



DUL1505 – 500V, 15A

August 2009

Preliminary
Mintech

HIGH EFFICIENCY, TEMPERATURE INDEPENDENT GaAs RECTIFIER DIODE

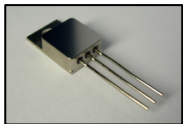
General Description

The DUL1505 is a GaAs P-I-N Rectifier. It uses a patented liquid phase epitaxy (LPE) construction to provide temperature performance above current Silicon, Silicon Carbide and Gallium Nitride products of a similar specification. The device is able to function stably well above the maximum T_j of more traditional diodes of this type while maintaining parity of performance in terms of key parameters such as recovery time and forward voltage.

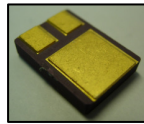
Features

- High maximum junction temperature; up to +260°C vs. +175°C for silicon diodes
- Lower and **temperature independent** dynamic recovery characteristics over the full specified temperature range
- Lower leakage current at all operating temperatures
- Very low capacitance

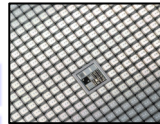
Package Types



TO-257



TO-276AB (SMD)



BARE DIE

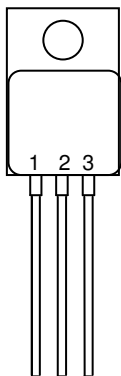
Applications

- High temperature electronics
- Power Modules
- Hybrid circuits

Thermal Characteristics

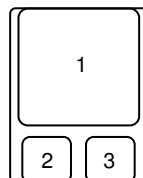
SYMBOL	PARAMETER	PACKAGE	RATINGS	UNITS
$R_{\theta JC}$	MAXIMUM THERMAL RESISTANCE, JUNCTION TO CASE	TO-276AI	3.51	°C/W
$R_{\theta JC}$	MAXIMUM THERMAL RESISTANCE, JUNCTION TO CASE	TO-257AIN	1.45	°C/W
$R_{\theta JC}$	MAXIMUM THERMAL RESISTANCE, JUNCTION TO CASE	TO-276AB	1.24	°C/W

TO-257AI / TO-257AIN



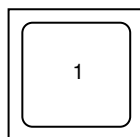
- 1 CATHODE
- 2 ANODE
- 3 CATHODE

TO-276AB



1. ANODE
2. COMMON CATHODE
3. COMMON CATHODE

BARE DIE (3.1mm²)



1. CATHODE
2. ANODE (DIE BACKSIDE)

ORDERING PART #	PACKAGE	TEMP RANGE
DUL1505AL	TO-257AI	-65 TO 260 °C
DUL1505ALN	TO-257AIN	-65 TO 260 °C
DUL1505S	TO-276AB	-65 TO 260 °C
DUL1505-AG	BARE DIE	-65 TO 260 °C
DUL1505-GG	BARE DIE	-65 TO 260 °C

Europe: sales@mintech.co.uk
 USA : ussales@mintech.co.uk
 China: chinasales@mintech.co.uk

Absolute Maximum Ratings

SYMBOL	PARAMETER	RATINGS	UNITS
V_{RRM}	PEAK REPETITIVE REVERSE VOLTAGE	500	V
V_{RWM}	WORKING PEAK REPETITIVE REVERSE VOLTAGE	500	V
V_R	DC BLOCKING VOLTAGE	500	V
$I_{F(AV)}$	AVERAGE RECTIFIED FORWARD CURRENT @ 260°C	15	A
I_{FSM}	NON-REPETITIVE PEAK SURGE CURRENT 60Hz SINGLE HALF-SINE WAVE	150	A
T_J, T_{STG}	OPERATING AND STORAGE TEMPERATURE RANGE	-65 to +260	°C

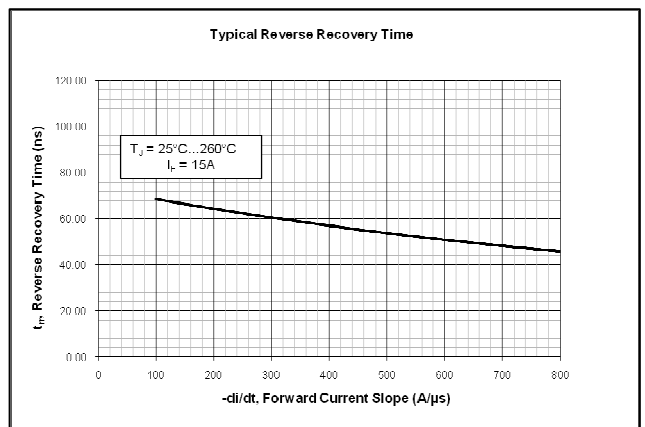
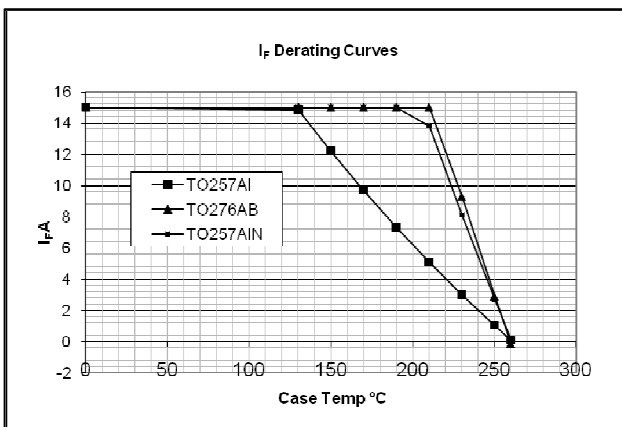
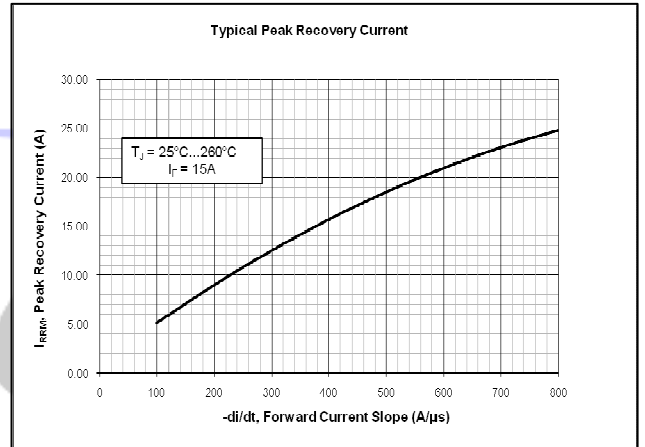
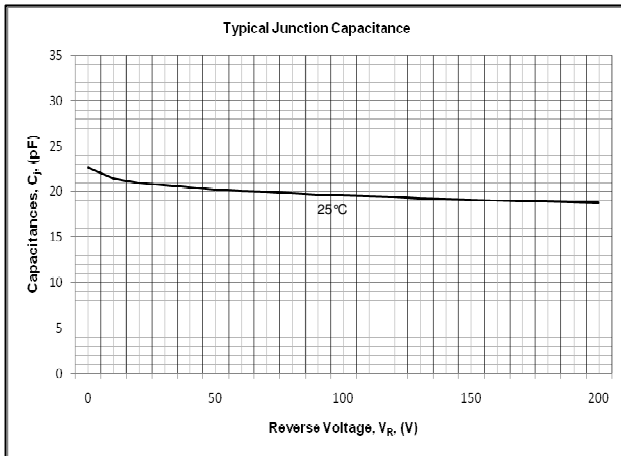
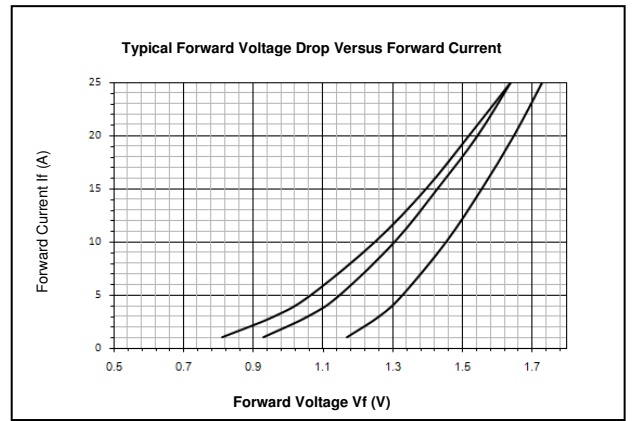
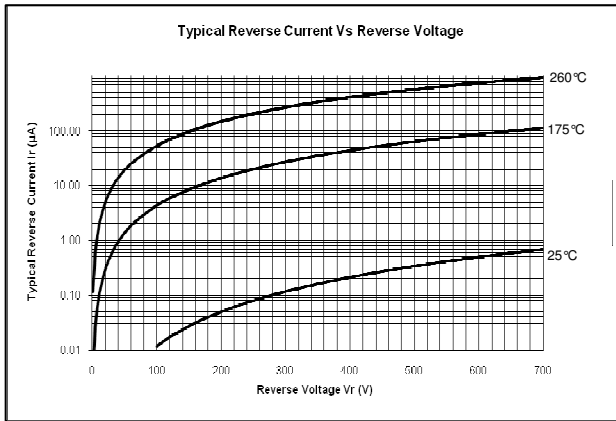
Electrical Characteristics

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS
V_{FM1}	$I_F=15A$ $T_C = 25^\circ C$ $T_C = 175^\circ C$ $T_C = 260^\circ C$	-	1.55 1.45 1.42	1.60 1.50 1.45	V
I_{RM1}	$V_R=500V$ $T_C = 25^\circ C$ $T_C = 175^\circ C$ $T_C = 260^\circ C$	-	0.40 125 1000	1 130 1100	μA
t_{RR}	$I_F=1A, di/dt = 200 A/\mu s, V_R=30V$ $T_C = 25^\circ C$ $T_C = 175^\circ C$ $T_C = 260^\circ C$	-	30 30 30	40 40 40	ns
t_{RR} I_{RR} Q_{RR}	$I_F=15A, di/dt = 200 A/\mu s, V_R=200V$ $T_C = 25^\circ C$	-	65 9 300	75 11 370	ns A nC
t_{RR} I_{RR} Q_{RR}	$I_F=15A, di/dt = 200 A/\mu A, V_R=200V$ $T_C = 175^\circ C$	-	65 9 300	75 11 370	ns A nC
t_{RR} I_{RR} Q_{RR}	$I_F=15A, di/dt = 200 A/\mu A, V_R=200V$ $T_C = 260^\circ C$	-	65 9 300	75 11 370	ns A nC
C_J	$T_J = 25^\circ C, f = 1MHz, V_R = 200V$	-	18	22	pF
W_{AVL}	AVALANCHE ENERGY ($L=2Mh$)	-	10	-	mJ

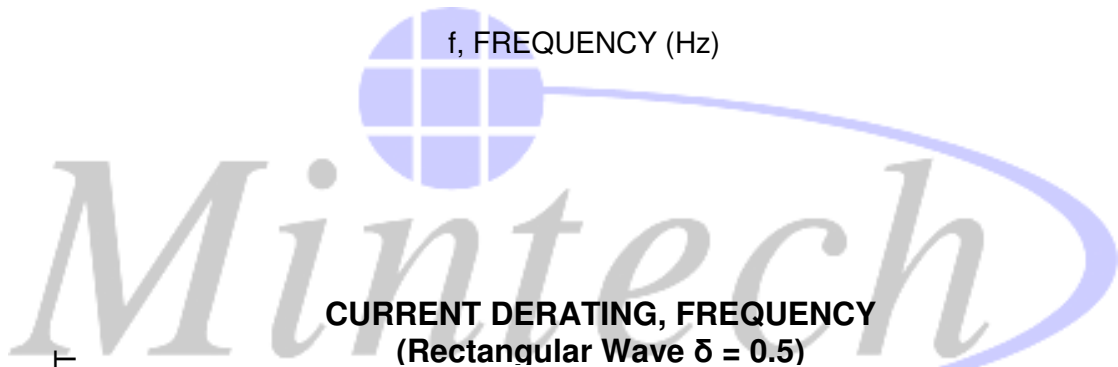
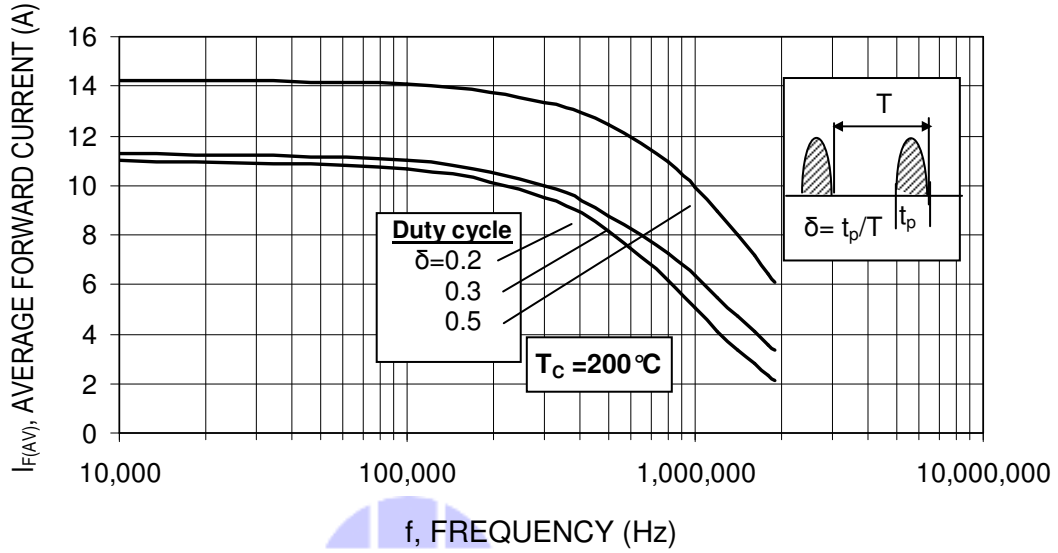
Notes:

1: Pulse: Test Pulse width = 300 μs , Duty Cycle = 2%

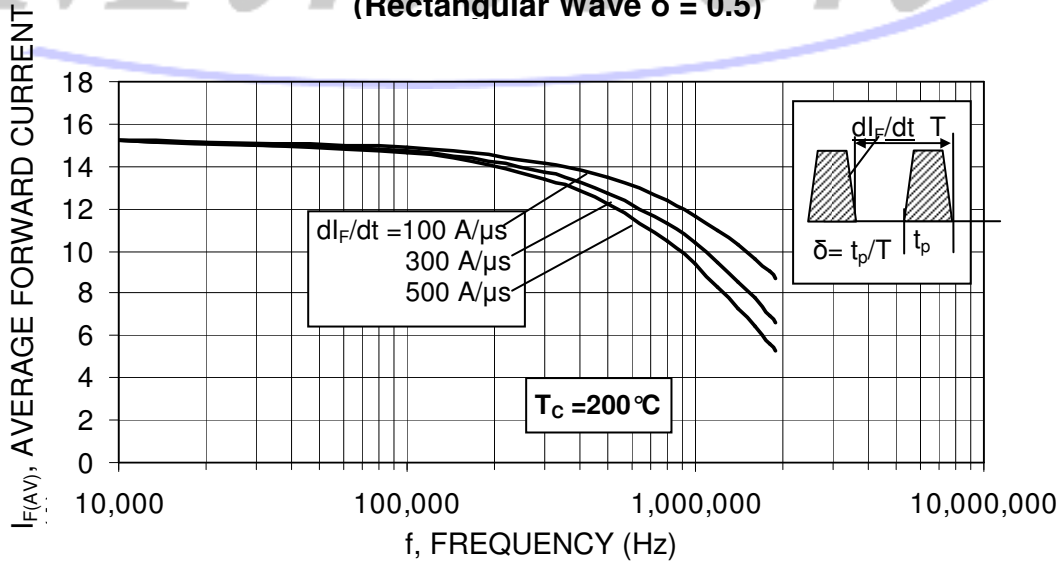
Typical Performance Characteristics



CURRENT DERATING, FREQUENCY (Sinusoidal Wave)

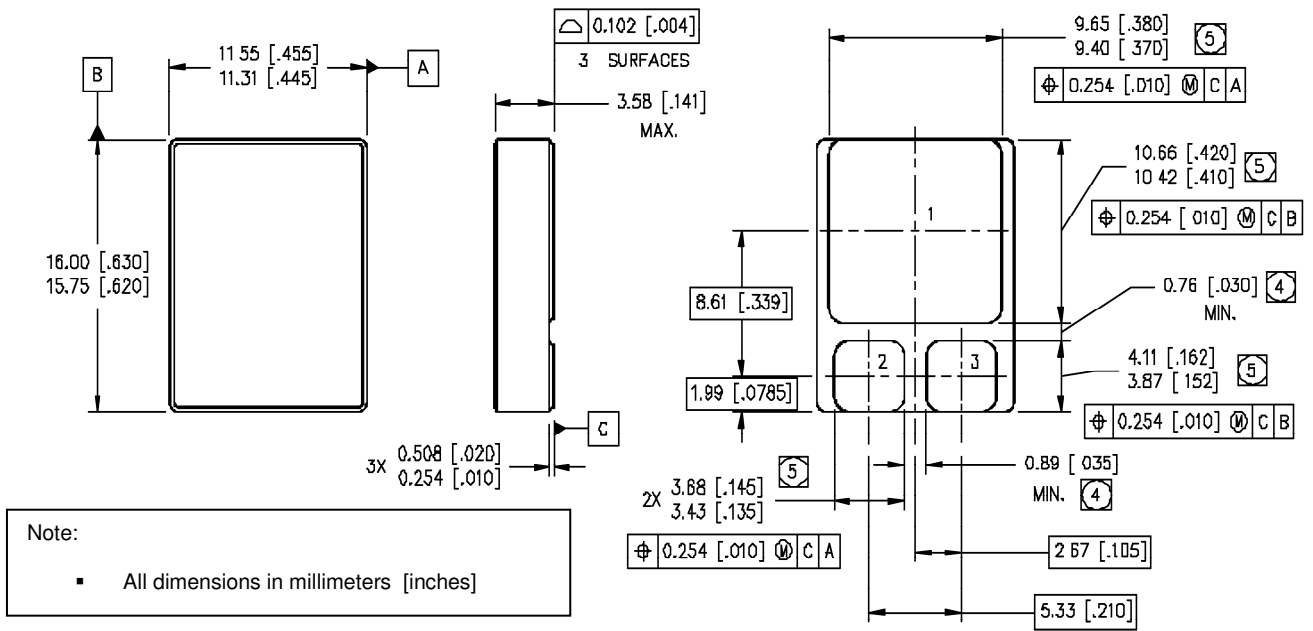
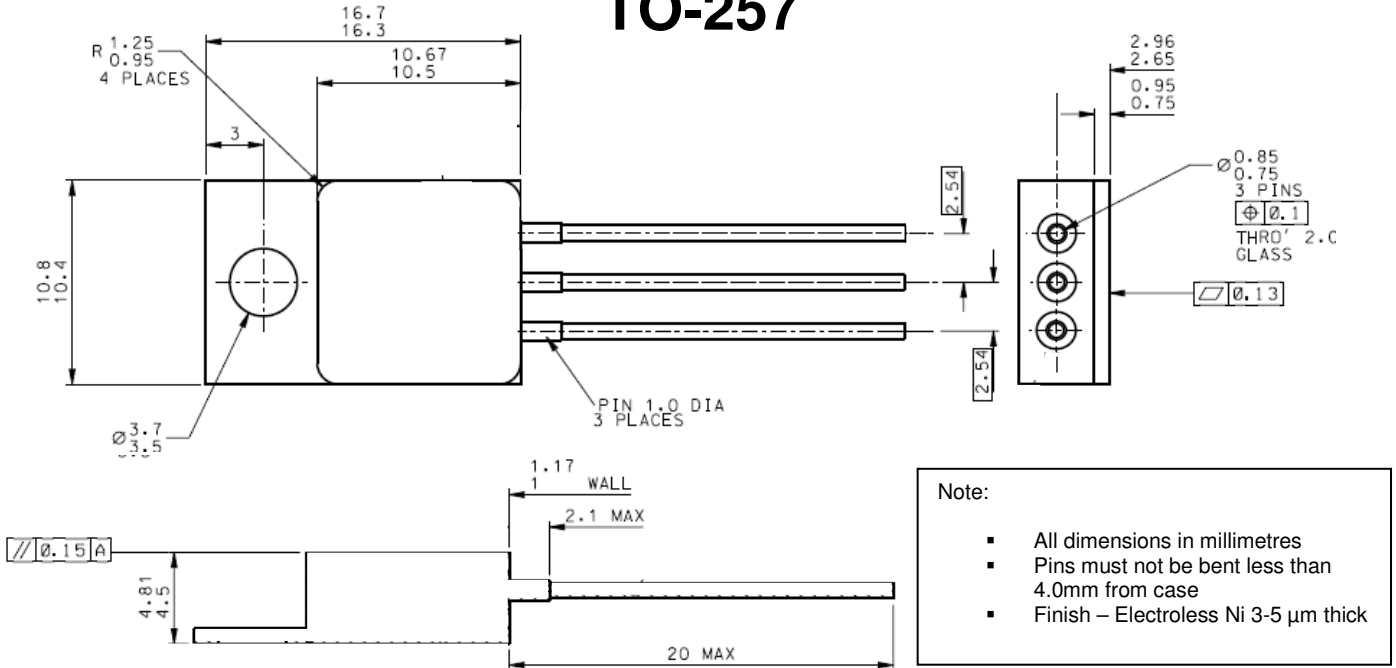


CURRENT DERATING, FREQUENCY (Rectangular Wave $\delta = 0.5$)



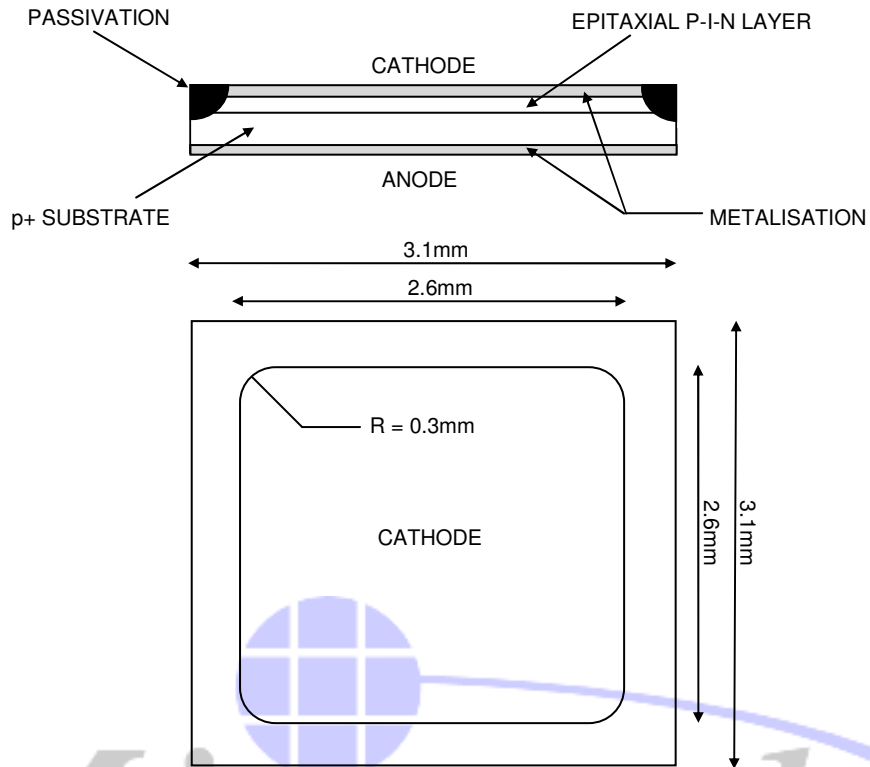
Mechanical Dimensions

TO-257



Mechanical Dimensions

Bare Die



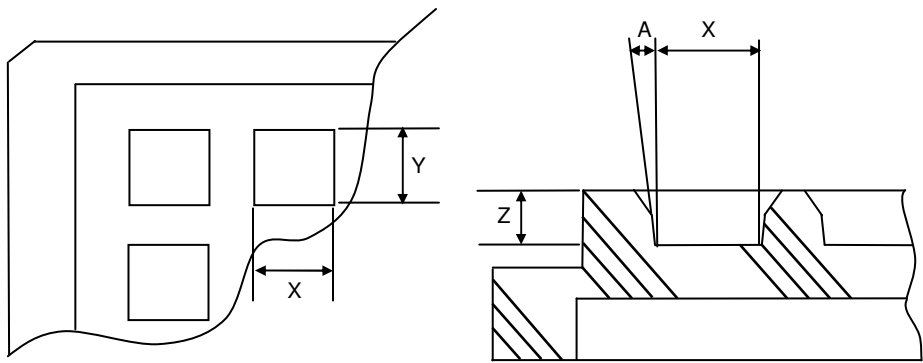
DIMENSIONS	3.1mm x 3.1mm	THICKNESS	400µm ± 20µm
Note: For custom thicknesses please contact us			

TOP METAL	Al OR Au (See order code below)
BACK METAL	Au

DUL1505-AG	Al TOPSIDE Au BACKSIDE
DUL1505-GG	Au TOPSIDE Au BACKSIDE

Waffle Pack Dimensions

Note: For other supply formats please contact us



POCKET DETAILS	
X	3.20mm ±0.05mm pocket size
Y	3.20mm ±0.05mm pocket size
Z	1.19mm ±0.08mm pocket depth
A	5° ±1/2° pocket draft angle
No Cross Slots	
Array = 10 X 10 (100)	
OVERALL TRAY SIZE	
Size	50.80mm ±0.10mm
Height	3.96mm +0.05mm -0.08mm
Flatness	0.10mm

DISCLAIMER

MINTECH SEMICONDUCTORS IN PARTNERSHIP WITH CLIFTON RESERVE THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN.

CLIFTON AS AND MINTECH SEMICONDUCTORS DO NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DO WE CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

MINTECH SEMICONDUCTORS & CLIFTON PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF MINTECH SEMICONDUCTORS AND CLIFTON.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

The logo features a stylized blue globe icon with a white grid pattern, positioned above the word "Mintech" in a large, italicized, blue serif font. A blue swoosh underline is positioned below the text.