MMG75S170B

1700V 75A IGBT Module

July 2016 | Preliminary | RoHS Compliant

PRODUCT FEATURES

☐ High short circuit capability,self limiting short circuit current

☐ IGBT CHIP(Highly rugged SPT+ design)

☐ $V_{CE(sat)}$ with positive temperature coefficient

☐ Ultra Low Loss,High Ruggedness

☐ Free wheeling diodes with fast and soft reverse recovery

APPLICATIONS

☐ AC motor control

☐ Motion/servo control

☐ Inverter and power supplies

☐ Photovoltaic/Fuel cell

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS(T_C *=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	T_J=25℃	1700	V
V_{GES}	Gate Emitter Voltage		±20	
I_C	DC Collector Current	T_C=25℃,T_{Jmax}=175℃	113	A
		T_C=100℃,T_{Jmax}=175℃	75	
I_{CM}	Repetitive Peak Collector Current	tp=1ms	150	
P_{tot}	Power Dissipation Per IGBT	T_C=25℃,T_{Jmax}=175℃	535	W

Diode-inverter

ABSOLUTE MAXIMUM RATINGS (T_C *=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	T_J=25℃	1700	V
$I_{F(AV)}$	Average Forward Current		75	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	150	
I^2t		T_J =150℃, t=10ms, V_R=0V	1350	A^2S

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IGBT-inverter

ELECTRICAL CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}$, I_C=3mA		5.4	6.2	7.4	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	I_C=75A, V_{GE}=15V, T_J=25℃			2.4	2.75	
		I_C=75A, V_{GE}=15V, T_J=150℃			2.8		
I_{CES}	Collector Leakage Current	V_{CE}=1700V, V_{GE}=0V, T_J=25℃				0.5	mA
		V_{CE}=1700V, V_{GE}=0V, T_J=150℃				5	mA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=±15V, T_J=25℃		-500		500	nA
R_{gint}	Integrated Gate Resistor				7.5		Ω
Q_g	Gate Charge	V_{CE}=900V, I_C=75A , V_{GE}=±15V			0.61		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz			5.4		nF
C_{res}	Reverse Transfer Capacitance				0.2		nF
$t_{d(on)}$	Turn on Delay Time	V_{CC}=900V,I_C=75A R_G =7.5Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		140		ns
			T_J=150℃		170		ns
t_r	Rise Time		T_J=25℃		80		ns
			T_J=150℃		90		ns
$t_{d(off)}$	Turn off Delay Time	V_{CC}=900V,I_C=75A R_G =7.5Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		360		ns
			T_J=150℃		420		ns
t_f	Fall Time		T_J=25℃		180		ns
			T_J=150℃		300		ns
E_{on}	Turn on Energy	V_{CC}=900V,I_C=75A R_G =7.5Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		21.5		mJ
			T_J=125℃		26		mJ
			T_J=150℃		27.5		mJ
E_{off}	Turn off Energy		T_J=25℃		12.5		mJ
			T_J=125℃		17		mJ
			T_J=150℃		18.5		mJ
I_{SC}	Short Circuit Current	tpsc≤10μS , V_{GE}=15V T_J=150℃,V_{CC}=1000V			250		A
R_{thJC}	Junction to Case Thermal Resistance （Per IGBT）					0.28	K /W

Diode-inverter

ELECTRICAL CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=75A , V_{GE}=0V, T_J=25℃		1.8	2.25	V
		I_F=75A , V_{GE}=0V, T_J=150℃		1.9		
t_{rr}	Reverse Recovery Time	I_F=75A , V_R=900V dI_F/dt=-1100A/μs T_J =150℃		720		ns
I_{RRM}	Max. Reverse Recovery Current			75		A
Q_{RR}	Reverse Recovery Charge			34		μC
E_{rec}	Reverse Recovery Energy			20		mJ
R_{thJCD}	Junction to Case Thermal Resistance （Per Diode）				0.48	K /W

MODULE CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	℃
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	4000	V
CTI	Comparative Tracking Index		＞200	
Torque	to heatsink	Recommended（M6）	3~5	Nm
	to terminal	Recommended（M5）	2.5~5	Nm
Weight			160	g

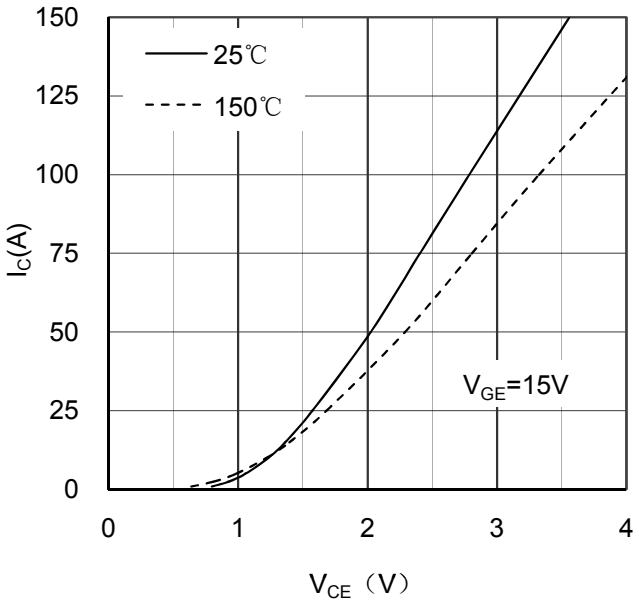


Figure 1. Typical Output Characteristics IGBT-inverter

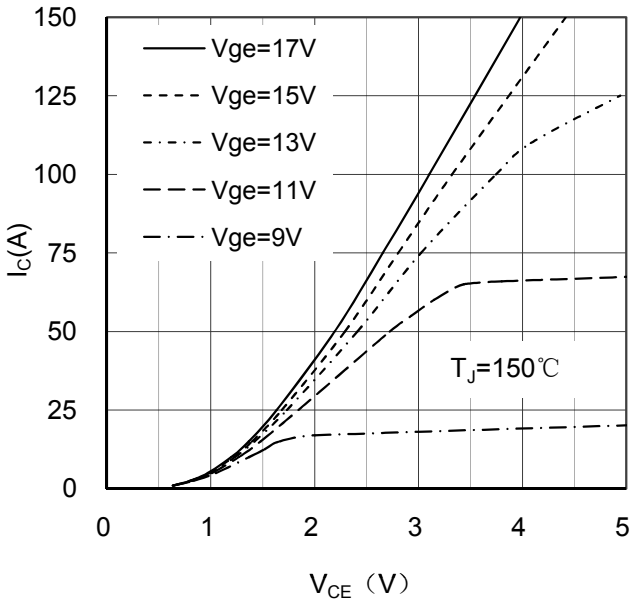


Figure 2. Typical Output Characteristics IGBT-inverter

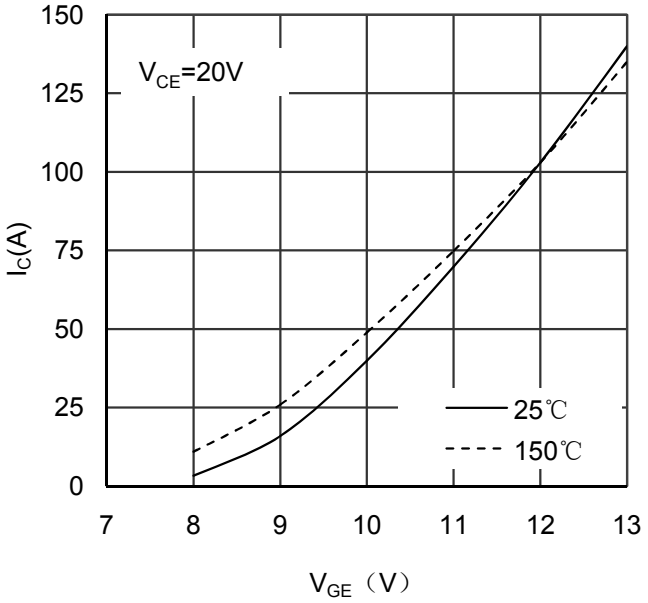


Figure 3. Typical Transfer characteristics IGBT-inverter

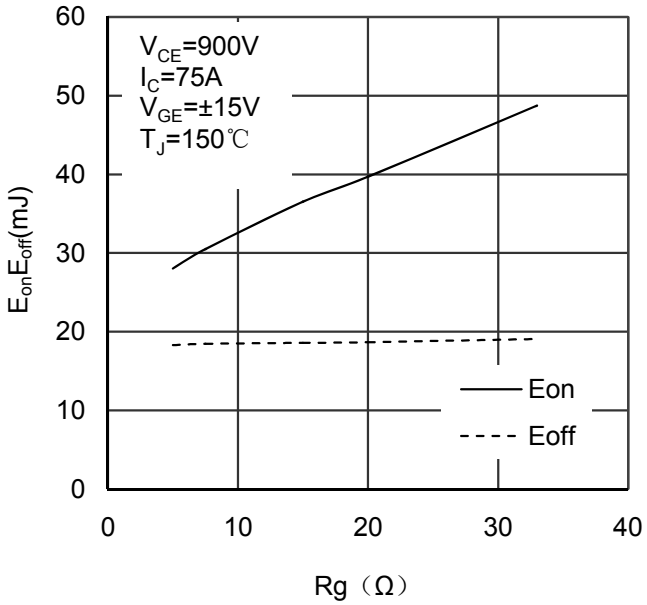


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

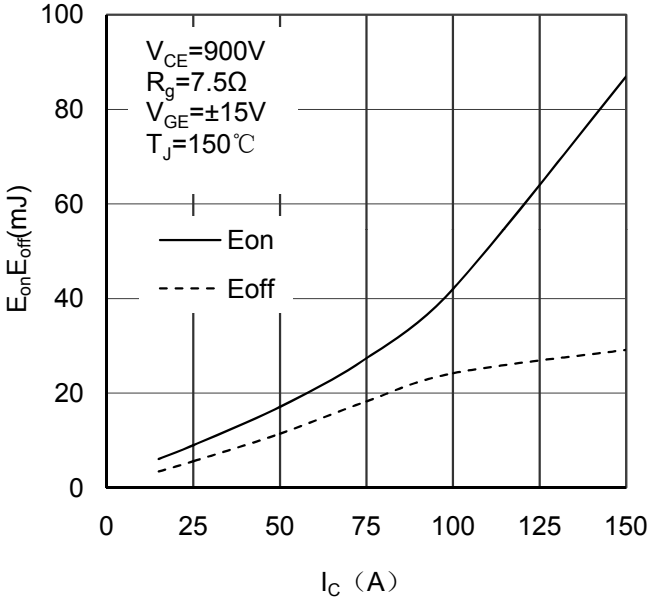


Figure 5. Switching Energy vs Collector Current IGBT-inverter

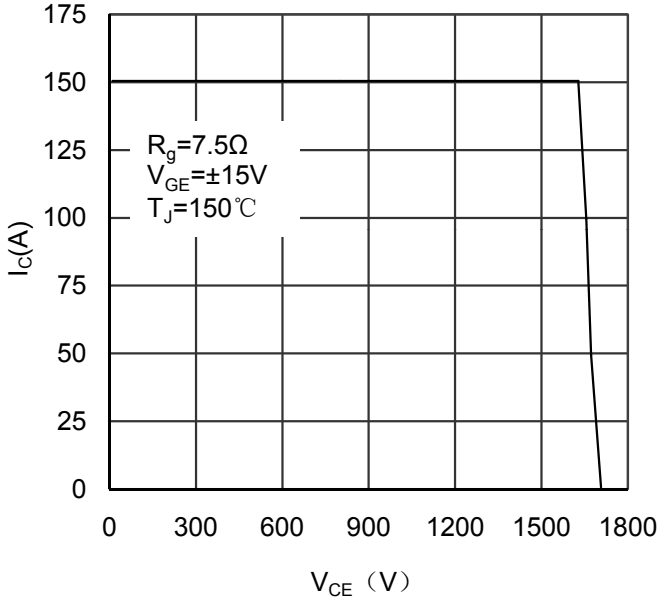


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

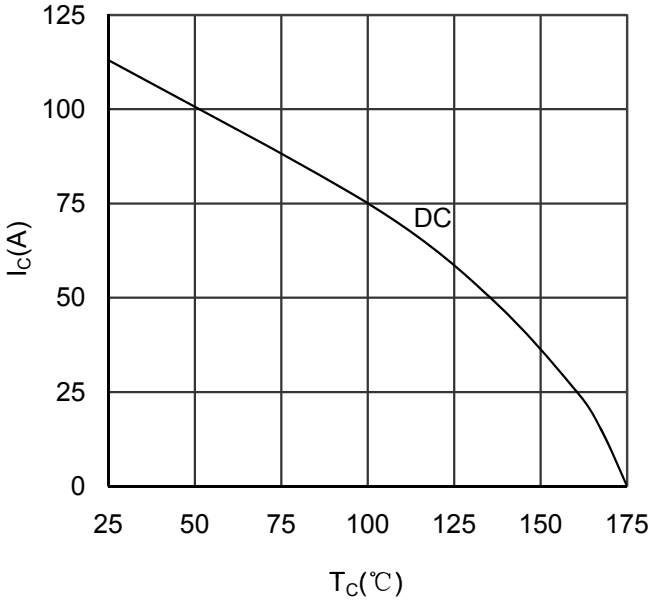


Figure 7. Collector Current vs Case temperature IGBT -inverter

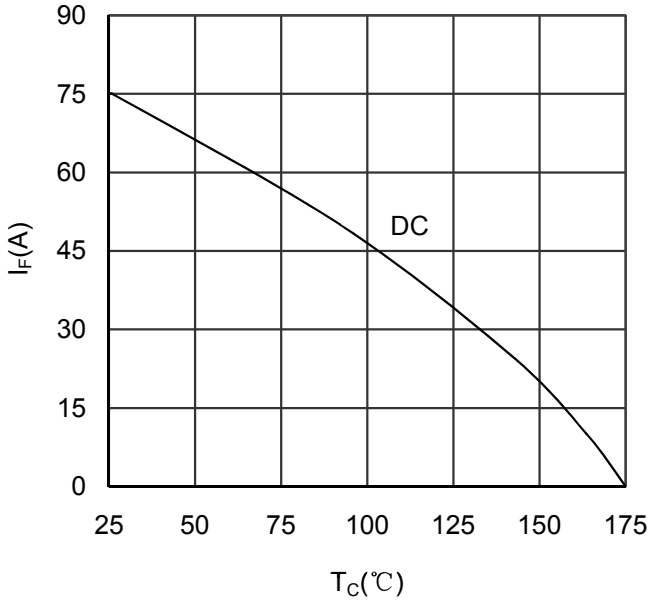


Figure 8. Forward current vs Case temperature Diode -inverter

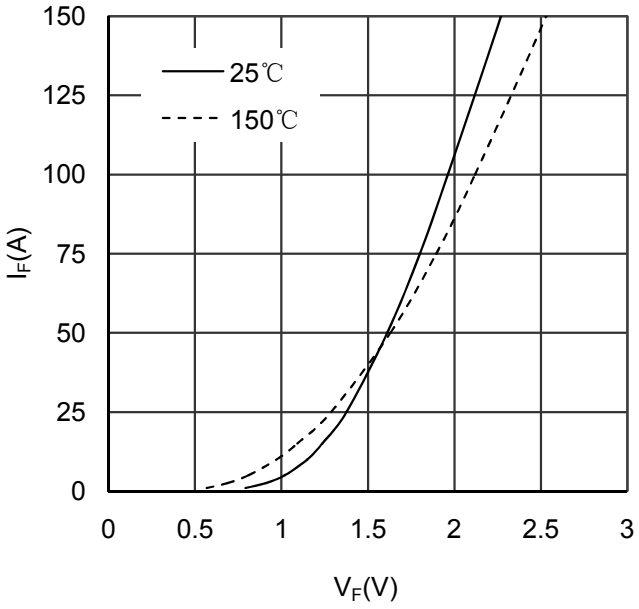


Figure 9. Diode Forward Characteristics Diode -inverter

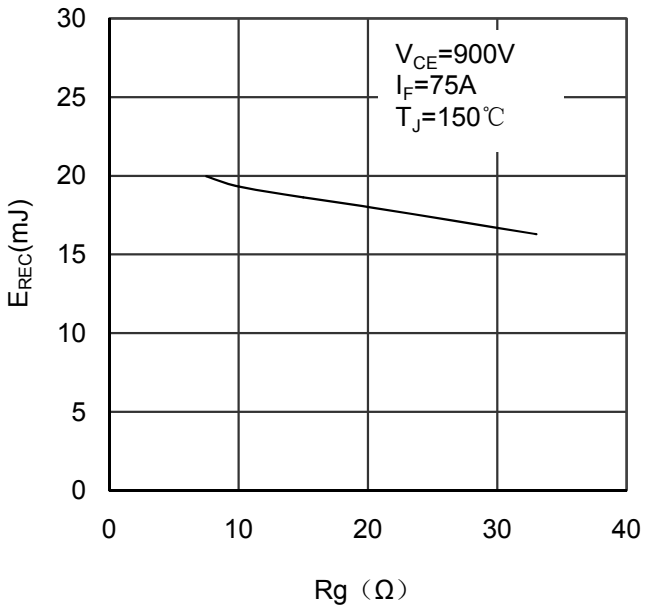


Figure 10. Switching Energy vs Gate Resistor Diode -inverter

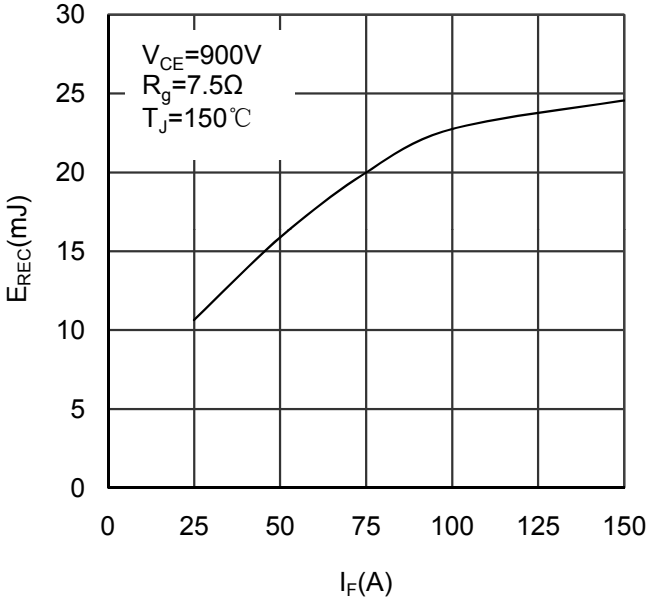


Figure 11. Switching Energy vs Forward Current Diode-inverter

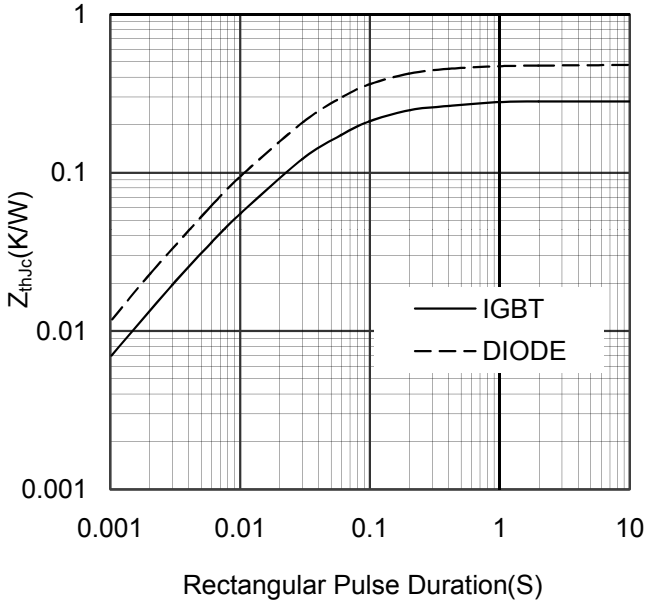


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

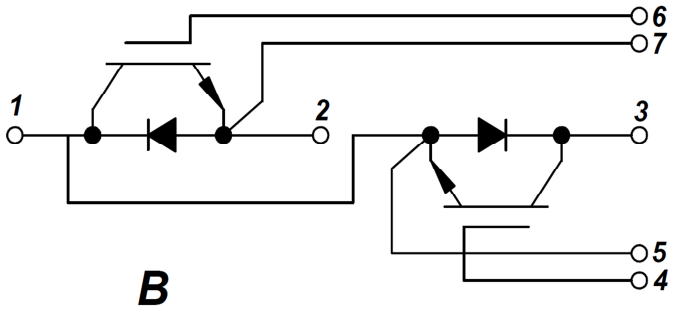
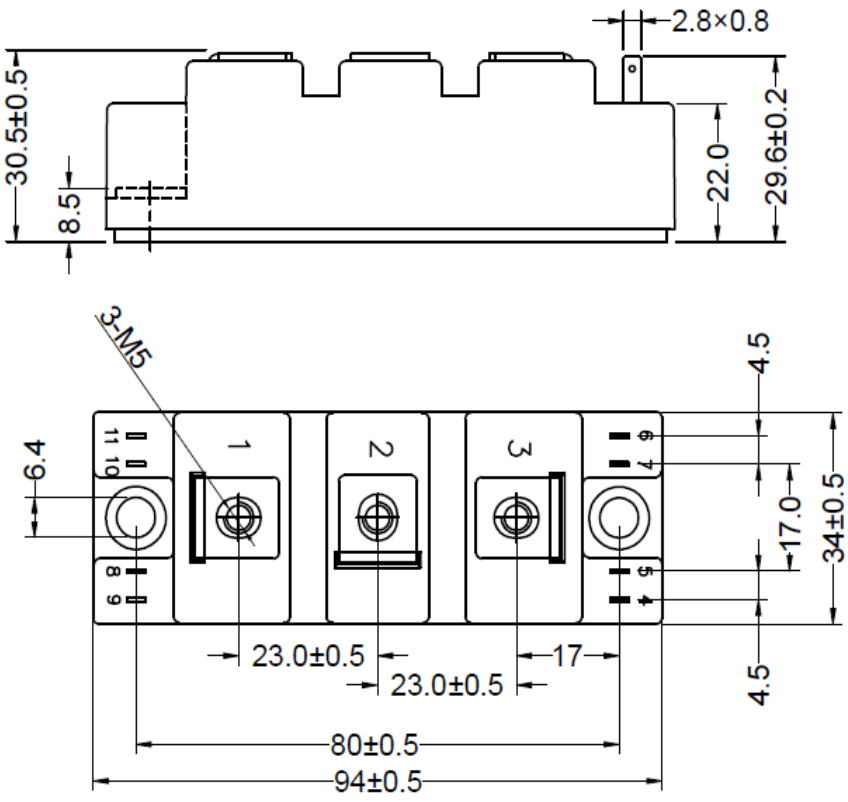


Figure 13. Circuit Diagram



Dimensions in (mm)

Figure 14. Package Outline