

## 8TR8217 / 8TR8218 / 8TR8219 ESD Protection for IoT FEM with TVS

### Application Notes

This application note explains how additional devices circuit delivers protection levels of  $\pm 4\text{kV}$  ESD HBM\*. It will help in the long-term reliability of the final product. (\*Electrostatic discharge Human Body Model(HBM) Reference Document: ANSI/ESDA/JEDEC JS-001-2017 )  
For more detailed product specifications of the 8TR8217 / 8TR8218 / 8TR8219, please check the datasheet.

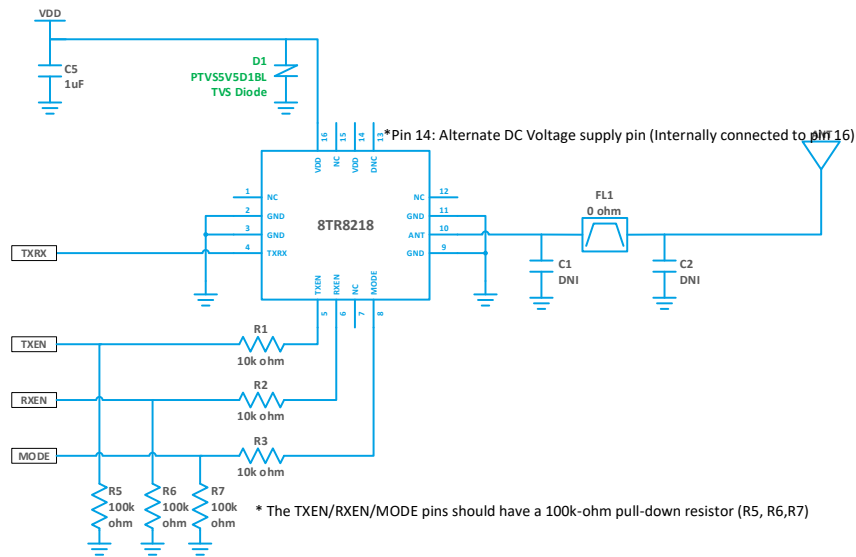
### Additional devices

The protection devices added in the circuit:

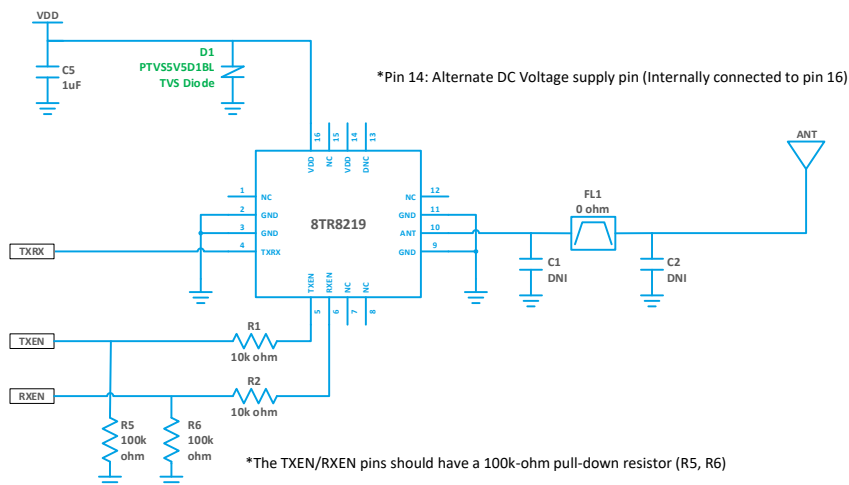
- VDD Line: PTVSSV5D1BL, TVS Diode (Nexperia)

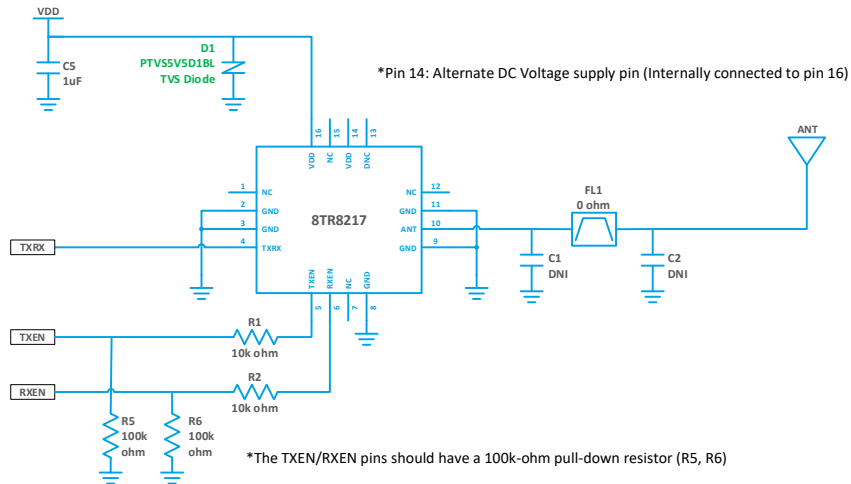
The part placement and orientation has little to no impact on the level of ESD protection.

### Application Schematic - 8TR8218



### Application Schematic - 8TR8219



**8TR8217 / 8TR8218 / 8TR8219 ESD Protection for IoT FEM with TVS**
**Application Schematic - 8TR8217**

**Results & Recommendation**

The VDD signal with TVS diode was subjected to  $\pm 4\text{kV}$  ESD HBM. Both TVS diode and RF IC show no physical damage as well as no degradation in the electrical performance.

For higher ESD HBM protection, aforementioned device (or one with the equivalent specification) is recommended.

**\*TVS Diode Electrical characteristics**

Part No.	Reverse working voltage $V_{RWM}$ $T_{AMB} = 25^\circ\text{C}$	Reverse breakdown voltage $V_{BR}$ $I_R=5\text{mA}$	Reverse leakage current $I_{RM}$ $V_R=5.5\text{V}$	Clamping voltage		Diode Capacitance $C_d$ $V_R=0\text{V}, f=1\text{MHz}$
				$I_{PPM}=1\text{A}, t_p=8/20\mu\text{s}$	$I_{PPM}=35\text{A}, t_p=8/20\mu\text{s}$	
	[V]	[V]	[nA]	[V]	[V]	[pF]
PTVS5V5D1BL	Max. 5.5	5.6 ~ 7.6	Max. 100	Typ. 5.7 / Max. 6.9	Typ. 10.3 / Max. 12.2	Typ. 70 / Max. 84