



DESCRIPTION

The AM40T120TLF is available in TO-247 Package.

V _{CES}	I _C	V _{CE}	P _D
1200V	40A	1.9V	681W

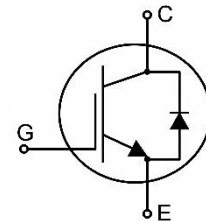
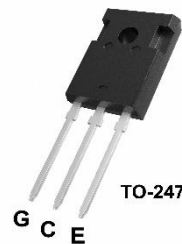
FEATURE

- Trench and field-stop technology
- High speed switching
- Low collector to emitter saturation voltage
- Easy parallel switching capability
- High ruggedness performance

APPLICATION

- Welding machines
- UPS Solar
- Inverters

PIN DESCRIPTION



ORDERING INFORMATION

Package Type	Part Number	
TO-247 SPQ: 30pcs/Tube	TL3F	AM40T120TL3FU
		AM40T120TL3FVU
Note	V: Halogen free Package U: Tube	
AiT provides all RoHS products		

Pin#	Symbol	Function
1	G	Gate
2	C	Collector
3	E	Emitter



ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CES}	1200	V
Gate-Emitter Voltage	V _{GES}	±20	V
Continuous Collector Current	I _C	80	A
Continuous Collector Current T _C = 100 °C		40	A
Pulsed Collector Current, tp limited by Tvjmax	I _{CM}	160	A
Diode continuous forward current T _C = 100 °C	I _F	40	A
Diode maximum current, tp limited by Tvjmax	I _{FM}	160	A
Power Dissipation	P _D	681	W
Operating Junction Temperature Range	T _{VJ}	-40 to 175	°C
Storage Temperature Range	T _{STG}	-55 to 150	

THERMAL CHARACTERISTICS

Parameter	Symbol	Value		Unit
		Typ	Max.	
Thermal Resistance, Junction to Case for IGBT	R _{th(j-c)}	-	0.22	K/W
Thermal Resistance, Junction to case for Diode	R _{th(j-c)}	-	0.48	K/W
Thermal Resistance, Junction to Ambient	R _{th(j-a)}	-	40	K/W

Note: Pulse test: 300 us pulse width, 2 % duty cycle

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**ELECTRICAL CHARACTERISTICS**T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	B _{VCE}	V _{GE} =0V, I _C =250uA	1200	-	-	V
Collector-Emitter Leakage Current	I _{CES}	V _{CE} =1200V, V _{GE} =0V	-	-	100	μA
Gate Leakage Current, Forward	I _{GES}	V _{GE} =±20V, V _{CE} =0V	-	-	±100	nA
Gate-Emitter Threshold Voltage	V _{GE(TH)}	V _{GE} =V _{CE} , I _C =1mA	5	6	7	V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	V _{GE} =15 V, I _C =40A	-	1.9	-	V
		V _{GE} =15V, I _C =40A, Tvj=175°C	-	2.2	-	V
Dynamic Characteristics						
Input Capacitance	C _{ies}	V _{CE} =30V, V _{GE} =0V, f=1MHz	-	9900	-	pF
Output Capacitance	C _{oes}		-	189	-	
Reverse Transfer Capacitance	C _{res}		-	40	-	
Total gate charge	Q _g	V _{CC} =960V, V _{GE} =15V, I _C =40A	-	263	-	nC
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{CC} =600V, V _{GE} =0/15V, I _C =40A, R _G =10Ω	-	85	-	ns
Rise Time	t _r		-	76	-	
Turn-Off Delay Time	t _{d(off)}		-	307	-	
Fall Time	t _f		-	69	-	
Turn-on Energy	E _{on}	Inductive load	-	2.5	-	mJ
Turn-off Energy	E _{off}		-	1.4	-	
Total Switching Energy	E _{ts}		-	3.9	-	
Turn-on Delay Time	t _{d(on)}	V _{CC} =600V, V _{GE} =0/15V, I _C =40A, R _G =10Ω	-	76	-	ns
Rise Time	t _r		-	75	-	
Turn-Off Delay Time	t _{d(off)}		-	360	-	
Fall Time	t _f		-	149	-	
Turn-on Energy	E _{on}	Inductive load, Tvj=175°C	-	2.9	-	mJ
Turn-off Energy	E _{off}		-	2.6	-	
Total Switching Energy	E _{ts}		-	5.5	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V _F	I _F =40A	-	2	-	V
		I _F =40A, Tvj=175°C	-	1.6	-	V
Diode Reverse Recovery Time	T _{rr}	V _R =600V, I _F =40A, diF/dt =-750A/us	-	175	-	ns
Diode peak reverse recovery current	I _{rrm}		-	24	-	A
Diode reverse recovery charge	Q _{rr}		-	2000	-	nC
Diode Reverse Recovery Time	T _{rr}	V _R =600V, I _F =40A, diF/dt =-750A/us, Tvj=175°C	-	285	-	ns
Diode peak reverse recovery current	I _{rrm}		-	37	-	A
Diode reverse recovery charge	Q _{rr}		-	5500	-	nC



TYPICAL PERFORMANCE CHARACTERISTICS

Fig1. Typical Output Characteristic ($T_{vj}=25^{\circ}\text{C}$)

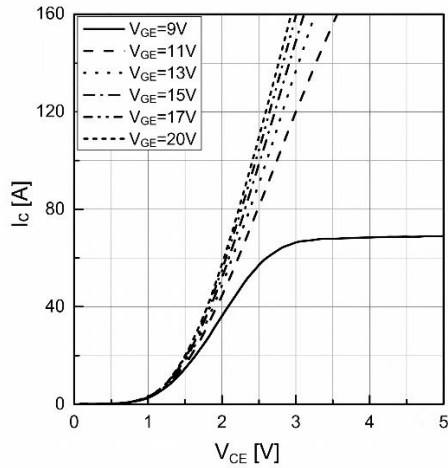


Fig 2. Typical Output Characteristic ($T_{vj}=175^{\circ}\text{C}$)

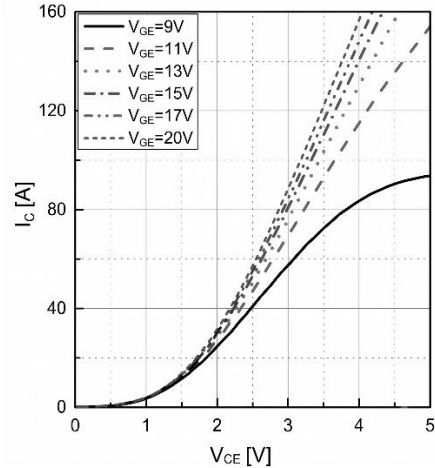


Fig 3. Power dissipation as a function of T_c

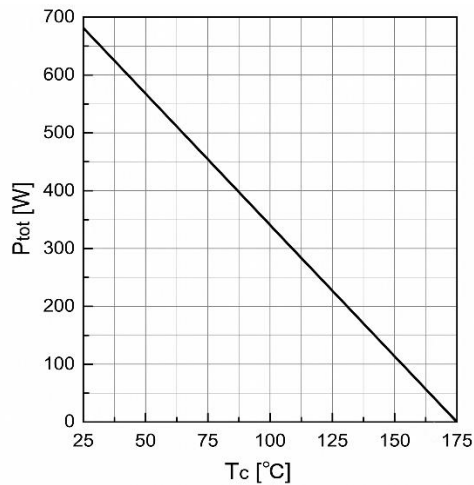


Fig 4. Typical Gate Charge

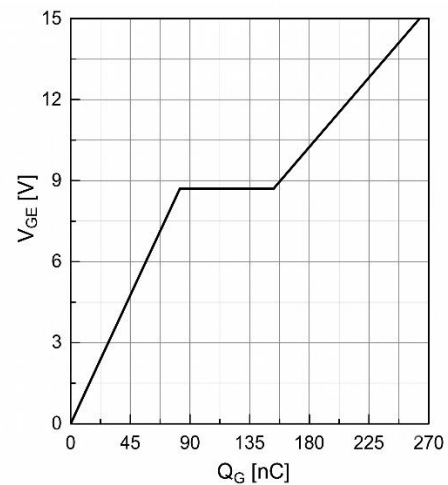


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} ($I_c=1\text{mA}$)

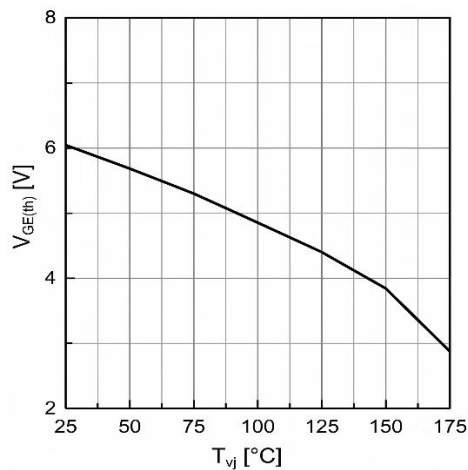


Fig 6. Typical V_F as a function of T_{vj}

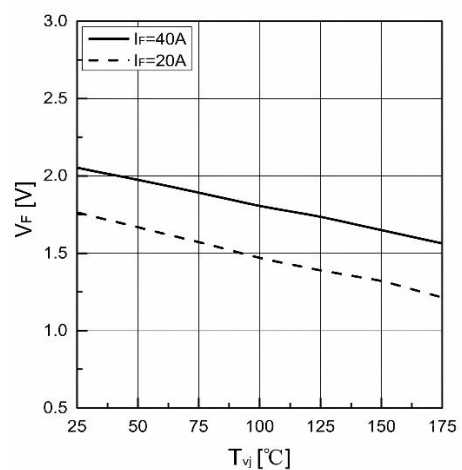




Fig 7. Typical V_{CEsat} as a function of T_{vj}

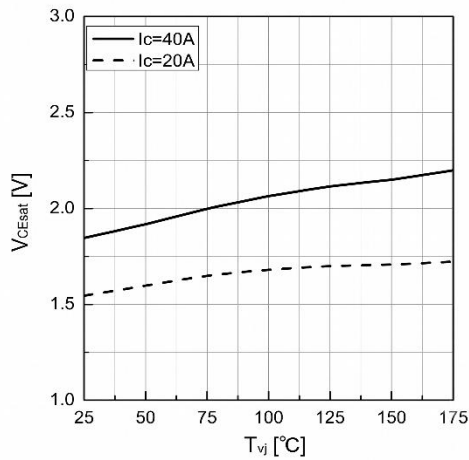


Fig 8. Typical I_F as a function of V_F

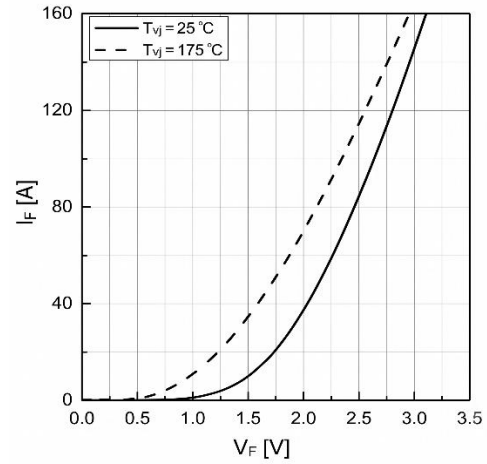


Fig 9. Typical switching time as a function of I_c

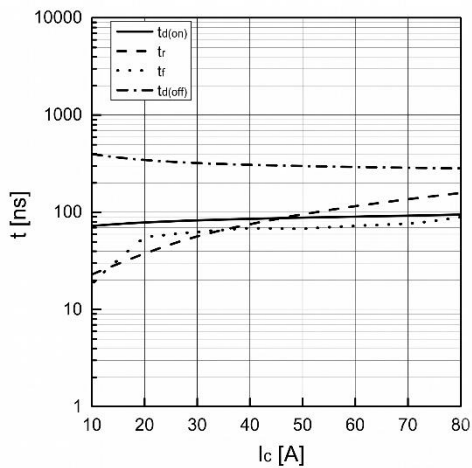


Fig 10. Typical switching times as a function of R_G

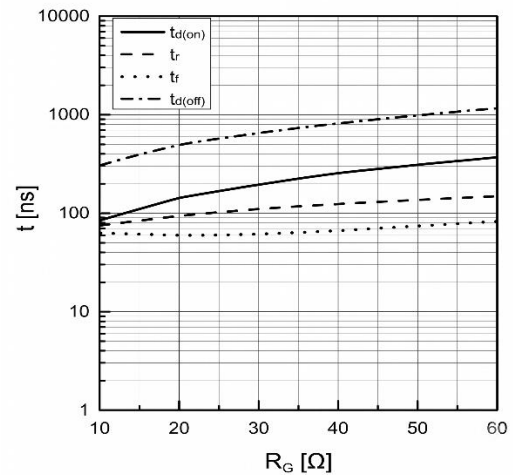


Fig 11. Typical switching energy losses as a function of I_c

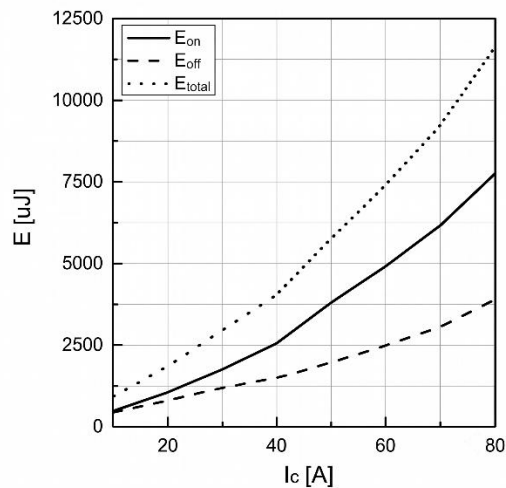


Fig 12. Typical switching energy losses as a function of R_G

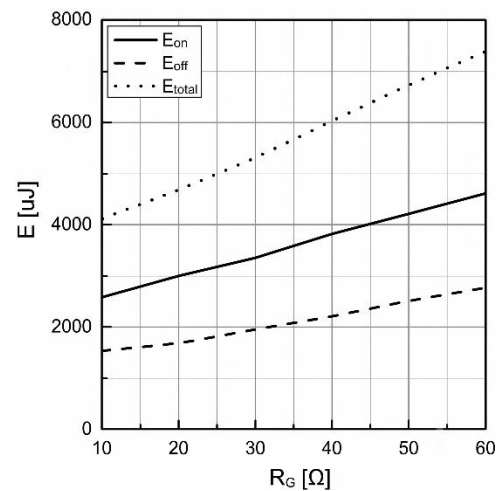




Fig 13. Typical Output Characteristic (Tvj=25°C)

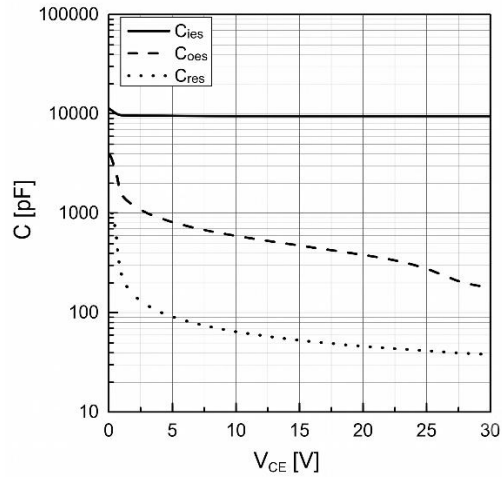


Fig 14. Typical Output Characteristic (Tvj=175°C)

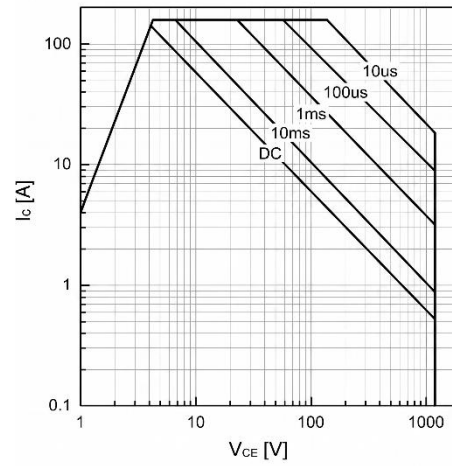
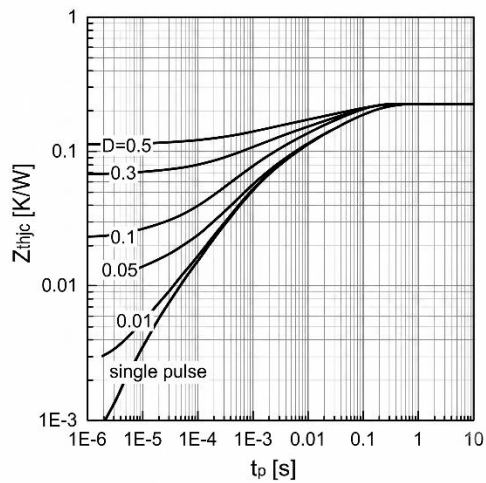


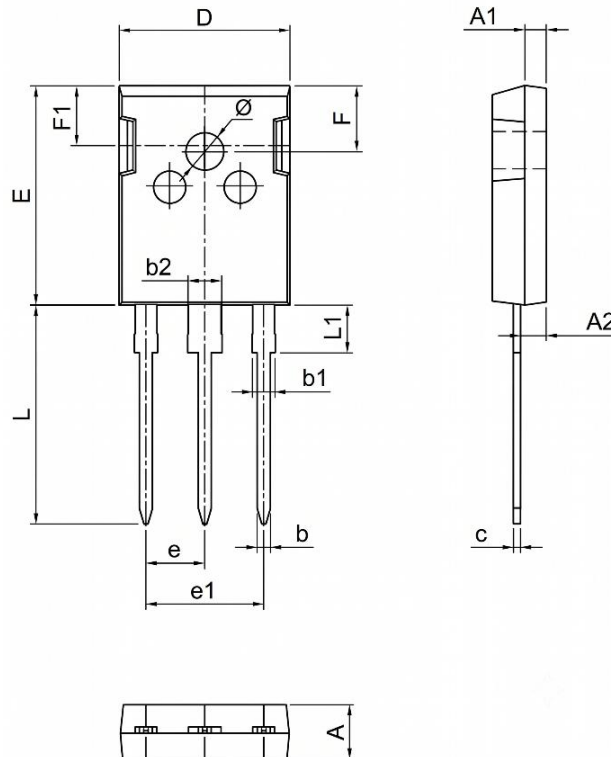
Fig 15. Power dissipation as a function of Tc





PACKAGE INFORMATION

Dimension in TO-247 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	4.90	5.10
A1	1.90	2.10
A2	2.29	2.54
Bb	1.00	1.40
b1	2.00	2.20
Bb2	3.00	3.20
Cc	0.50	0.70
D	15.75	16.05
E	20.20	20.80
Ee	5.45 BSC	
Ee1	10.90 BSC	
F	6.05	6.25
F1	5.80	6.00
L	20.10	20.40
L1	4.05	4.35
Φ	3.50	3.70



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