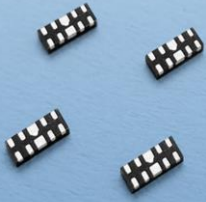


Together We Make It Safe!



TVS Protection Array (TPA)



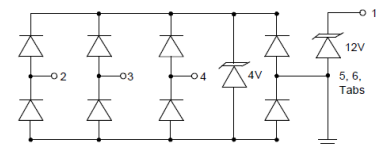


TVS Protection Array TPA1255

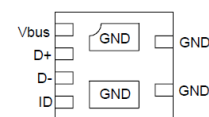
- DFN2018-6
- Low Capacitance

Features

- Low capacitance: 0.35pF typical (I/O to GND)
- Very high peak pulse power at Vbus (2500W)
- Up to 3 data lines and one power line protects
- Lead Finish: NiPdAu
- Case Material: "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$ (Vbus) / 16kV (data lines)
 - Contact discharge: $\pm 30\text{kV}$ (Vbus) / 10kV (data lines)
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-4 (Lightning) 100A (Vbus, 8/20 μs)
 - 4A (data lines, 8/20 μs)
- RoHS Compliant



Circuit Diagram



Pin Schematic

Applications

- USB 2.0 USB OTG μUSB

TVS Protection Array TPA1255

• DFN2018-6 • Low Clamping Voltage

Maximum Ratings

Parameter	Symbol	Value	Unit
DP,DM,USB ID(Pins2,3,4)			
Peak Pulse Power (8/20μs)	P_{pk}	60	W
Peak Pulse Current ($t_p = 8/20\mu S$)	I_{pp}	4	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	±16	KV
ESD per IEC 61000-4-2 (Contact)		±10	
Junction Temperature Range	T_J	-55~125	°C
Storage Temperature Range	T_{STG}	-55~125	°C
Vbus(Pin 1)			
Peak Pulse Power (8/20μs)	P_{pk}	2500	W
Peak Pulse Current ($t_p = 8/20\mu S$)	I_{pp}	100	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	±30	KV
ESD per IEC 61000-4-2 (Contact)		±30	
Junction Temperature Range	T_J	-55~125	°C
Storage Temperature Range	T_{STG}	-55~125	°C

Note: 1. Ratings at 25 °C ambient temperature unless otherwise specified.

TVS Protection Array TPA1255

• DFN2018-6 • Low Clamping Voltage

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
DP,DM,USB ID (Pins 2,3,4)						
Reverse Working Voltage	V_{RWM}			4	V	Any I/O to ground
Breakdown Voltage	V_{BR}	4.5			V	$I_T = 1mA$, any I/O to ground
Reverse Leakage Current	I_R			0.1	μA	$V_{RWM} = 3.3V$, any I/O to ground
Clamping Voltage	V_C			10.5	V	$I_{PP} = 1A$ (8 x 20 μs pulse), any I/O to ground
Clamping Voltage	V_C			15	V	$I_{PP} = 22A$ (8 x 20 μs pulse), any I/O to ground
Junction Capacitance	C_J		0.35	0.5	pF	$V_R = 0V$, $f = 1MHz$, any I/O to ground

Note: I/O pins are 2,3,4

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Vbus TVS(Pin 1)						
Reverse Working Voltage	V_{RWM}			12	V	Pin1 to ground
Breakdown Voltage	V_{BR}	12.5	13.3	16.5	V	$I_T = 1mA$, pin1 to ground
Reverse Leakage Current	I_R			0.2	μA	$V_{RWM} = 4.5V$, pin1 to ground
Forward Voltage	V_F	0.6	0.7	1	V	$I_F = 10mA$, pin1 to ground
Clamping Voltage	V_C			18	V	$I_{PP} = 240A$ (8 x 20 μs pulse), pin1 to ground
Clamping Voltage	V_C			25	V	$I_{PP} = 22A$ (8 x 20 μs pulse), pin1 to ground
Junction Capacitance	C_J			1000	pF	$V_R = 0V$, $f = 1MHz$, pin1 to ground

Symbol	Parameter	Explanation
(1) I_{PP}	Peak pulse current	The maximum surge current that flows though the TVS
(2) V_{BR}	Breakdown voltage	The Voltage that flows though the TVS at a specified test current (I_T)
(3) I_T	Test current	A specified test current that flows though the TVS
(4) V_{RWM}	Stand-off voltage	Maximum voltage that can be applied to the TVS without operation
(5) I_R	Leakage current @ V_R	Current measured at V_R
(6) V_C	Clamping voltage	Peak voltage measured across the suppressor at a specified I_{pp} (peak impulse current)

TVS Protection Array TPA1255

DFN2018-6 Low Clamping Voltage

Figure 1. Junction Capacitance vs. Reverse Voltage

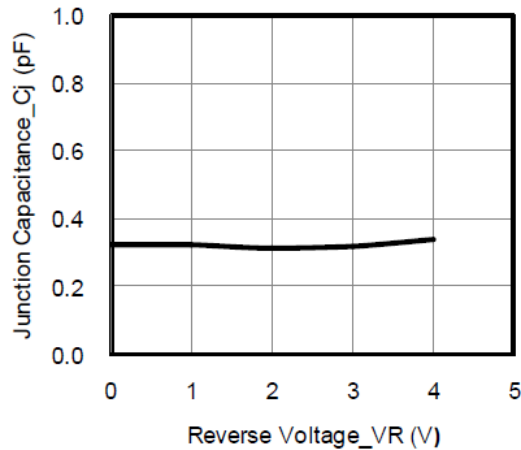


Figure 2. Peak Pulse Power Rating Curve

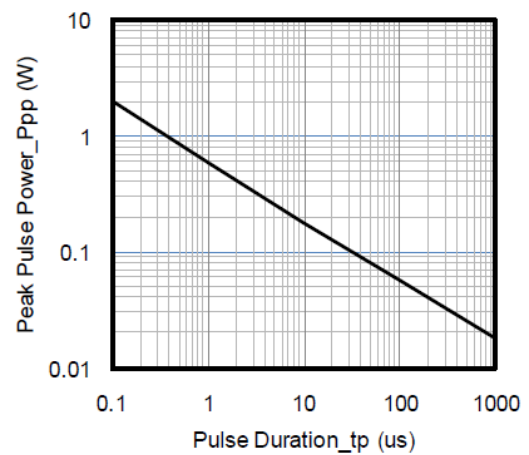


Figure 3. Clamping Voltage vs. Peak Pulse Current(Vbus)

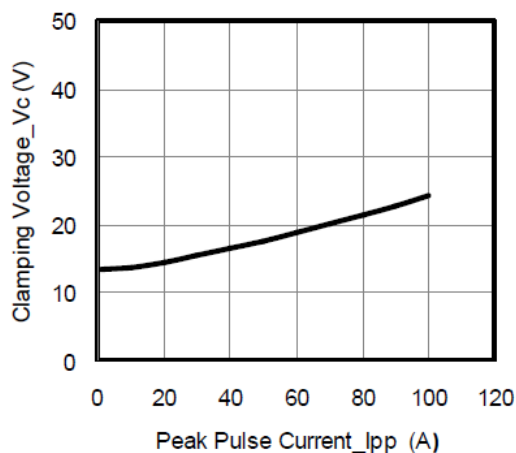


Figure 4. Power Derating Curve

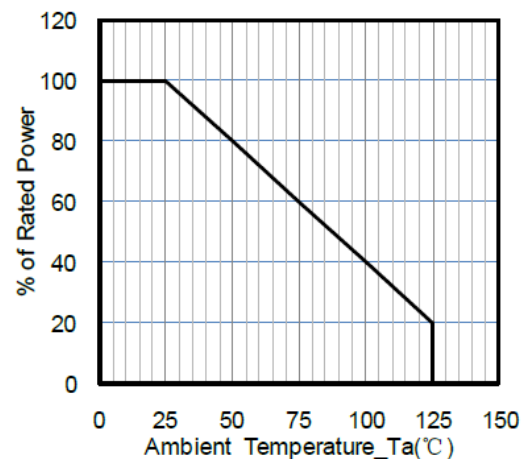


Figure 5. Clamping Voltage vs. Peak Pulse Current(Pin2,3,4)

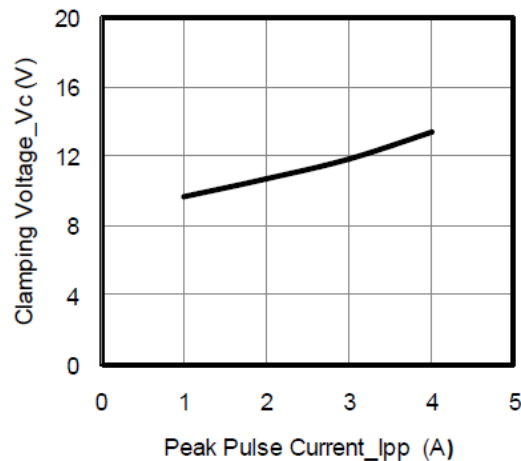
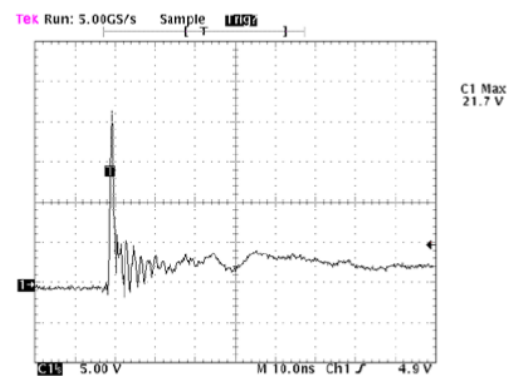


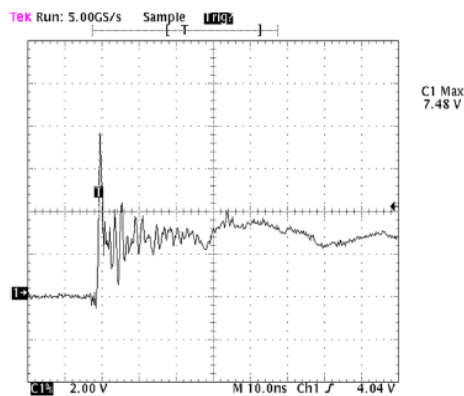
Figure 6. ESD Clamping Voltage (Vbus)



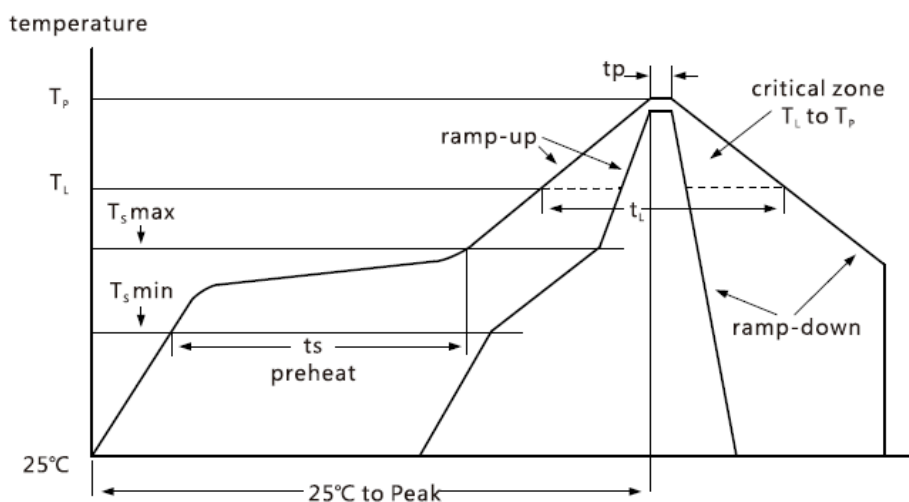
TVS Protection Array TPA1255

• DFN2018-6 • Low Clamping Voltage

Figure 7. ESD Clamping Voltage 8KV Contact (Pin2,3,4)



Reflow Soldering Profile



Reflow Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T_s max to T_p)	3°C/s maximum	3°C/s maximum
Preheat		
Temperature minimum ($T_{s,min}$)	100°C	150°C
Temperature maximum ($T_{s,max}$)	150°C	200°C
Time ($T_{s,min}$ to $T_{s,max}$)	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (T_L)	183°C	217°C
Time (t_L)	60 s to 150 s	60 s to 150 s
Peak/classification temperature (T_p)	235°C	260°C
Number of allowed reflow cycles	3	3
Time within 5 °C of actual peak temperature (t_p)	10 s to 30 s	10 s to 30 s
Ramp-down rate	6°C/s maximum	6°C/s maximum
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum

TVS Protection Array TPA1255

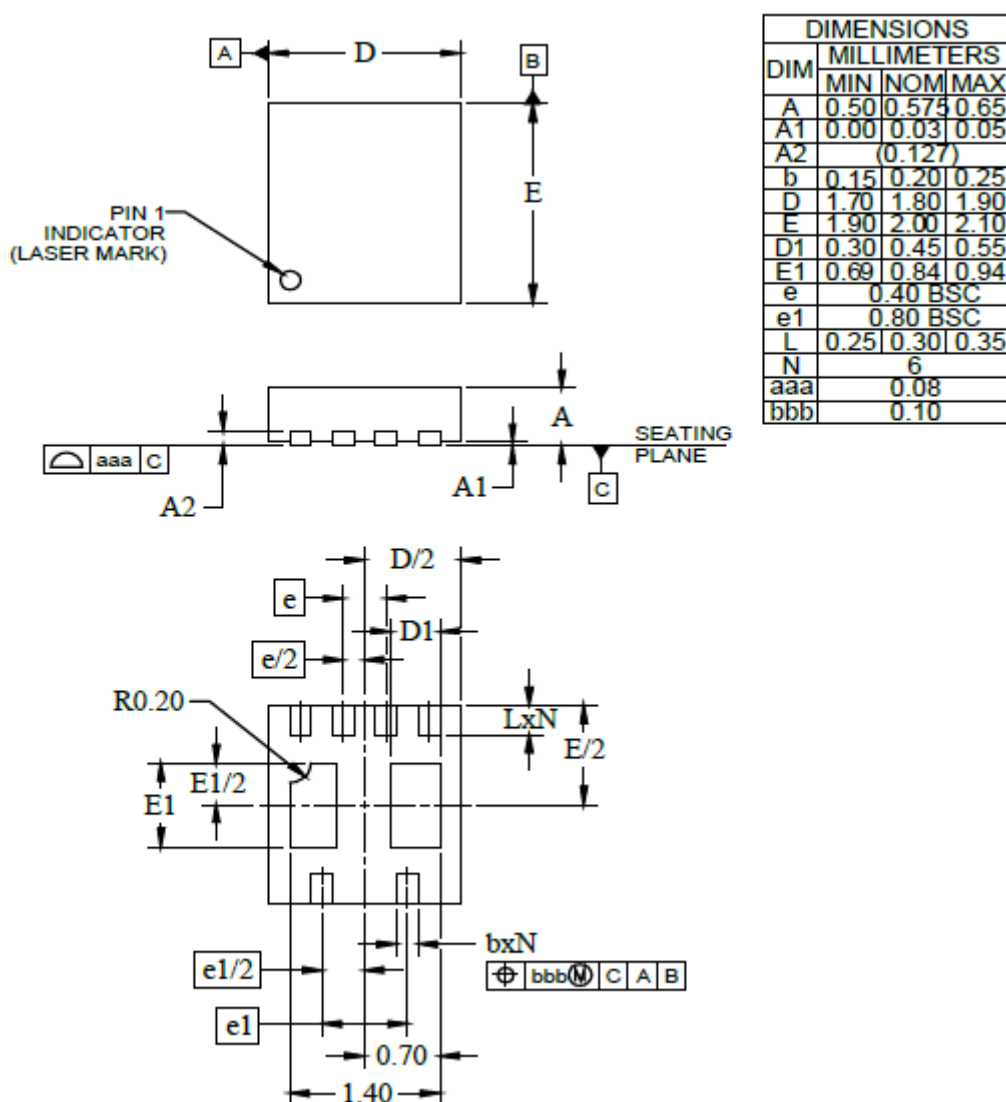
• DFN2018-6 • Low Clamping Voltage

Product Marking



1255P = Device Marking Code
YYWW = Date Code
Dot denotes Pin1

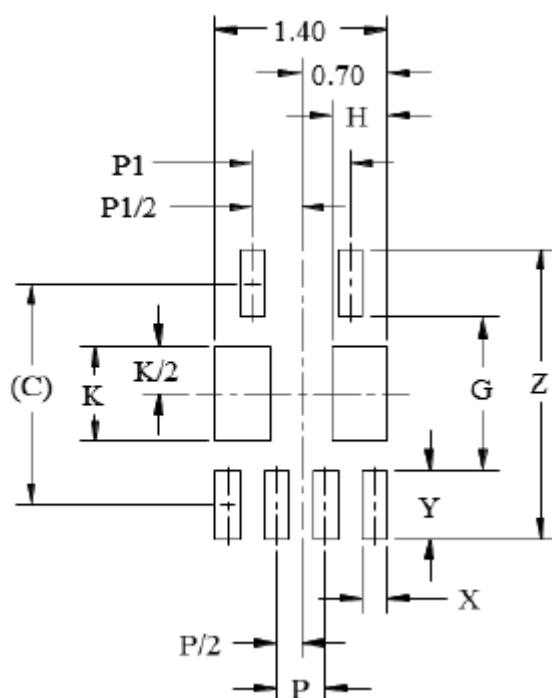
Package Dimension (DFN2018-6) Unit: mm



TVS Protection Array TPA1255

• DFN2018-6 • Low Clamping Voltage

Layout Dimension Unit: mm



DIMENSIONS	
DIM	MILLIMETERS
C	(1.95)
G	1.35
H	0.45
K	0.84
P	0.40
P1	0.80
X	0.20
Y	0.60
Z	2.55

Packaging

Part	Component Package	Quantity	Packaging Option
TPA1255	DFN2018-6	3kpcs	Tape & Reel