

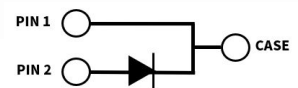


# E4D10120A

## E-Series Automotive 4th Generation 1200 V, 10 A Silicon Carbide Schottky Diode

### Description

With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.



Package Types: TO-220-2  
Marking: E4D10120A

### Features

- Low Forward Voltage ( $V_F$ ) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- Automotive Qualified (AEC Q101) and PPAP Capable

### Applications

- Industrial Switched Mode Power Supplies
- Uninterruptible & AUX Power Supplies
- Boost for PFC & DC-DC Stages
- Solar Inverters

### Maximum Ratings ( $T_C = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	$V_{RRM}$	1200	V		
DC Blocking Voltage	$V_{DC}$	1200			
Continuous Forward Current	$I_F$	33	A	$T_J = 25^\circ\text{C}$	Fig. 3
		16		$T_J = 135^\circ\text{C}$	
		10		$T_J = 156^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	44		$T_C = 25^\circ\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Wave	
		26		$T_C = 110^\circ\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Wave	
Power Dissipation	$P_{tot}$	166	W	$T_J = 25^\circ\text{C}$	Fig. 4
		72		$T_J = 110^\circ\text{C}$	
Diode dV/dt ruggedness	dV/dt	250	V/ns	$V_R = 0\text{-}960\text{V}$	

## Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	$V_F$	1.5	1.8	V	$I_F = 10 \text{ A}, T_j = 25^\circ\text{C}$	Fig. 1
		2.2			$I_F = 10 \text{ A}, T_j = 175^\circ\text{C}$	
Reverse Current	$I_R$	30	200	$\mu\text{A}$	$V_R = 1200 \text{ V}, T_j = 25^\circ\text{C}$	Fig. 2
		55			$V_R = 1200 \text{ V}, T_j = 175^\circ\text{C}$	
Total Capacitive Charge	$Q_C$	56		nC	$V_R = 800 \text{ V}, T_j = 25^\circ\text{C}$	Fig. 5
Total Capacitance	C	77		pF	$V_R = 0 \text{ V}, T_j = 25^\circ\text{C}, f = 1 \text{ MHz}$	Fig. 6
		51			$V_R = 400 \text{ V}, T_j = 25^\circ\text{C}, f = 1 \text{ MHz}$	
		44			$V_R = 800 \text{ V}, T_j = 25^\circ\text{C}, f = 1 \text{ MHz}$	
Capacitance Stored Energy	$E_C$	17		$\mu\text{J}$	$V_R = 800 \text{ V}$	Fig. 7

### Notes:

SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

## Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Unit	Notes
Thermal Resistance, Junction to Case (Typical)	$R_{\theta, JC(TYP)}$	0.9	$^\circ\text{C} / \text{W}$	
Junction Temperature	$T_j$	-55 to +175	$^\circ\text{C}$	
Case & Storage Temperature	$T_c$	-55 to +175		
TO-220 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

## Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Notes
Human Body Model	HBM	Class 3B ( $\geq 8000 \text{ V}$ )
Charge Device Model	CDM	Class C3 ( $\geq 1000 \text{ V}$ )

Typical Performance

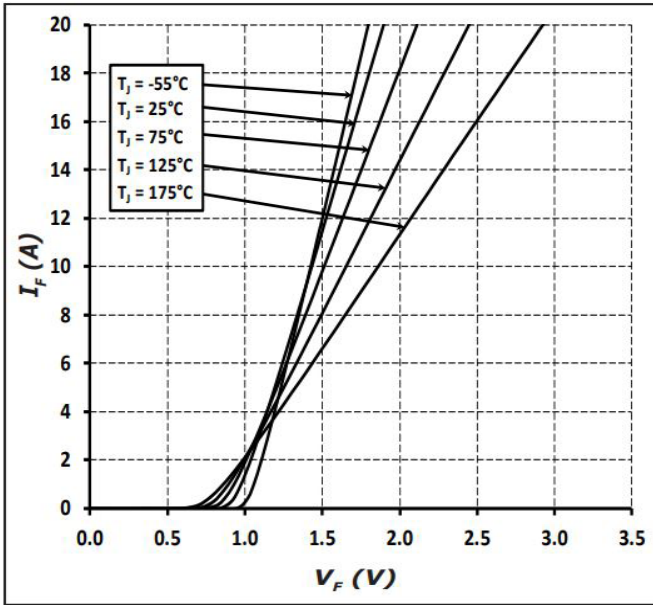


Figure 1  
Forward Characteristics

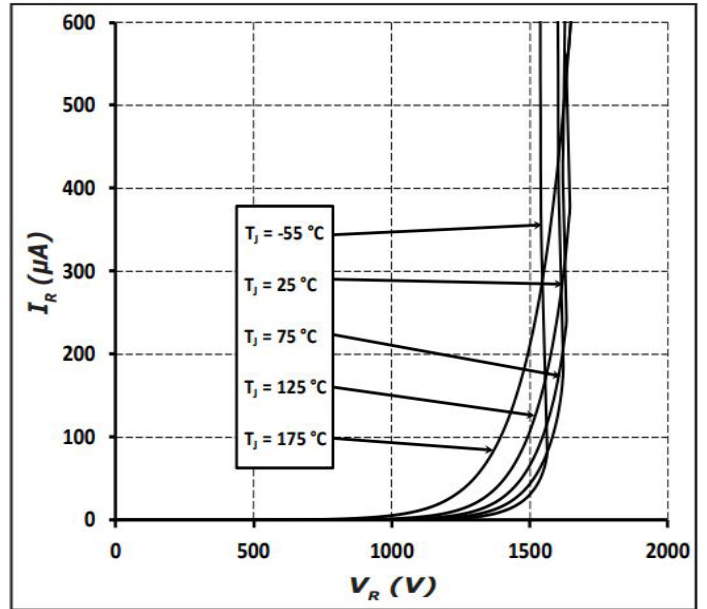


Figure 2  
Reverse Characteristics

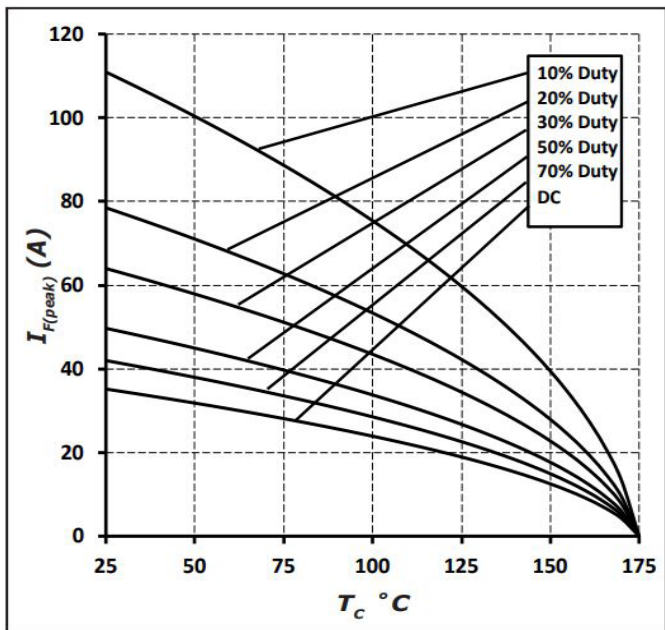


Figure 3  
Current Derating

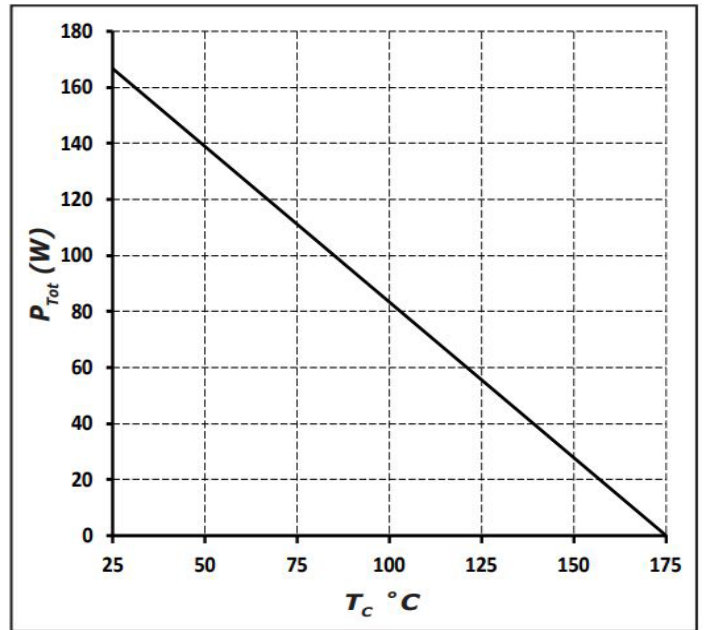
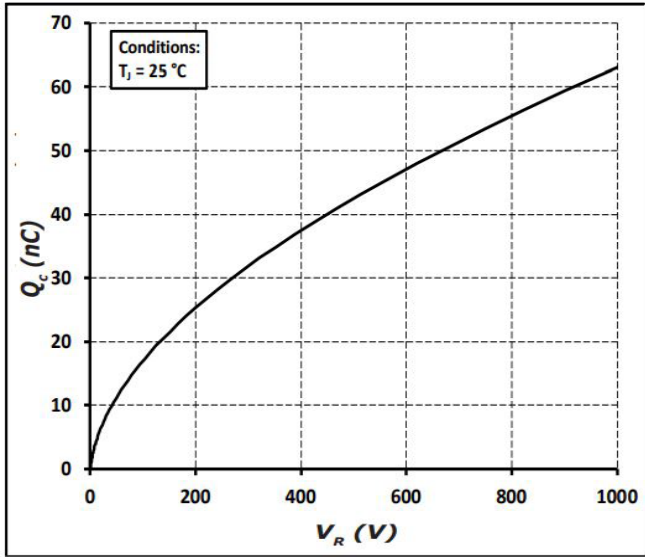
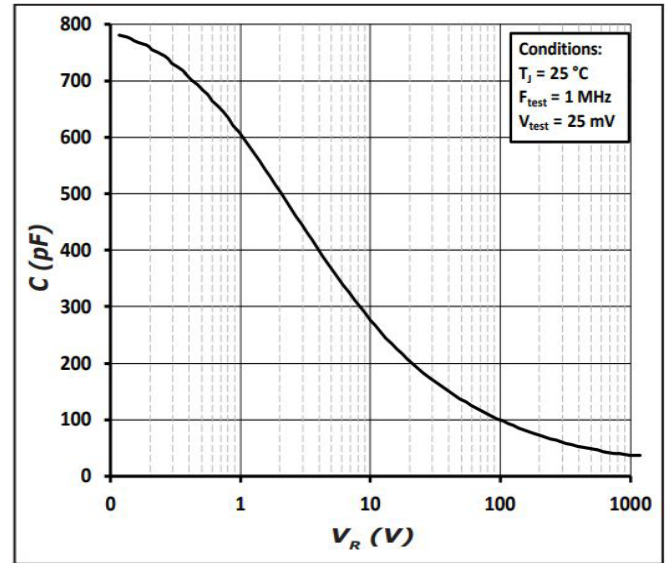


Figure 4  
Power Derating



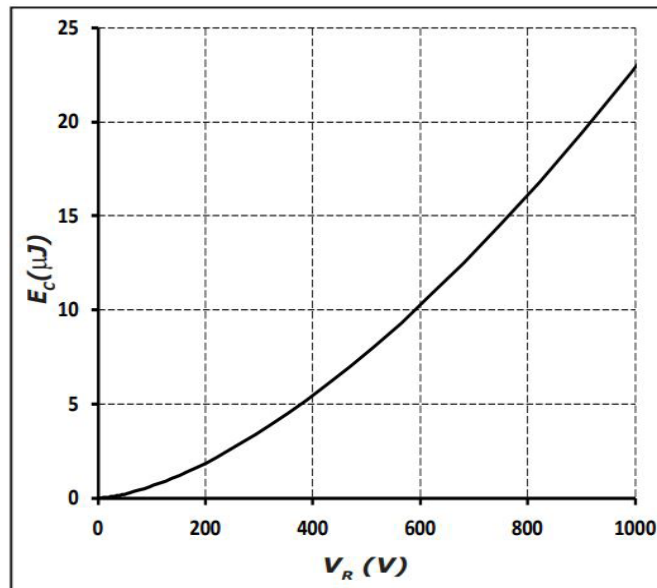
**Figure 5**

Total Capacitance vs. Reverse Voltage



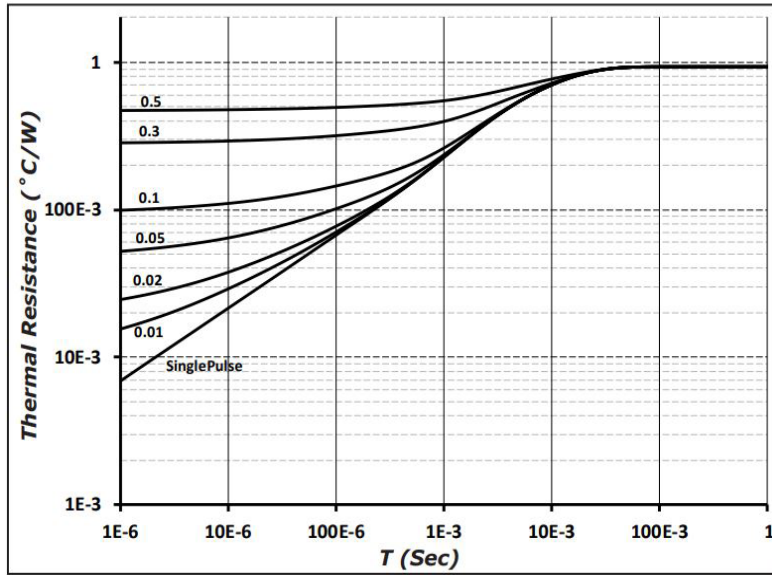
**Figure 6**

Capacitance vs. Reverse Voltage



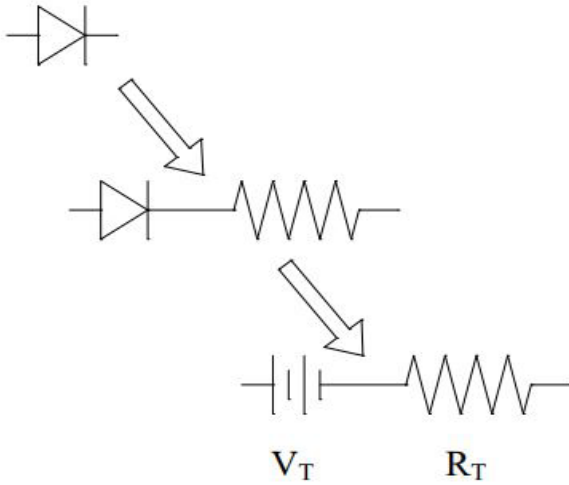
**Figure 7**

Capacitance Stored Energy



**Figure 9**  
Transient Thermal Impedance

**Diode Model**



$$V_{fT} = V_T + I_f \cdot R_T$$

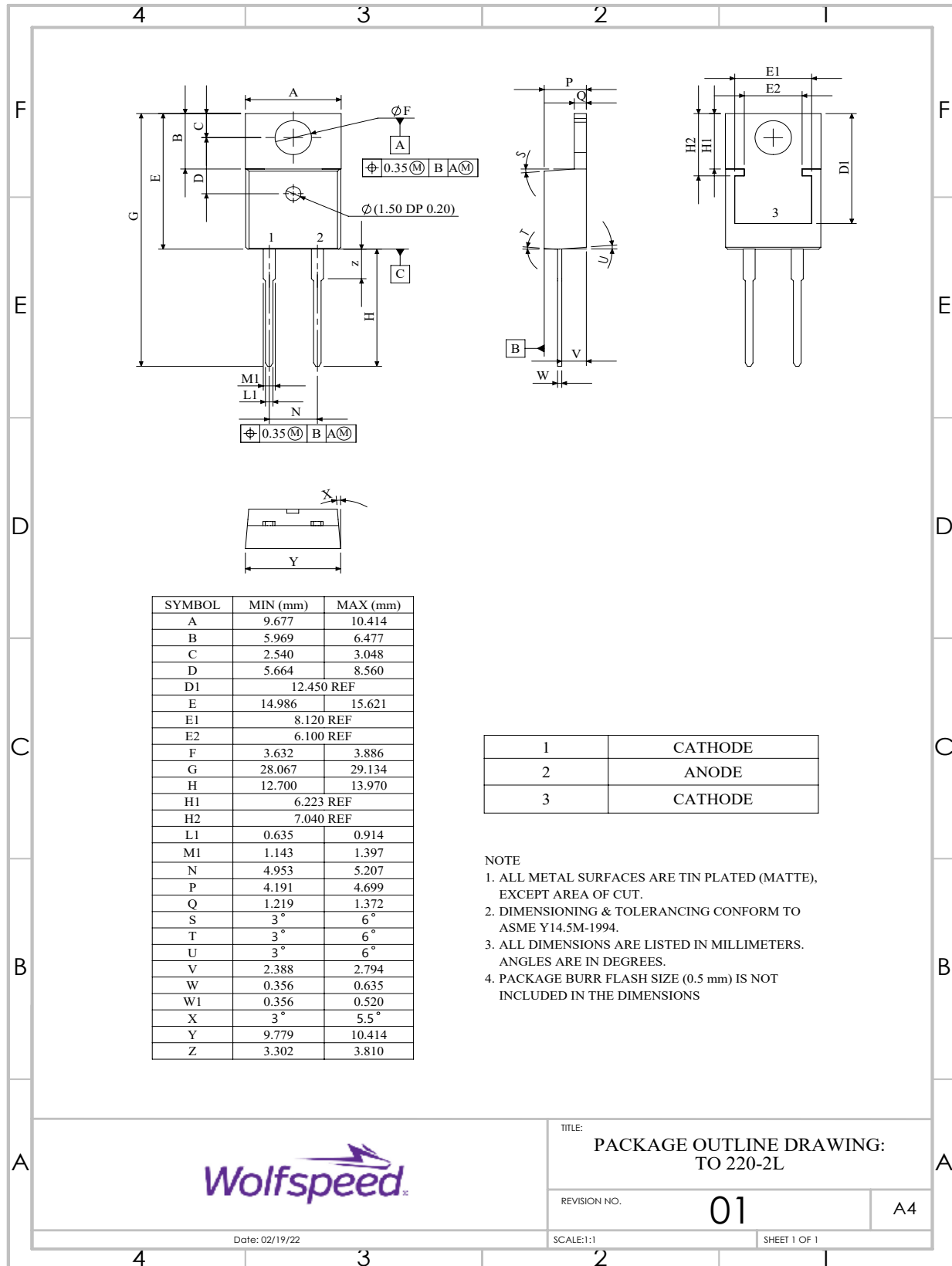
$$V_T = 1.00 + (T_J \cdot -1.10 \cdot 10^{-3})$$

$$R_T = 0.03 + (T_J \cdot 4.00 \cdot 10^{-4})$$

Note:  $T_J$  = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

### Package Dimensions & Pin-Out

Package: TO-220-2



TITLE: PACKAGE OUTLINE DRAWING: TO 220-2L

REVISION NO. 01 A4

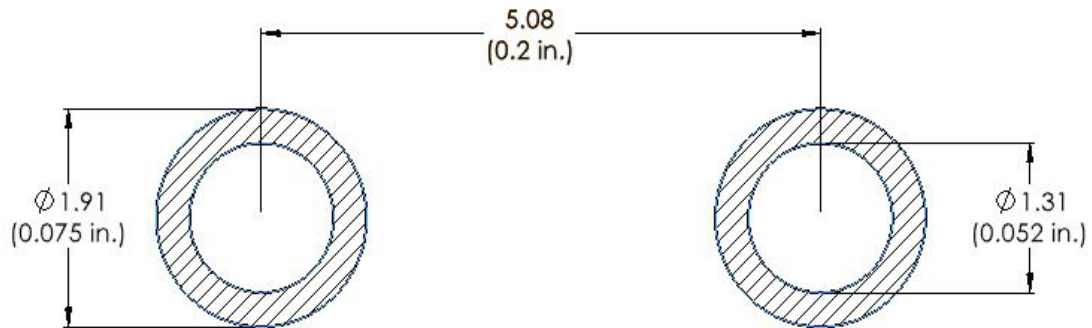
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SHEET 1 OF 1

## Recommended Solder Pad Layout

Primary dimensions shown in mm.



## Product Ordering Information

Order Number	Packing Type
E4D10120A	Tube



## Revision History

Document Version	Date of Release	Description of Changes
0	July-2016	Initial Release
1	March-2023	Update Package Drawing Update Landing Pad



## Notes & Disclaimer

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