsec
Rise time	Ic=50A, Vcc=300V Vge=+/-15V,Rg=2.7Ω,Tvj=25C Vge=+/-15V,Rg=2.7Ω,Tvj=125C	tr		9 10		nsec nsec
Turn off delay time	Ic=50A, Vcc=300V Vge=+/-15V,Rg=2.7Ω,Tvj=25C Vge=+/-15V,Rg=2.7Ω,Tvj=125C	$t_{d,off}$		120 130		nsec nsec
Fall time	Ic=50A, Vcc=300V Vge=+/-15V,Rg=2.7Ω,Tvj=25C Vge=+/-15V,Rg=2.7Ω,Tvj=125C	t_f		12 21		nsec nsec
Turn energy loss per pulse	Ic=50A,Vce=300V,Vge=15V Rge=2.7Ω,Tvj=125C,L=35nH	E_{on}		0.5		mJ
Turn off energy loss per pulse	Ic=50A,Vce=300V, Vge=15V Rge=Ω,Tvj=125C,L=35nH	E_{off}		1.0		mJ
SC Data	tp≤10µsec, Vge≤15V Tvj≤125C,Vcc=300V,Vce(max)-Vces-Lσdi/dT	I_{sc}		225		A
Stray Module inductance		$L_{σce}$		40		nH
Terminal-chip resistance		R_c		1.2		mΩ

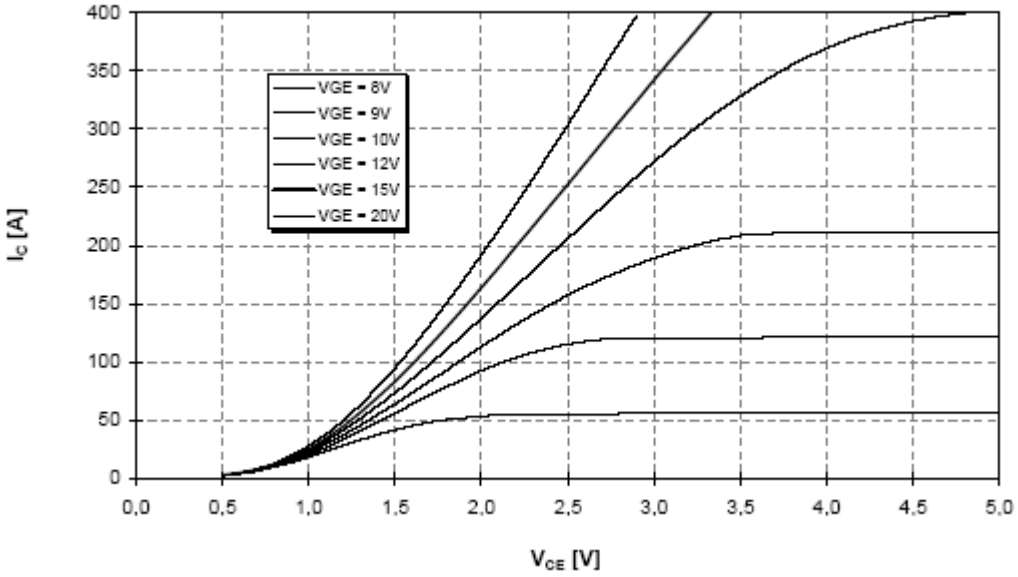
Diode characteristics

Forward voltage	Ic=50A,Vge=0V, Tc=25C Ic=50A,Vge=0V, Tc=125C	V_f		1.25 1.2	1.6	V
Peak reverse recovery current	If=50A, -di/dt=2900A/µsec Vce=300V,Vge=-10V,Tvj=25C Vce=300V,Vge=-10V,Tvj=125C	I_{rm}		 88 92		A
Recovered charge	If=50A, -di/dt=2900A/µsec Vce=600V,Vge=-10V,Tvj=25C Vce=600V,Vge=-10V,Tvj=125C	Qr		3.4 5.6		µC
Reverse recovery energy	If=50A, -di/dt=2900A/µsec Vce=600V,Vge=-10V,Tvj=25C Vce=600V,Vge=-10V,Tvj=125C	E_{rec}		 1.5		mJ mJ

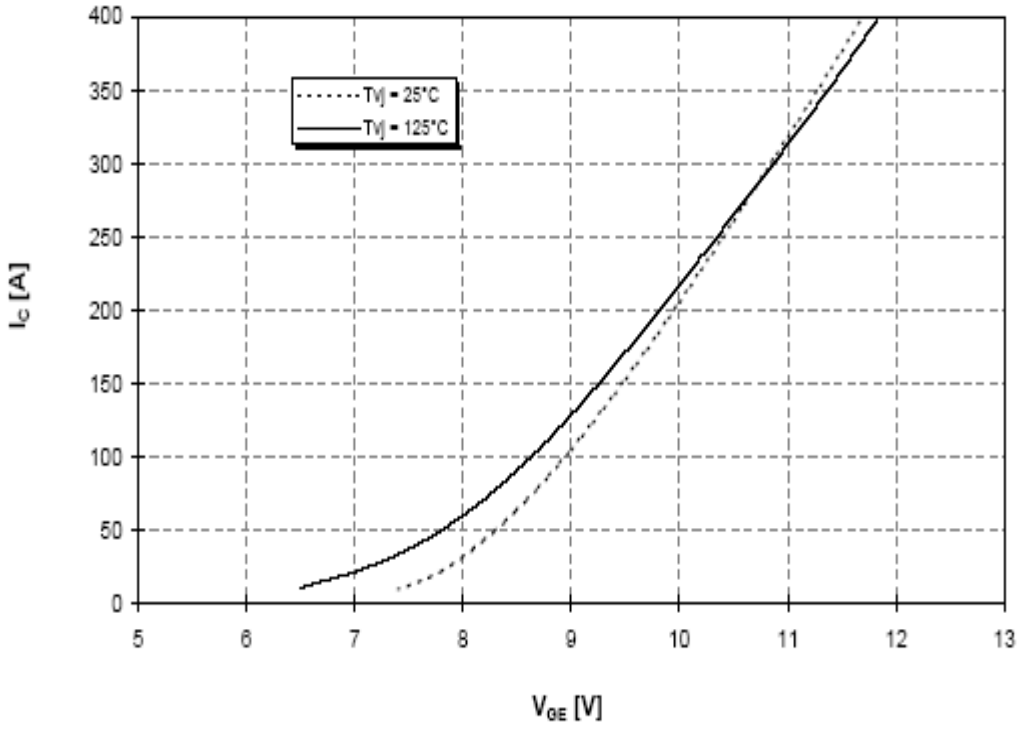
Thermal Properties			Min	Typ	Max	
Thermal resistance junction to case	Igbt Diode	$R_{\theta J-C}$			0.67 1.1	K/W
Thermal resistance case to heatsink		$R_{\theta C-hs}$		0.03		K/W
Maximum junction temperature		Tvj			150	C
Maximum operating temperature		Top	-55		125	C
Storage Temperature		Tstg	-55		125	C



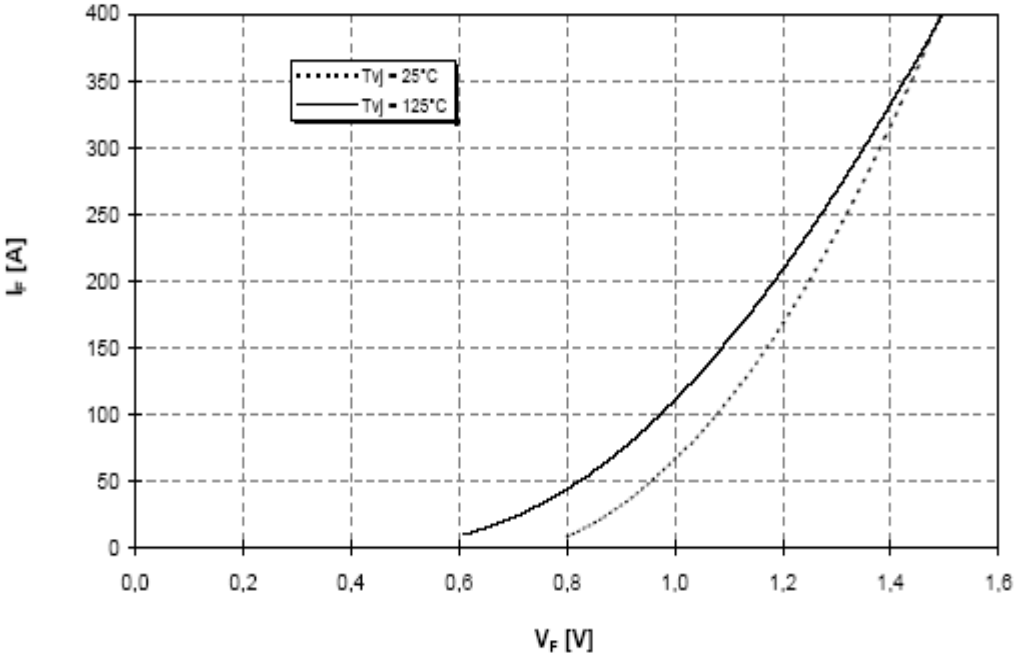
Output characteristic (typical) T_{vj}= 125°C



Transfer characteristic (typical) V_{CE}= 20V

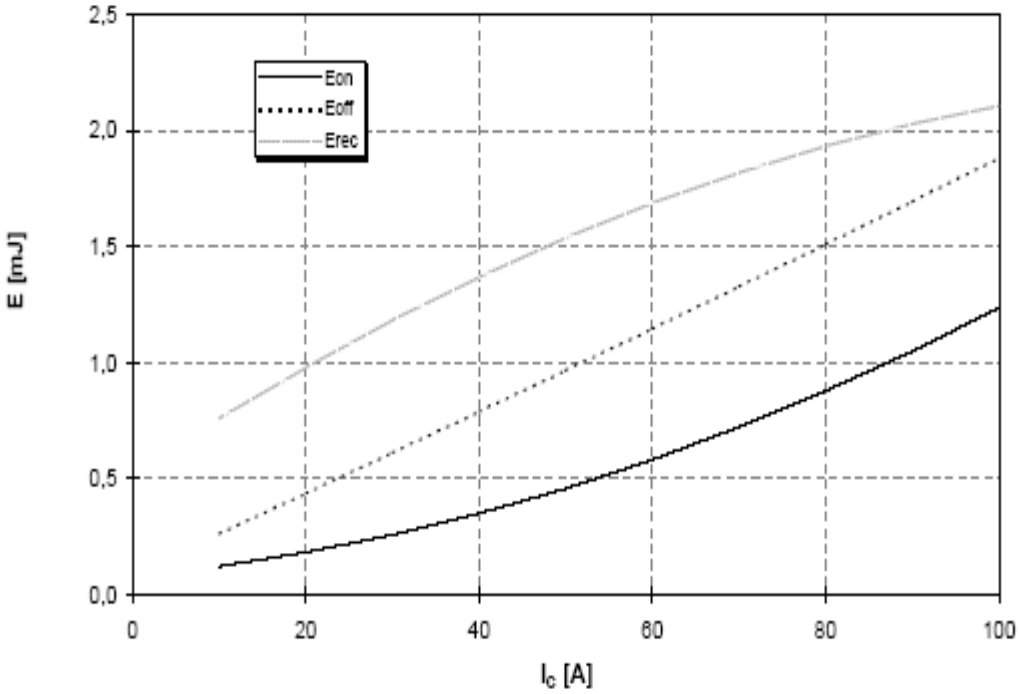


Forward characteristic of inverse diode (typical)



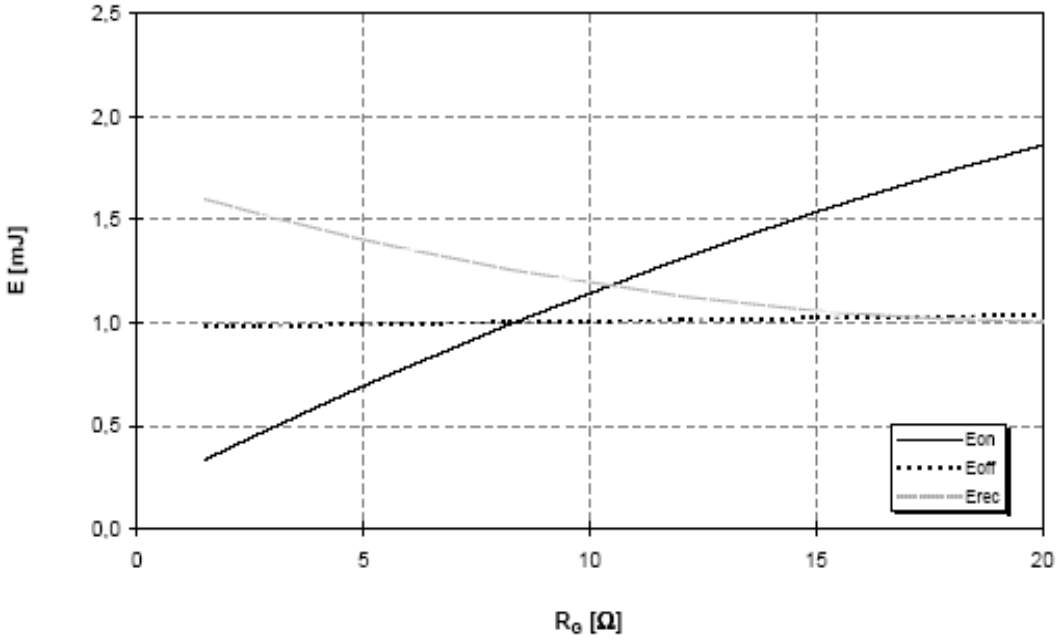
Switching losses (typical)

$R_{G,on}$= 2,7Ω, $R_{G,off}$= 2,7Ω, V_{CC}= 300V, T_{vj}= 125°C



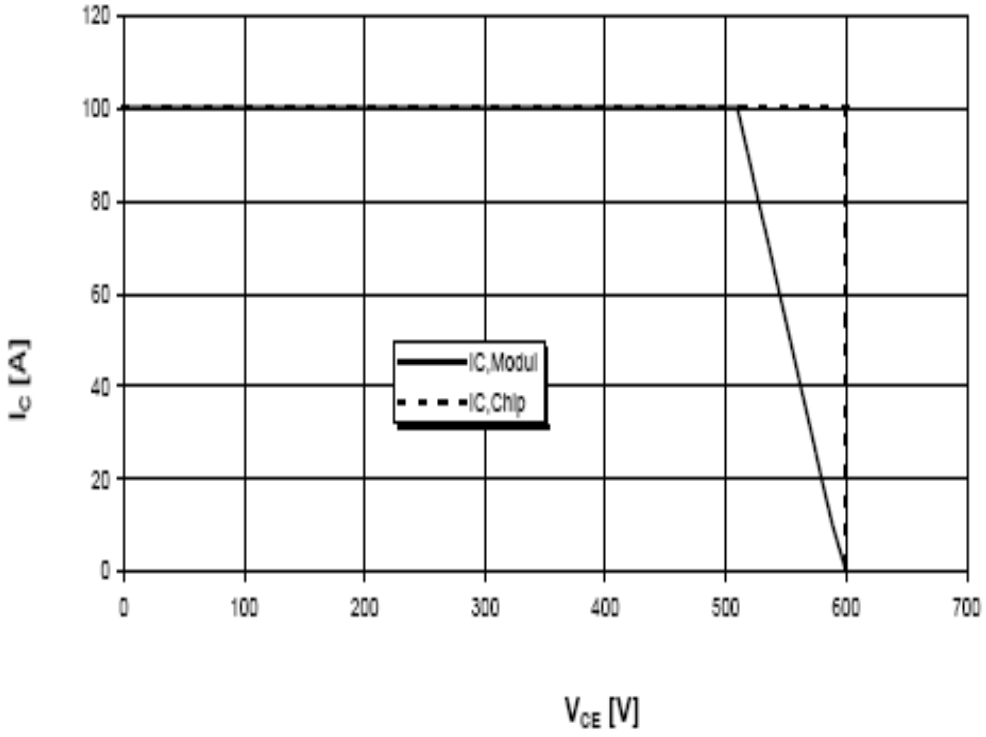
Switching losses (typical)

I_C= 50A , V_{CC}= 300V , T_{vj} = 125°C

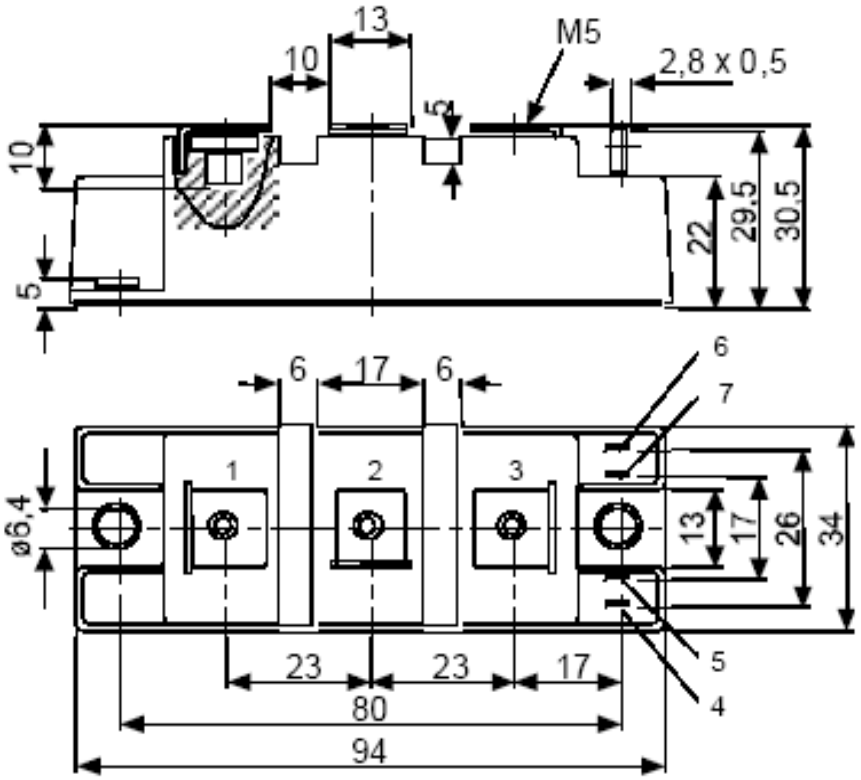


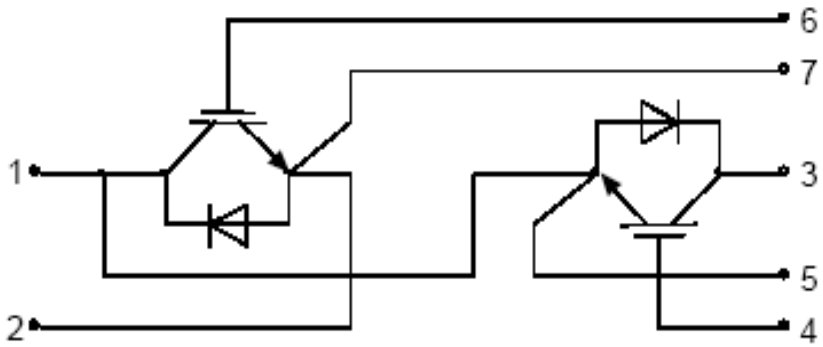
Reverse bias safe operation area (RBSOA)

V_{GE}= +15V, $R_{G,off}$= 2,7Ω, T_{vj}= 125°C



Package outline / Circuit diagram





CIRCUIT DIAGRAM