



### DESCRIPTION

The AM50T65 is available in TO-247 Package.

V <sub>CES</sub>	I <sub>C</sub>	V <sub>CE</sub>	P <sub>D</sub>
650V	75A	1.58V	275W

### FEATURE

- 650V grooved gate/field termination process
- Low switching loss
- Positive temperature coefficient.

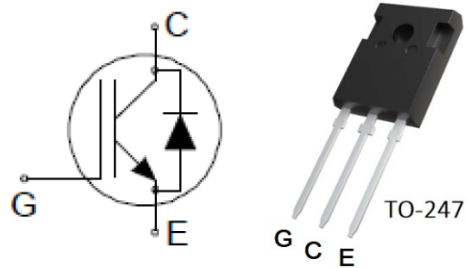
### APPLICATIONS

- Charging Pile
- OBC
- UPS
- Inverter

### ORDERING INFORMATION

Package Type	Part Number	
TO-247 SPQ: 25pcs/ Tube	TL3F	AM50T65TL3FU
		AM750T65TL3FVU
Note	U: Tube V: Halogen free Package	
AiT provides all RoHS products		

### PIN DESCRIPTION



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

**ABSOLUTE MAXIMUM RATINGS****IGBT**

Parameter		Symbol	Value	Unit
Collector-Emitter Voltage	$T_{vj}=25^{\circ}\text{C}$	$V_{CES}$	650	V
Continuous DC Collector Current	$T_C=100^{\circ}\text{C}$ $T_{vj\max}=175^{\circ}\text{C}$	$I_{CNOM}$	50	A
Repetitive Peak Collector Current	$t_P=1\text{ ms}$	$I_{CRM}$	100	A
Gate Charge	$V_{GE}=-15\text{V}\sim+15\text{V}$	QG	0.50	$\mu\text{C}$
Total Power Dissipation	$T_C=25^{\circ}\text{C}$ $T_{vj\max}=175^{\circ}\text{C}$	$P_{TOT}$	275	W
Gate Emitter Voltage		$V_{GE}$	$\pm 20$	V

**Diode**

Parameter		Symbol	Value	Unit
Repetitive Peak Reverse Voltage	$T_{vj}=25^{\circ}\text{C}$	$V_{RRM}$	650	V
Continuous DC Forward Current	$T_C=100^{\circ}\text{C}$ $T_{vj\max}=175^{\circ}\text{C}$	$I_F$	50	A
Repetitive Peak Forward Current	$t_P=1\text{ ms}$	$I_{FRM}$	100	A

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**

**IGBT**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Collector-Emitter Saturation Voltage	$V_{CEsat}$	$V_{GE}=15V, I_C=50A, T_{vj}=25^{\circ}C$	-	1.58	2.10	V	
		$V_{GE}=15V, I_C=50A, T_{vj}=125^{\circ}C$	-	1.87	-		
		$V_{GE}=15V, I_C=50A, T_{vj}=150^{\circ}C$	-	1.95	-		
Gate-Emitter Threshold Voltage	$V_{GE(TH)}$	$V_{GE}=V_{CE}, I_C=0.50mA, T_{vj}=25^{\circ}C$	4.2	5.0	5.8	V	
Transconductance	$G_{FS}$	$V_{CE}=20V, I_C=50A$	-	77	-	S	
Input Capacitance	$C_{IES}$	$f=1\text{ MHz}, V_{CE}=25V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	5.46	-	nF	
Reverse Transfer Capacitance	$C_{RES}$		-	0.10	-		
Collector-Emitter Cut-Off Current	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	1	mA	
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	200	nA	
Turn-on Delay Time	$t_{d(on)}$	$I_C=50A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	33	-	ns
			$T_{vj}=125^{\circ}C$	-	21	-	
			$T_{vj}=150^{\circ}C$	-	19	-	
Rise Time	$t_r$	$I_C=75A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	75	-	ns
			$T_{vj}=125^{\circ}C$	-	67	-	
			$T_{vj}=150^{\circ}C$	-	65	-	
Turn-off Delay Time	$t_{d(off)}$	$I_C=75A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	32	-	ns
			$T_{vj}=125^{\circ}C$	-	32	-	
			$T_{vj}=150^{\circ}C$	-	38	-	
Fall Time	$t_f$	$I_C=75A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	41	-	ns
			$T_{vj}=125^{\circ}C$	-	62	-	
			$T_{vj}=150^{\circ}C$	-	62	-	
Turn-On Energy Loss Per Pulse	$E_{ON}$	$I_C=75A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	2.37	-	mJ
			$T_{vj}=125^{\circ}C$	-	2.88	-	
			$T_{vj}=150^{\circ}C$	-	3.10	-	
Turn-Off Energy Loss Per Pulse	$E_{OFF}$	$I_C=75A, V_{CE}=400V, V_{GE}=\pm 15V, R_G=8\Omega$ (Inductive load)	$T_{vj}=25^{\circ}C$	-	0.60	-	mJ
			$T_{vj}=125^{\circ}C$	-	0.73	-	
			$T_{vj}=150^{\circ}C$	-	0.76	-	
IGBT Thermal Resistance, Junction	$R_{thJC}$		-	0.38	-	K/W	
Temperature Under Switching Conditions	$R_{vjop}$		-40	-	175	$^{\circ}C$	



**Diode**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =50A, V <sub>GE</sub> =0V, T <sub>vj</sub> =25°C	-	1.63	2.10	V	
		I <sub>F</sub> =50A, V <sub>GE</sub> =0V, T <sub>vj</sub> =125°C	-	1.42	-		
		I <sub>F</sub> =50A, V <sub>GE</sub> =0V, T <sub>vj</sub> =150°C	-	1.37	-		
Peak Reverse Recovery Current	I <sub>RM</sub>	I <sub>F</sub> =50A, -di <sub>F</sub> /dt=411A/μs(T <sub>vj</sub> =150°C) V <sub>R</sub> =400V, V <sub>GE</sub> =-15V	T <sub>vj</sub> =25°C	-	21	-	A
		T <sub>vj</sub> =125°C	-	29	-		
		T <sub>vj</sub> =150°C	-	32	-		
Reverse Recovered Charge	Q <sub>rr</sub>	I <sub>F</sub> =50A, -di <sub>F</sub> /dt=411A/μs(T <sub>vj</sub> =150°C) V <sub>R</sub> =400V, V <sub>GE</sub> =-15V	T <sub>vj</sub> =25°C	-	1.48	-	μC
		T <sub>vj</sub> =125°C	-	3.26	-		
		T <sub>vj</sub> =150°C	-	3.95	-		
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =50A, -di <sub>F</sub> /dt=411A/μs(T <sub>vj</sub> =150°C) V <sub>R</sub> =400V, V <sub>GE</sub> =-15V	T <sub>vj</sub> =25°C	-	133	-	ns
		T <sub>vj</sub> =125°C	-	199	-		
		T <sub>vj</sub> =150°C	-	218	-		
Reverse Recovered Energy	E <sub>rec</sub>	I <sub>F</sub> =50A, -di <sub>F</sub> /dt=411A/μs(T <sub>vj</sub> =150°C) V <sub>R</sub> =400V, V <sub>GE</sub> =-15V	T <sub>vj</sub> =25°C	-	0.34	-	mJ
		T <sub>vj</sub> =125°C	-	0.66	-		
		T <sub>vj</sub> =150°C	-	0.78	-		
Diode Thermal Resistance Junction	R <sub>thJC</sub>		-	0.45	-	K/W	
Temperature Under Switching Conditions	R <sub>vjop</sub>		-40	-	175	°C	



## TYPICAL PERFORMANCE CHARACTERISTICS

Fig.1 Typical output characteristics ( $V_{GE}=15V$ )

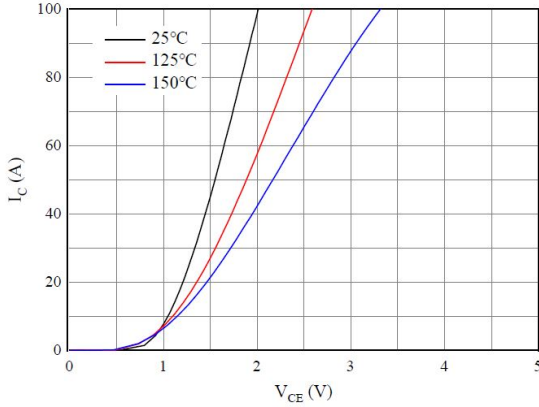


Fig.2 Typical output characteristics ( $T_{vj}=150^\circ C$ )

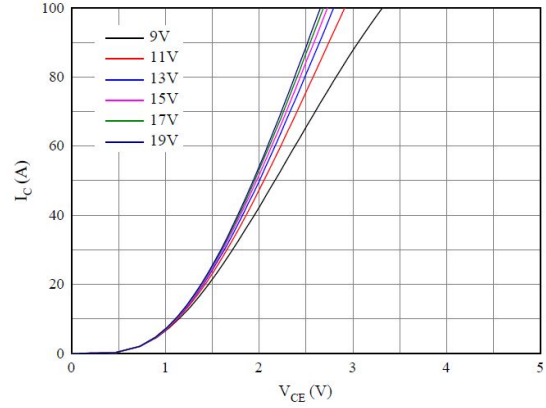


Fig.3 Typical transfer characteristic ( $V_{CE}=20V$ )

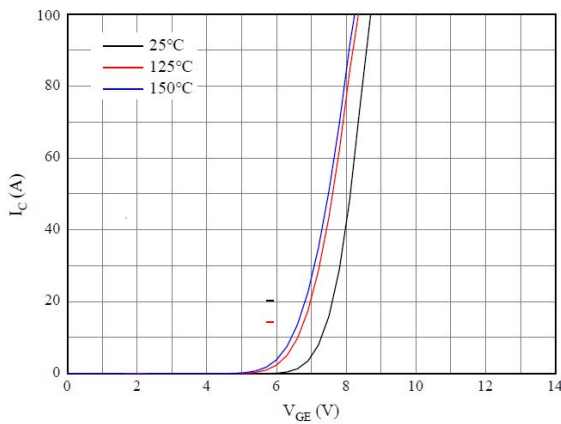


Fig.4 Forward characteristic of Diode

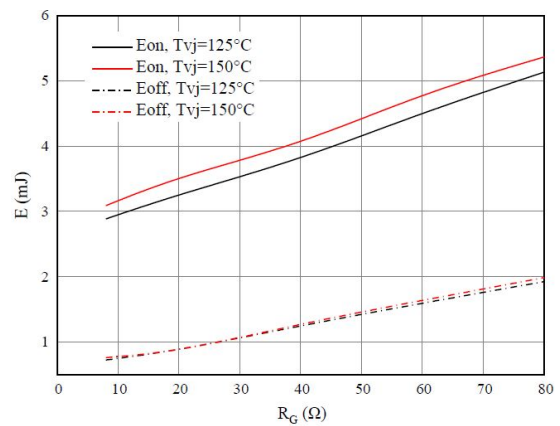


Fig.5 Switching losses of IGBT

$V_{GE}=\pm 15V$ ,  $R_{Gon}=8\Omega$ ,  $R_{Goff}=8\Omega$ ,  $V_{CE}=400V$

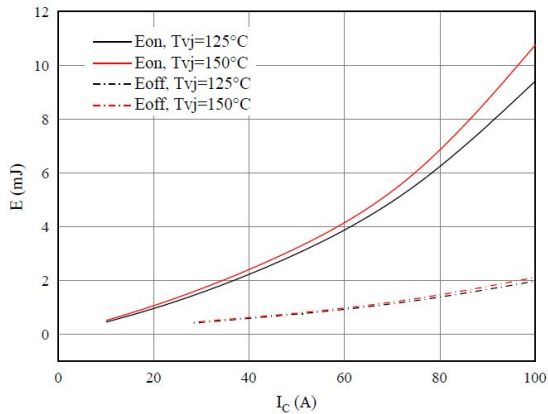


Fig.6 Switching losses of IGBT

$V_{GE}=\pm 15V$ ,  $I_C=50A$ ,  $V_{CE}=400V$

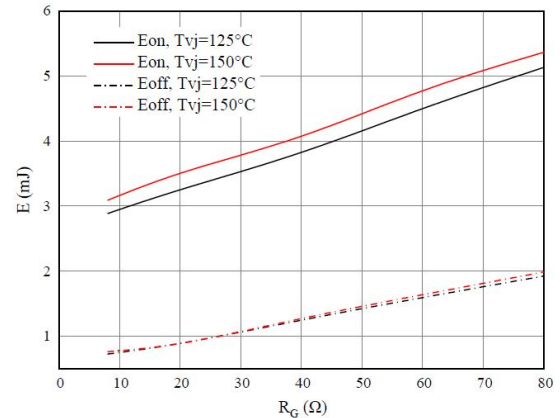




Fig.7 Switching losses of Diode  
 $R_{Gon}=8\Omega, V_{CE}=400V$

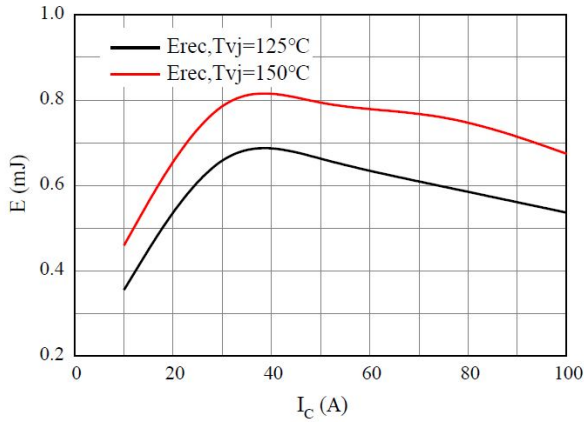


Fig.8 Switching losses of Diode  
 $I_F=50A, V_{CE}=400V$

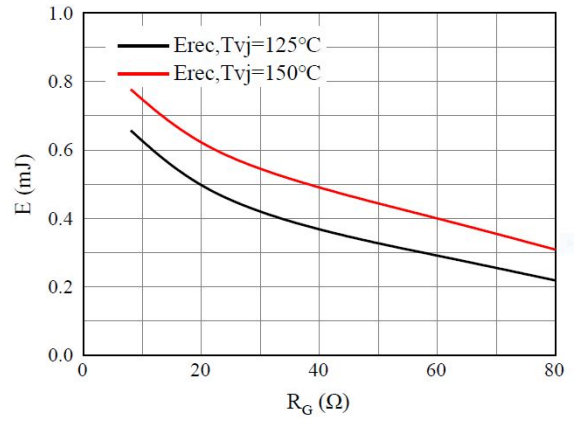
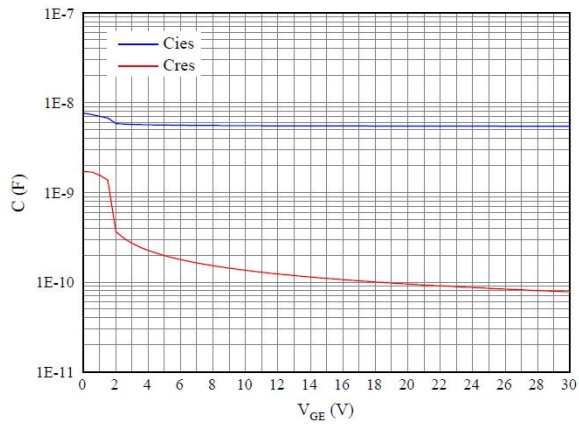


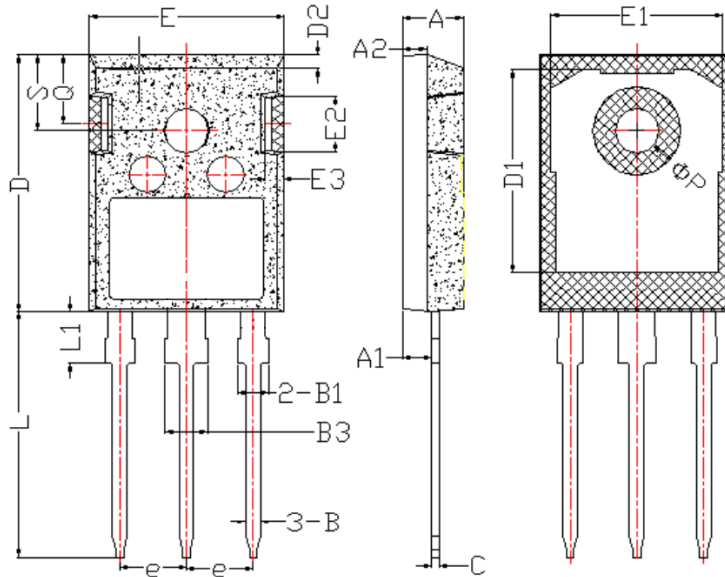
Fig.9 Capacitance characteristic





**PACKAGE INFORMATION**

Dimension in TO-247 (Unit: mm)



Symbol	Min.	Max.
A	4.900	5.100
A1	2.310	5.510
A2	1.900	2.100
B	1.150	1.250
B1	1.950	2.250
B3	2.950	3.250
C	0.550	0.650
D	20.900	21.100
D1	16.350	16.750
D2	1.050	1.350
E	15.700	15.900
E1	13.100	13.400
E2	4.900	5.100
E3	2.400	2.600
e	5.400	5.480
L	19.800	20.100
L1	-	4.300
ΦP	3.500	3.700
Q	5.60	6.00
S	6.05	6.25



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