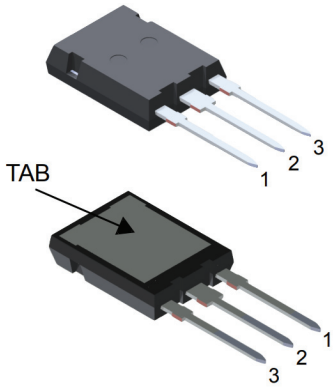
SYD75H120FHB

INSULATED GATE BIPOLAR TRANSISTOR

Preliminary Data

Features：

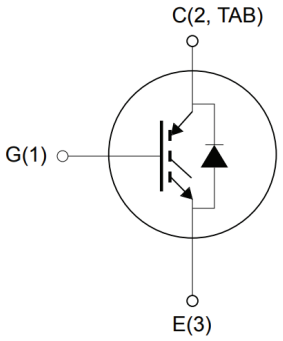
- Low $V_{CE\ (sat)}$ Trench IGBT Technology
- Low Switching Loss
- 10μs Short Circuit SOA
- Square RBSOA
- Positive $V_{CE(sat)}$ Temperature Coefficient
- Tight Parameter Distribution
- Low Thermal Resistance
- Very Fast Recovery Antiparallel Diode



Max247 long leads

Benefits:

- High Efficiency in a Wide Range of Applications
- Suitable for a Wide Range of Switching Frequencies due to Low $V_{CE(sat)}$ and Low Switching Losses
- Rugged Transient Performance for Increased Reliability
- Excellent Current Sharing in Parallel Operation



Applications：

- Uninterrupted Power Supply
- Solar Inverters
- Inverter Welding Machine
- PFC

Absolute Maximum Rated Values (T_J=25℃unless otherwise specified)

Symbol	Description	Conditions	Values	Units
V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=100℃	75	A
		T_C=25℃	150(1)	A
I_{CP}(2)	Pulse Collector Current		300	A
I_F	Continuous Forward Current	T_C=100℃	75	A
		T_C=25℃	150(1)	A
I_{FP}(2)	Pulse Forward Current		300	A
P_D	Maximum Power Dissipation	T_C=25℃	750	W
T_J	Maximum Junction Temperature		-40~150	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40~150	℃

1.Current level is limited by bond wires.
2.Pulse width is limited by maximum junction temperature.

Electrical Characteristics (T_J=25℃unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	V_{GE}=0V, I_C=2mA		1200			V
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1.0mA, V_{CE}=V_{GE}		5.0	5.7	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=75A, V_{GE}=15V	T_J=25℃		2.15	2.40	V
			T_J=125℃		2.80		V
			T_J=150℃		2.95		V
V_F	Forward On-voltage	I_F=75A	T_J=25℃		2.65		V
			T_J=125℃		2.25		V
			T_J=150℃		2.15		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=1200V	T_J=25℃			25	uA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V	T_J=25℃			±100	nA

IGBT Switching Characteristics (T_J=25℃unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
C_{ies}	Input Capacitance	V_{CE}=25V,V_{GE}=0V,f=100kHz			6393		pF
C_{oes}	Output Capacitance				438		pF
C_{res}	Reverse Transfer Capacitance				56		pF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=75A, R_G=10Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		172		ns
			T_J=125℃		169		
			T_J=150℃		172		
t_r	Rise Time		T_J=25℃		70		ns
			T_J=125℃		70		
			T_J=150℃		70		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=600V,I_C=75A, R_G=10Ω,V_{GE}=±15V, Inductive Load	T_J=25℃		123		ns
			T_J=125℃		120		
			T_J=150℃		120		
t_f	Fall Time		T_J=25℃		161		ns
			T_J=125℃		167		
			T_J=150℃		174		
E_{on}(1)	Turn-on Switching Loss	V_{CC}=600V,I_C=75A, R_G=10Ω,V_{GE}=±15V, di/dt=914A/μs(T_J=150℃), Inductive Load	T_J=25℃		5.5		mJ
			T_J=125℃		6.2		
			T_J=150℃		6.5		
E_{off}(2)	Turn-off Switching Loss	V_{CC}=600V,I_C=75A, R_G=10Ω,V_{GE}=±15V, du/dt=7384V/μs(T_J=150℃), Inductive Load	T_J=25℃		2.9		mJ
			T_J=125℃		3.1		
			T_J=150℃		3.2		

1. Including the reverse recovery of the diode.
2. Including the tail of the collector current.

Diode Switching Characteristics (T_J=25℃unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
t_{rr}	Reverse Recovery Time	V_R=600V,I_F=75A, R_G=15Ω,V_{GE}=±15V, di/dt=1090A/μs(T_J=150℃), Inductive Load	T_J=25℃		163		ns
			T_J=125℃		196		
			T_J=150℃		211		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		1.25		uC
			T_J=125℃		1.79		
			T_J=150℃		2.02		
I_{rrm}	Reverse Recovery Current		T_J=25℃		16.2		A
			T_J=125℃		18.1		
			T_J=150℃		18.3		
dI_{rr}/dt	Peak Rate of Fall of Reverse Recovery Current during t_b		T_J=25℃		405		A/us
			T_J=125℃		384		
			T_J=150℃		400		
E_{rr}	Reverse Recovery Energy		T_J=25℃		0.43		mJ
			T_J=125℃		0.47		
			T_J=150℃		0.54		

Thermal Characteristics (T_C=25℃unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$R_{\Theta JC}$(IGBT)	Thermal Resistance: Junction-to-Case(each IGBT)				0.20	℃/W
$R_{\Theta JC}$(Diode)	Thermal Resistance: Junction-to-Case(each Diode)				0.48	℃/W
$R_{\Theta JA}$	Thermal Resistance: Junction-to-Ambient(typical socket mount)				40	℃/W

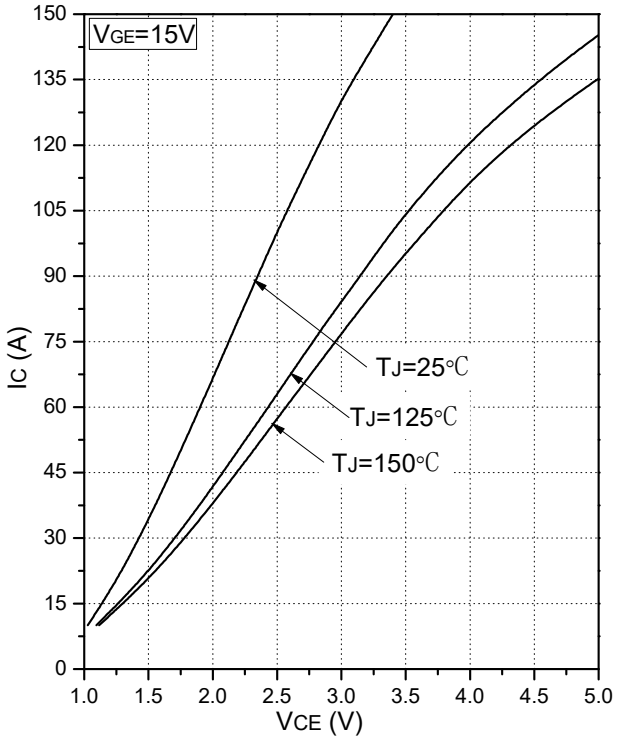


Fig.1 Typical Saturation Voltage Characteristics

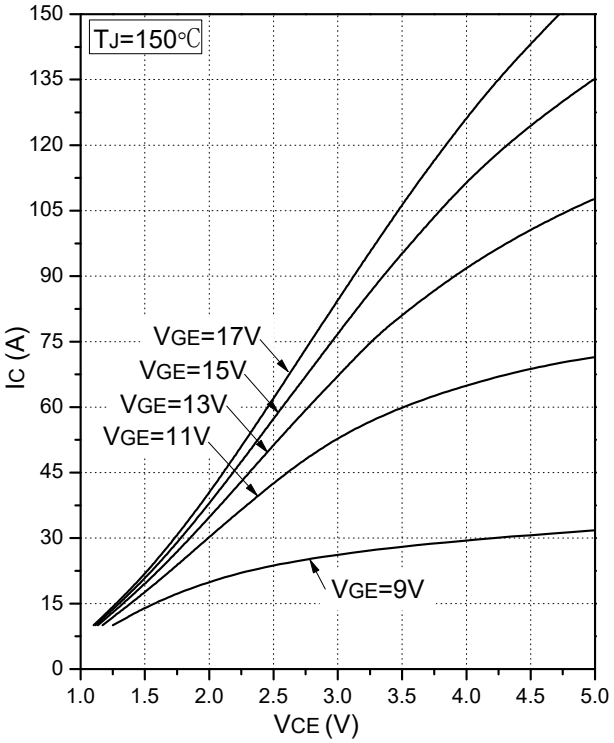


Fig.2 Typical Output Characteristics

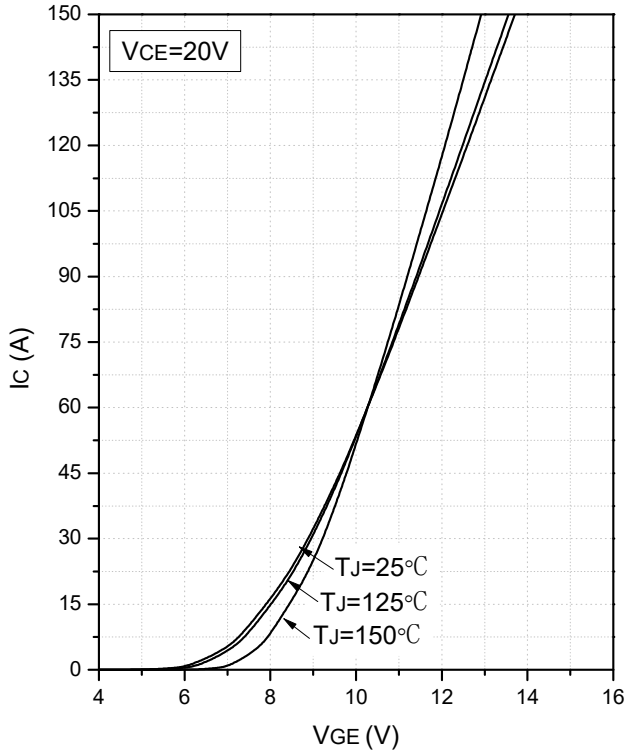


Fig.3 Transfer Characteristic

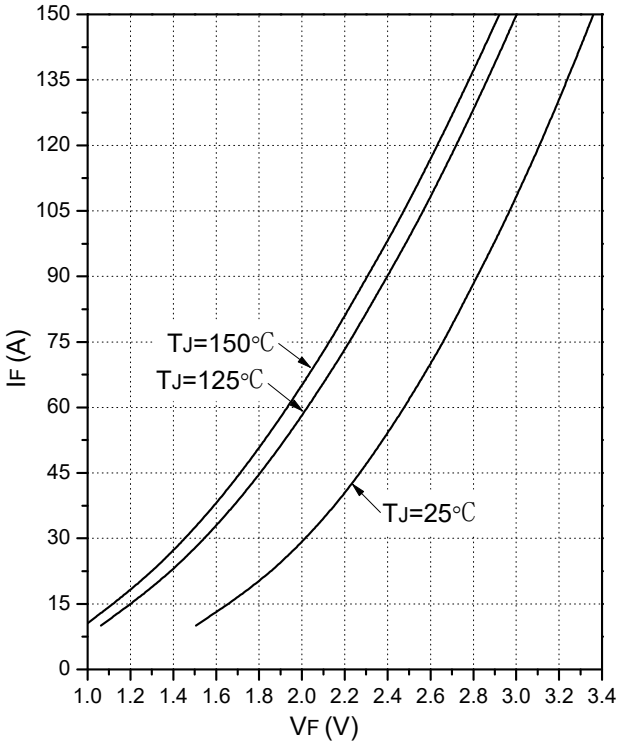


Fig.4 Forward Characteristics of Diode

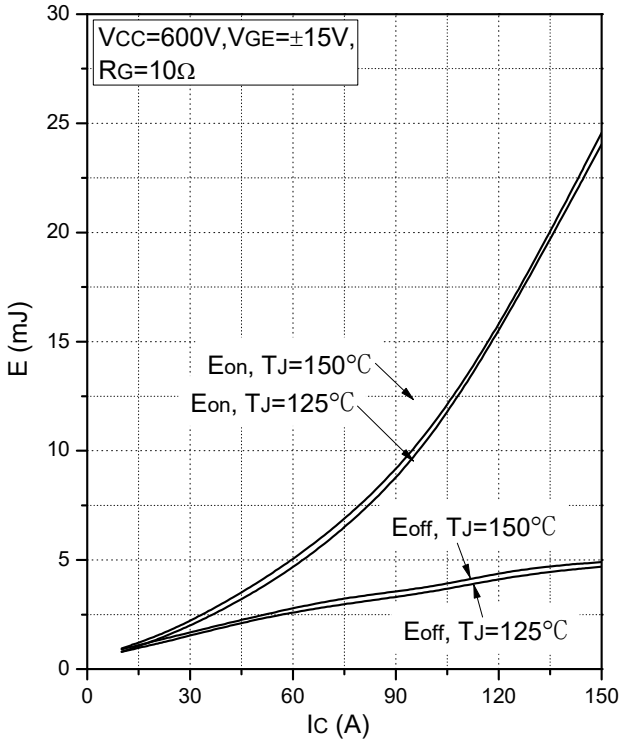


Fig.5 Typical Switching Loss vs. Collector Current

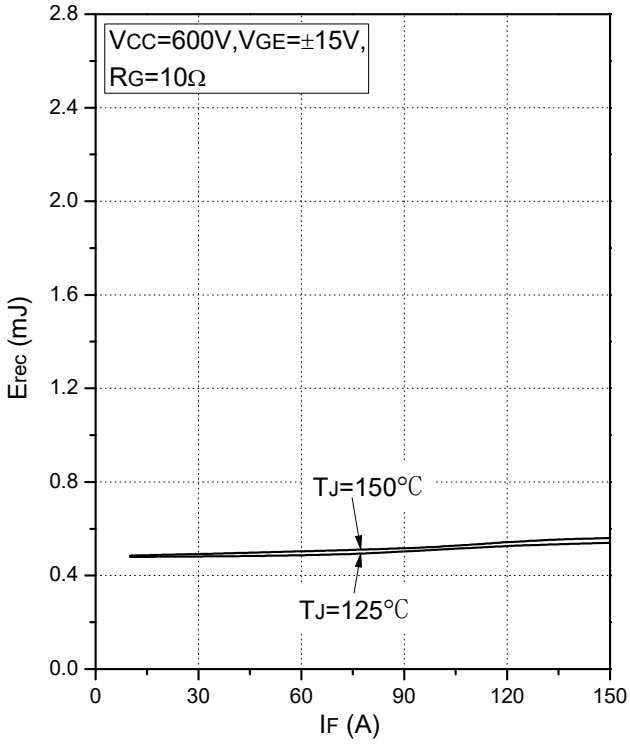


Fig.6 Typical Switching Loss vs. Forward Current

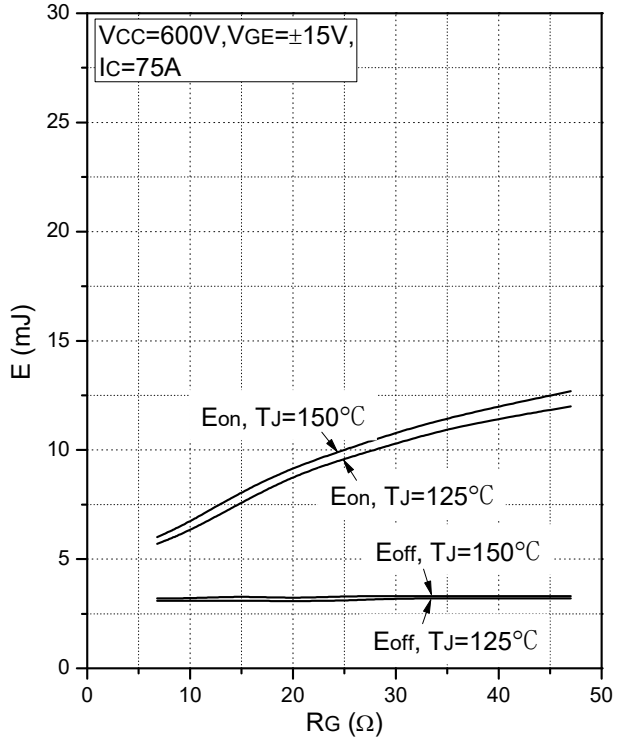


Fig.7 Typical Switching Loss vs. Gate Resistance

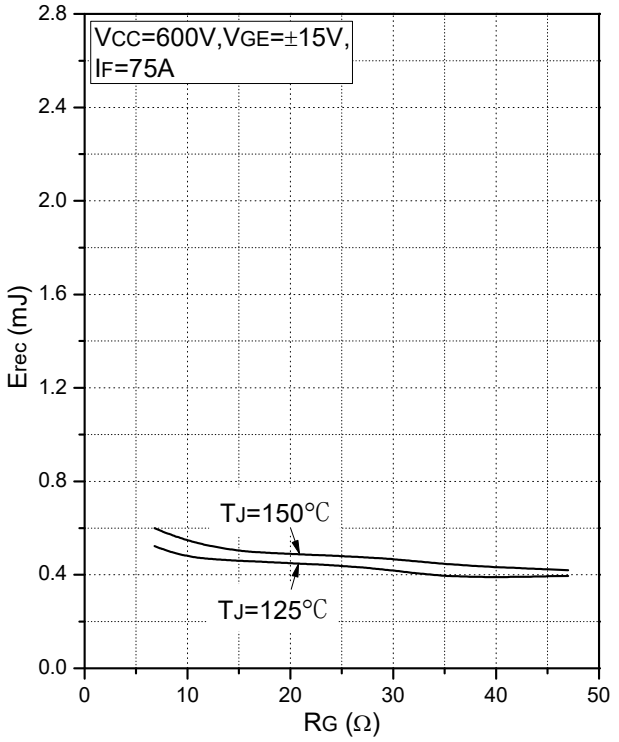


Fig.8 Typical Switching Loss vs. Gate Resistance

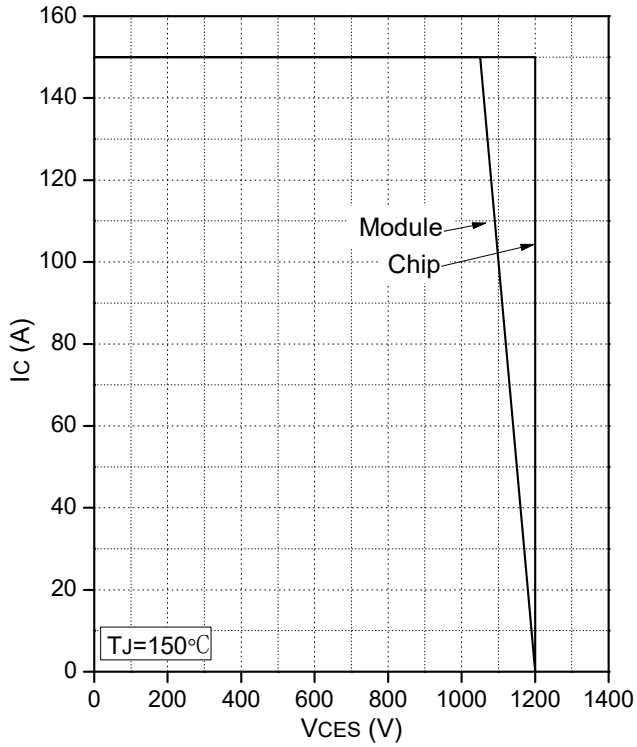
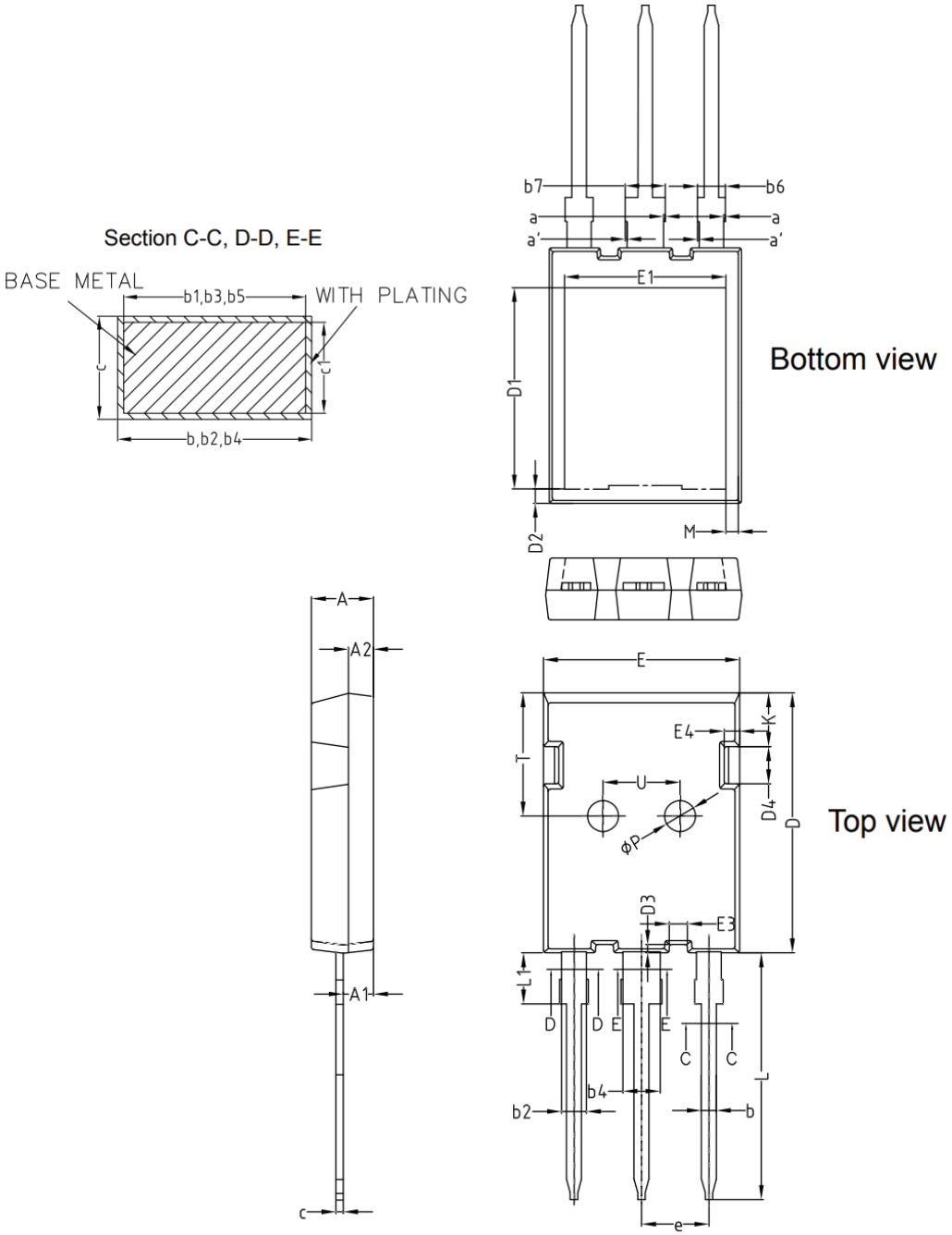


Fig.9 Reverse Bias Safe Operation Area (RBSOA)

Max247 Long Leads Package Outline (Unit: mm):



Max247 Long Leads Package Mechanical Data:

Dim	mm		
	Min.	Typ.	Max.
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0		0.15
a’	0		0.15
b	1.16		1.26
b1	1.15	1.20	1.22
b2	1.96		2.06
b3	1.95	2.00	2.02
b4	2.96		3.06
b5	2.95	3.00	3.02
b6			2.25
b7			3.25
c	0.59		0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
D3	0.58	0.68	0.78
D4	2.90	3.00	3.10
E	15.70	15.80	15.90
E1	13.10	13.26	13.50
E3	1.35	1.45	1.55
E4	1.14	1.24	1.34
e	5.34	5.44	5.54
K	4.25	4.35	4.45
L	19.80	19.92	20.10
L1	3.90		4.30
M	0.70		1.30
P	2.40	2.50	2.60
T	9.80		10.02
U	6.00		6.40