



## DESCRIPTION

The AM6613 is available in TO-247 Package.

## FEATURES

- 100V/180A<sup>a</sup>,  
 $R_{DS(ON)} = 4.2m\Omega$  (Max.) @  $V_{GS} = 10V$
- Reliable and Rugged
- 100% UIS +  $R_g$  Tested
- Available in TO-247 Package

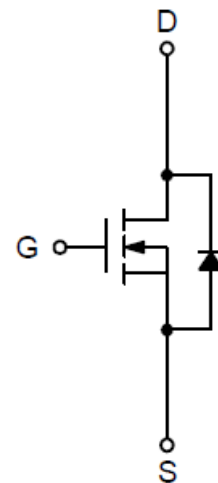
## ORDERING INFORMATION

Package Type	Part Number	
TO-247 SPQ: 30pcs/Tube	TL3	AM6613TL3U
		AM6613TL3VU
Note	V: Halogen free Package U: Tube	
AiT provides all RoHS free products		

## APPLICATIONS

- Synchronous Rectification.
- Power Management in Inverter Systems.
- Motor Driver.
- Uninterruptible Power Supply.

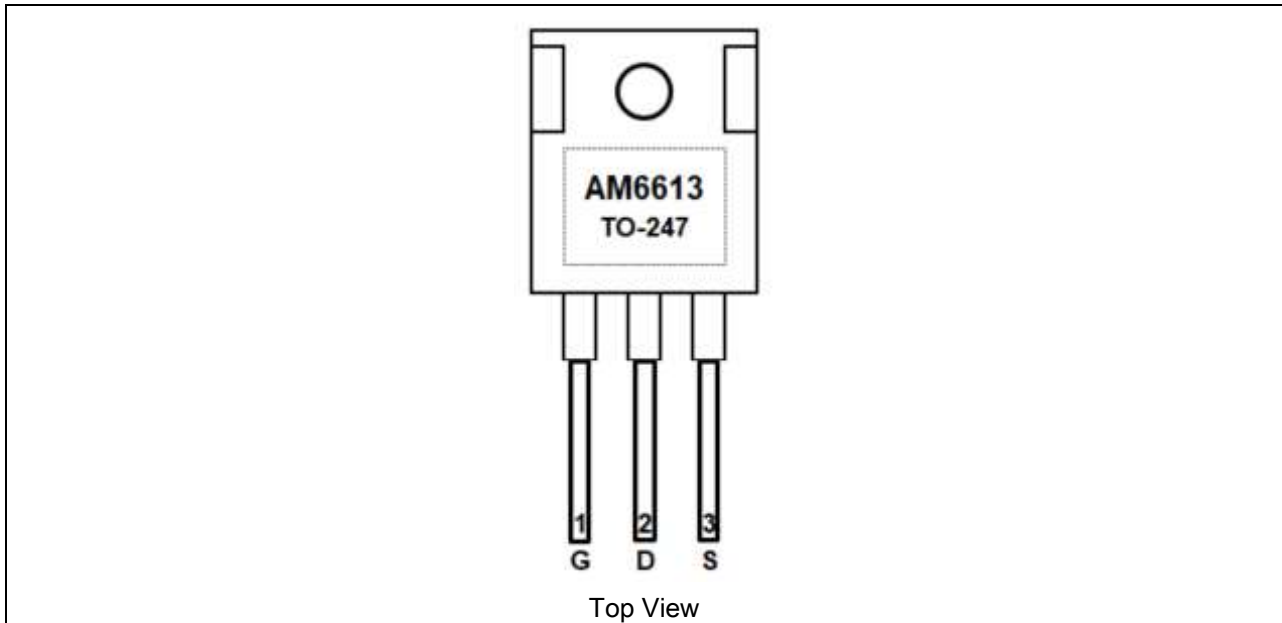
## PIN CONFIGURATION



N-Channel MOSFET



## PIN DESCRIPTION



Pin #	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source



## ABSOLUTE MAXIMUM RATINGS

T<sub>A</sub> = 25°C, unless otherwise noted

V <sub>DSS</sub> , Drain-Source Voltage		100V
V <sub>GSS</sub> , Gate-Source Voltage		±25V
T <sub>J</sub> , Maximum Junction Temperature		150°C
T <sub>STG</sub> , Storage Temperature Range		-55°C ~ 150°C
I <sub>S</sub> , Diode Continuous Forward Current	T <sub>C</sub> =25°C	80A
I <sub>D</sub> , Continuous Drain Current	T <sub>C</sub> =25°C	180A <sup>NOTE1</sup>
	T <sub>C</sub> =100°C	115A
I <sub>DM</sub> , Pulsed Drain Current <sup>NOTE2</sup>	T <sub>C</sub> =25°C	400A
P <sub>D</sub> , Maximum Power Dissipation	T <sub>C</sub> =25°C	312W
	T <sub>C</sub> =100°C	125W
R <sub>θJC</sub> , Thermal Resistance-Junction to Case	Steady State	0.4°C/W
I <sub>D</sub> , Continuous Drain Current	T <sub>A</sub> =25°C	18A
	T <sub>A</sub> =70°C	14.5A
P <sub>D</sub> , Maximum Power Dissipation	T <sub>A</sub> =25°C	3.1W
	T <sub>A</sub> =70°C	2W
R <sub>θJA</sub> , Thermal Resistance-Junction to Ambient	Steady State	40°C/W
I <sub>AS</sub> , Avalanche Current, Single pulse <sup>NOTE3</sup>	L=0.5mH	57A
E <sub>AS</sub> , Avalanche Energy, Single pulse <sup>NOTE3</sup>	L=0.5mH	812mJ

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Calculated continuous current based on maximum allowable junction temperature. Bonding wire limitation current is 120A.

NOTE2: Pulse width limited by max. junction temperature.

NOTE3: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T<sub>J</sub>=25°C).



## ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =85°C	-	-	30	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V	-	-	±100	nA
Drain-Source On-state Resistance	R <sub>DS(ON)</sub> NOTE4	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	-	3.5	4.2	mΩ
<b>Diode Characteristics</b>						
Diode Forward Voltage	V <sub>SD</sub> NOTE4	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	-	0.8	1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>SD</sub> =40A, dI <sub>SD</sub> /dt=100A/μs	-	56	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	136	-	nC
<b>Dynamic Characteristics</b> NOTE5						
Gate Resistance	R <sub>G</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	1	-	Ω
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V f=1MHz	-	9550	12400	pF
Output Capacitance	C <sub>oss</sub>		-	980	-	
Reverse Transfer Capacitance	C <sub>rSS</sub>		-	595	-	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, R <sub>L</sub> =30Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =3Ω	-	47	85	ns
Turn-on Rise Time	t <sub>r</sub>		-	33	60	
Turn-off Delay Time	t <sub>d(off)</sub>		-	160	290	
Turn-off Fall Time	t <sub>f</sub>		-	100	180	
<b>Gate Charge Characteristics</b> NOTE5						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V I <sub>D</sub> =40A	-	215	300	nC
Gate-Source Charge	Q <sub>gs</sub>		-	61	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	62	-	

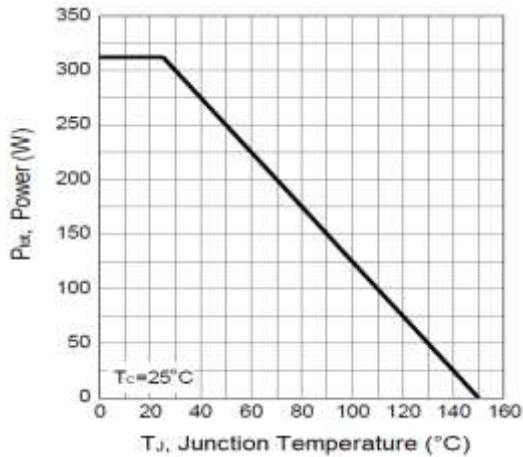
NOTE4: Pulse test; pulse width≤300us, duty cycle≤2%.

NOTE5: Guaranteed by design, not subject to production testing.

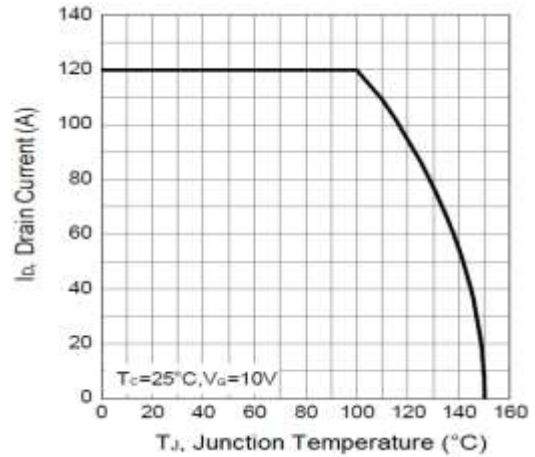


## TYPICAL CHARACTERISTICS

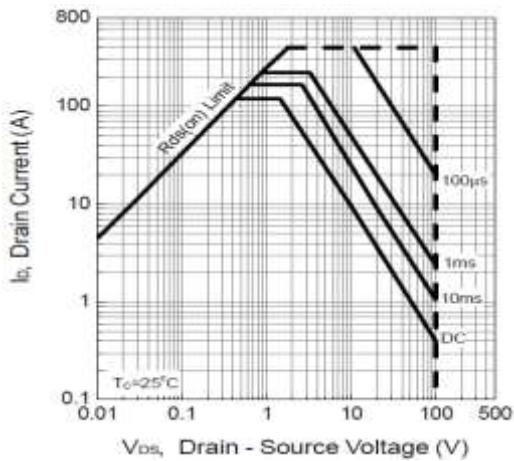
### 1. Power Dissipation



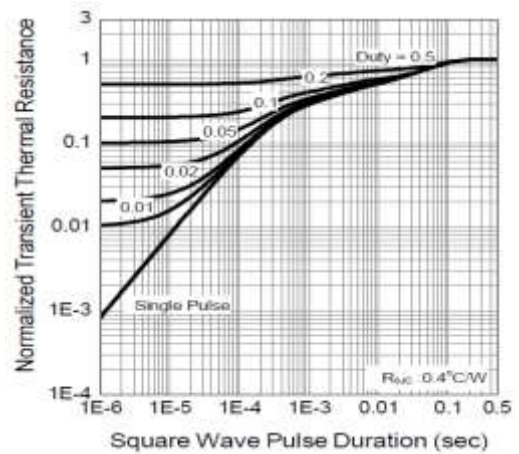
### 2. Drain Current



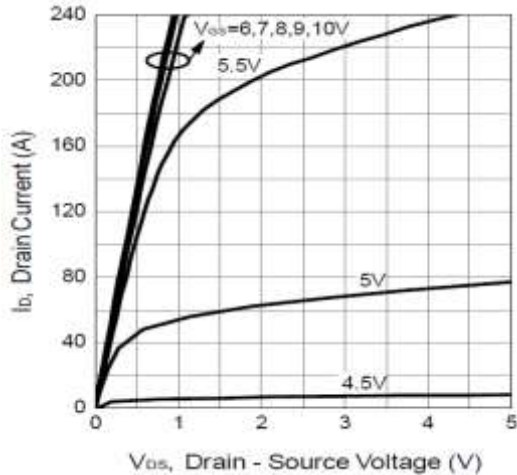
### 3. Safe Operation Area



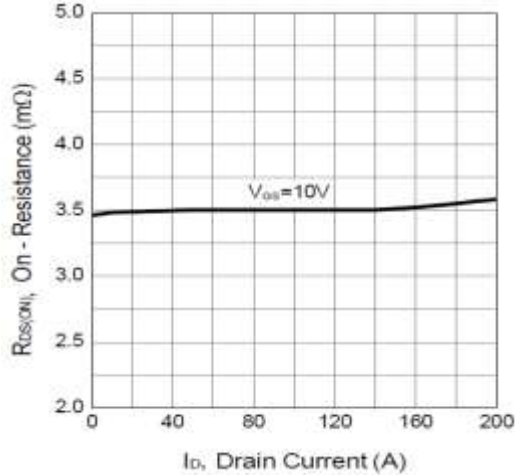
### 4. Thermal Transient Impedance



### 5. Output Characteristics

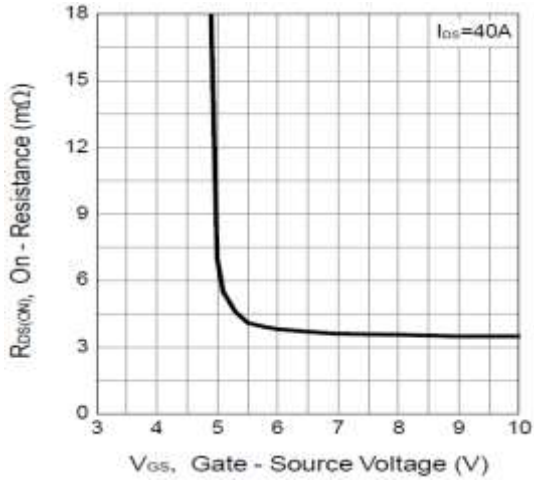


### 6. Drain-Source On Resistance

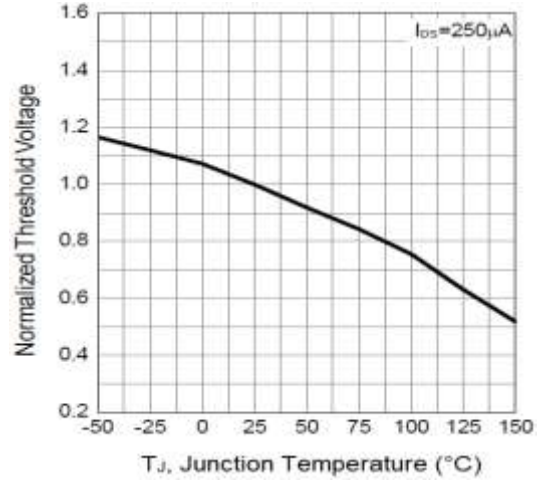




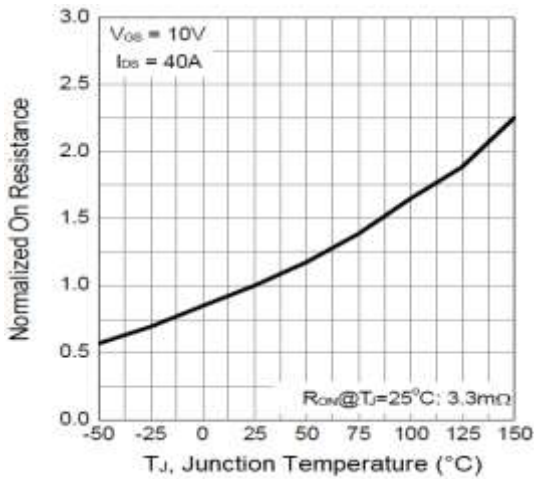
7. Gate-Source On Resistance



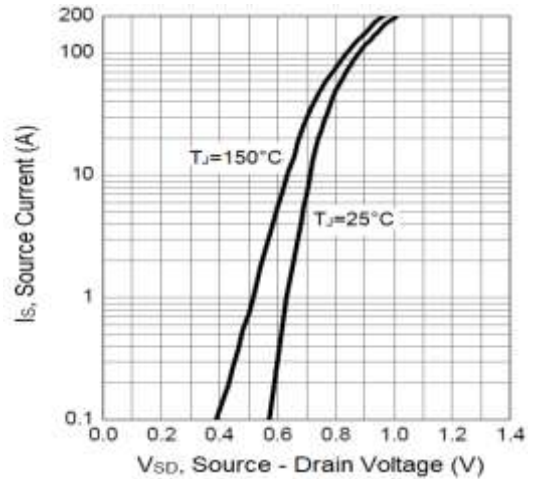
8. Gate Threshold Voltage



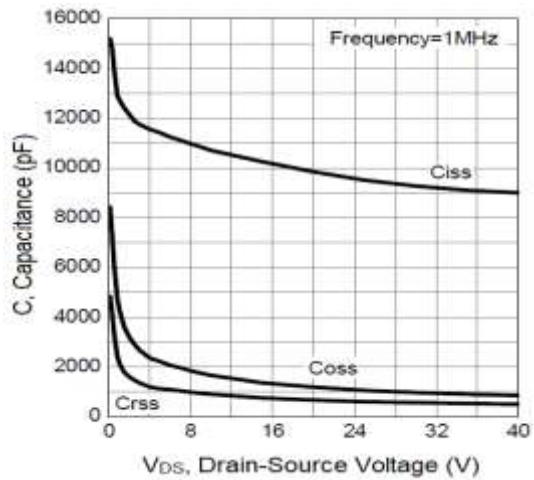
9. Drain-Source On Resistance



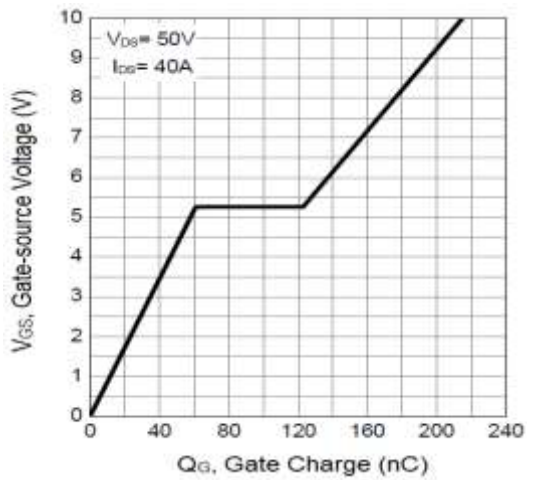
10. Source-Drain Diode Forward



11. Capacitance

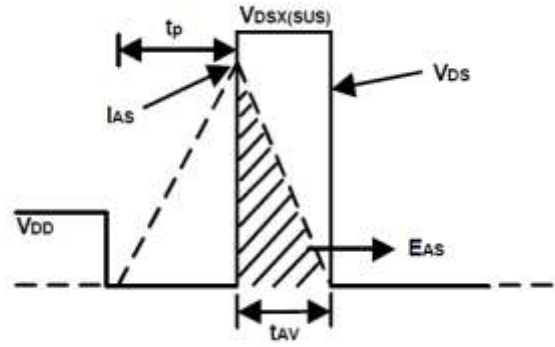
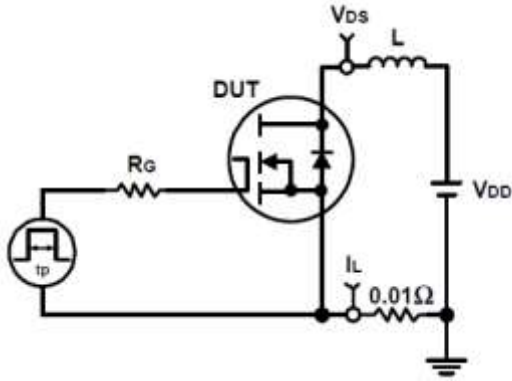


12. Gate Charge

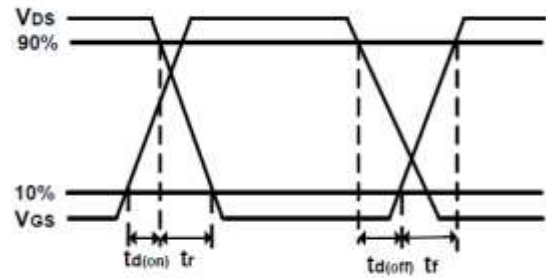
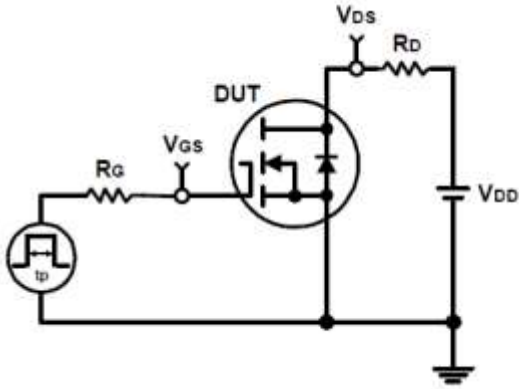




Avalanche Test Circuit and Waveforms



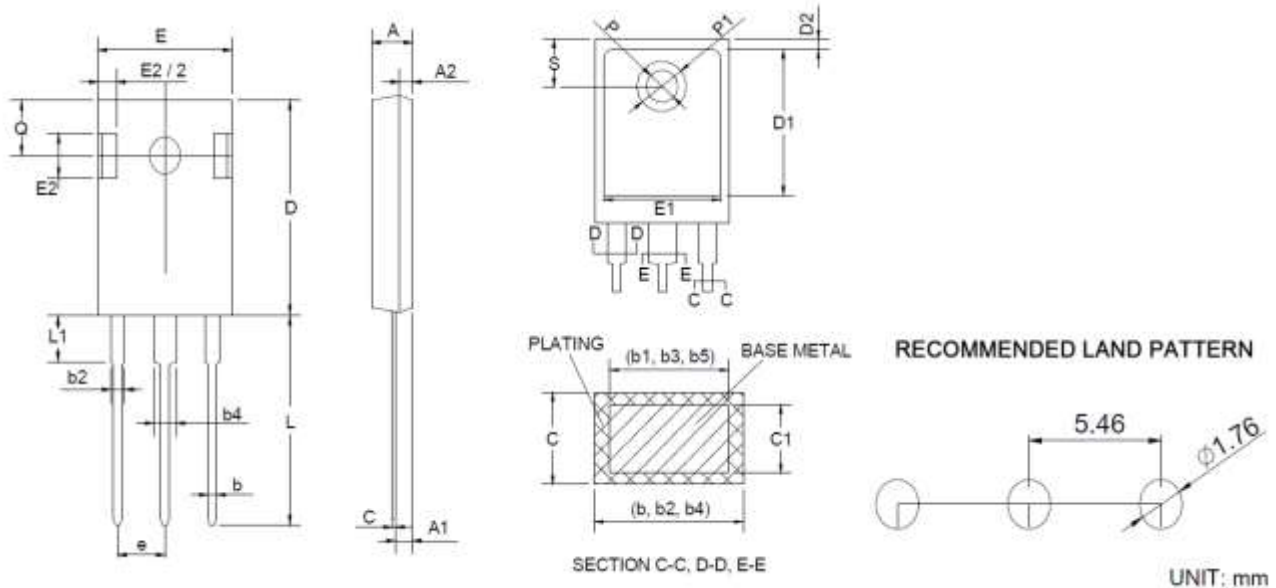
Switching Time Test Circuit and Waveforms





## PACKAGE INFORMATION

Dimension in TO-247 Package (Unit: mm)



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.5	2.49	0.059	0.098
D	20.8	21.46	0.819	0.845
E	15.49	16.26	0.610	0.640
E2	4.32	5.49	0.170	0.216
e	5.46 BSC		0.215 BSC	
L	19.81	20.32	0.780	0.800
L1	-	4.5	-	0.177
P	3.56	3.66	0.140	0.144
Q	5.38	6.2	0.212	0.244
S	6.15 BSC		0.242 BSC	
b	0.99	1.4	0.039	0.055
b1	0.99	1.35	0.039	0.053
b2	1.65	2.39	0.065	0.094
b3	1.65	2.34	0.065	0.092
b4	2.59	3.43	0.102	0.135
b5	2.59	3.38	0.102	0.133
c	0.38	0.89	0.015	0.035
c1	0.38	0.84	0.015	0.033
D1	13.08	-	0.515	-
D2	0.51	1.35	0.020	0.053
E1	13.46	-	0.530	-
P1	-	7.4	-	0.291





## IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or server property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.