

Description

The DC2405P5 is designed for asymmetrical (5V to -24V) protection in multi-point data transmission application, making this device an ideal solution for protecting voltage sensitive high-speed data lines. The DC2405P5 complies with the IEC 61000-4-2 (ESD) with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a lead-free DFN2510-10 package. The small size, low capacitance and high ESD surge protection make DC2405P5 an ideal choice to protect one data line of the Local Information Network (LIN) in an automotive.

Features

- ◆ Ultra low leakage: nA level
- ◆ Low operating voltage: 24V/5V
- ◆ Low clamping voltage
- ◆ Up to 4 lines protects
- ◆ Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
- ◆ ROHS Compliant

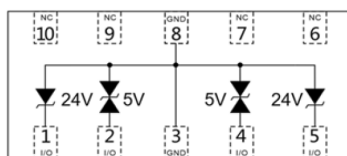
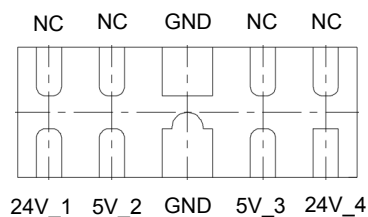
Mechanical Characteristics

- ◆ Lead Finish: Matte Tin
- ◆ Case Material: "Green" Molding Compound
- ◆ Moisture Sensitivity: Level 3 per J-STD-020
- ◆ Terminal Connections: See Diagram Below
- ◆ Marking Information: See Below

Applications

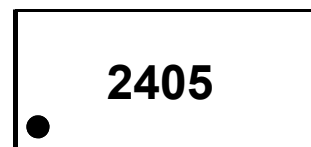
- ◆ USB Type-C
- ◆ Monitors and flat panel displays
- ◆ Set-top box and digital TV
- ◆ Video graphics cards
- ◆ Digital video interface(DVI)
- ◆ Notebook Computers
- ◆ PCI express and Serial SATA ports

Dimensions and Pin Configuration



Circuit and Pin Schematic

Marking Information



2405 = Device Marking Code
Dot denotes Pin1

Ordering Information

Part Number	Marking	Packaging	Reel Size
DC2405P5	2405	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

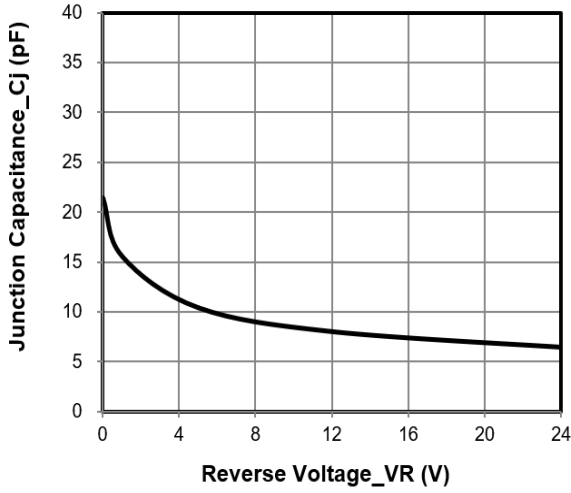
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 μs)	Ppk	140/100	W
Peak Pulse Current ($t_p = 8/20\mu\text{s}$), Pin 1&5 to GND	Ipp	3	A
Peak Pulse Current ($t_p = 8/20\mu\text{s}$), Pin 2&4 to GND		8	
ESD per IEC 61000-4-2 (Air)	VESD	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature Range	TJ	-40 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

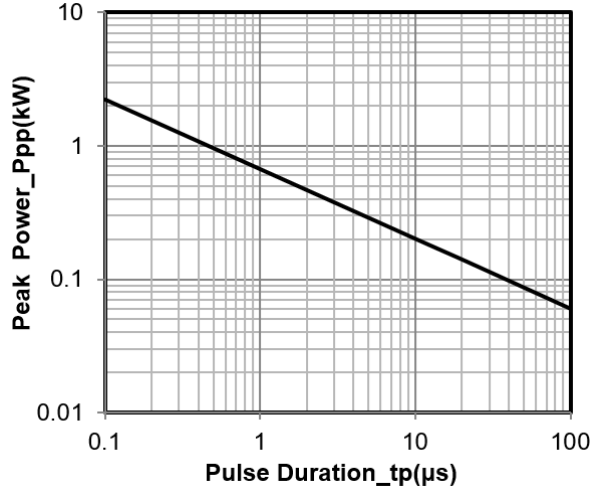
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	Pin 1&5 to GND
Breakdown Voltage	VBR	27			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 24V
Clamping Voltage	VC			37	V	I _{PP} = 1A (8 x 20 μs pulse)
Clamping Voltage	VC			45	V	I _{PP} = 3A (8 x 20 μs pulse)
Junction Capacitance	CJ		20		pF	VR = 0V, f = 1MHz

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	Pin 2&4 to GND
Breakdown Voltage	VBR	6			V	IT = 1mA
Reverse Leakage Current	IR			0.2	μA	VRWM = 5V
Clamping Voltage	VC			8.0	V	I _{PP} = 1A (8 x 20 μs pulse)
Clamping Voltage	VC			12.5	V	I _{PP} = 8A (8 x 20 μs pulse)
Junction Capacitance	CJ		18		pF	VR = 0V, f = 1MHz

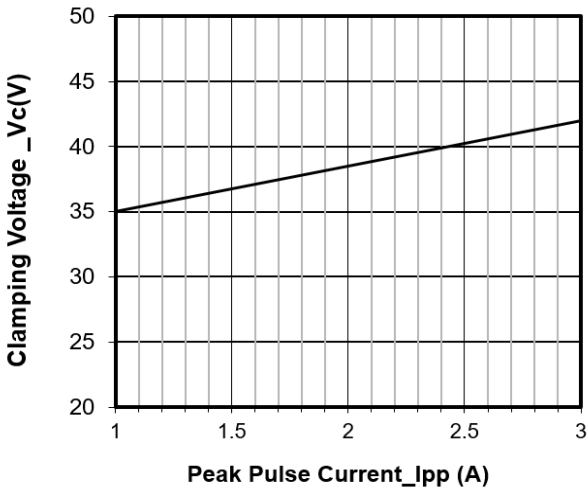
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



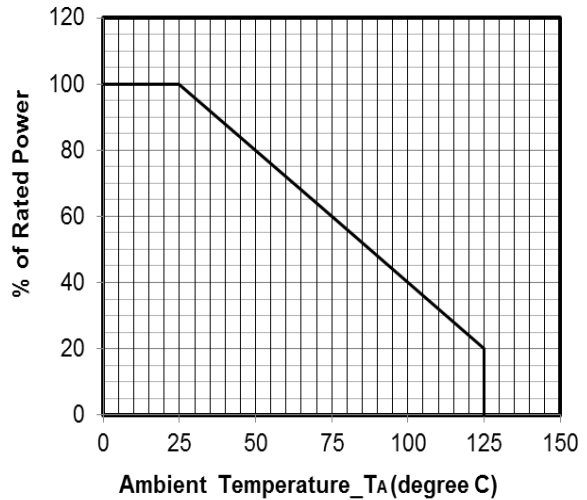
Junction Capacitance vs. Reverse Voltage



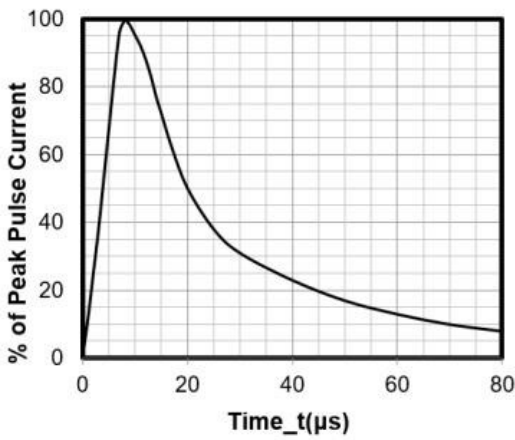
Peak Pulse Power vs. Pulse Time



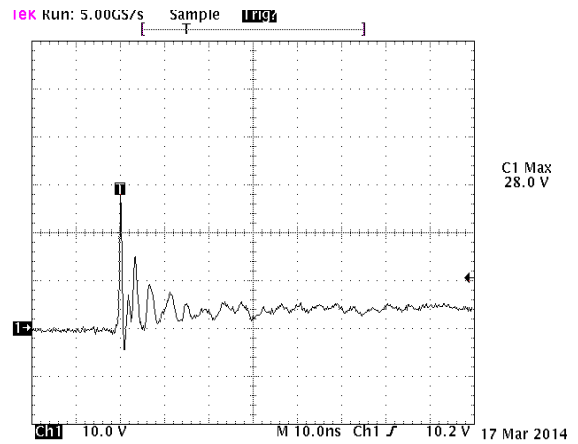
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



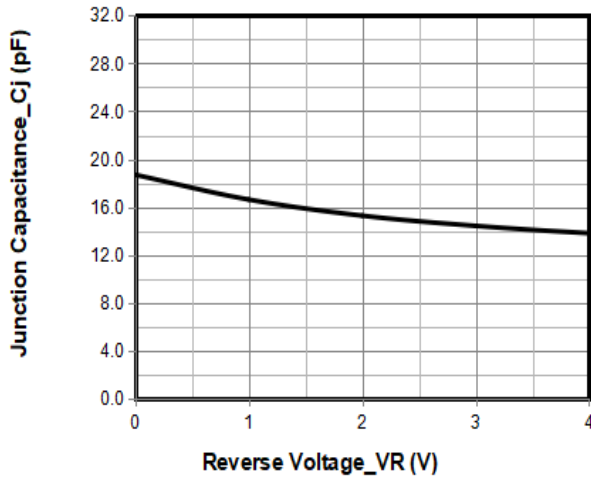
8 X 20μs Pulse Waveform



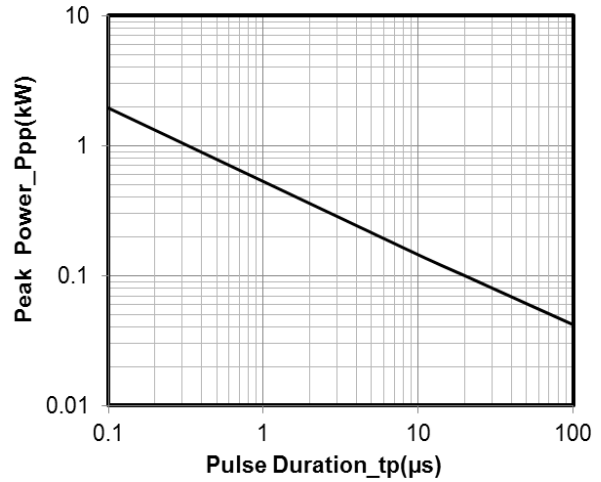
Note: Data is taken with a 10x attenuator

**ESD Clamping Voltage
8 kV Contact per IEC61000-4-2**

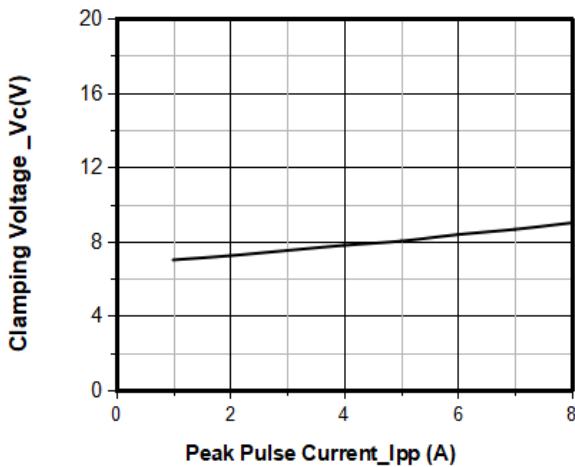
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



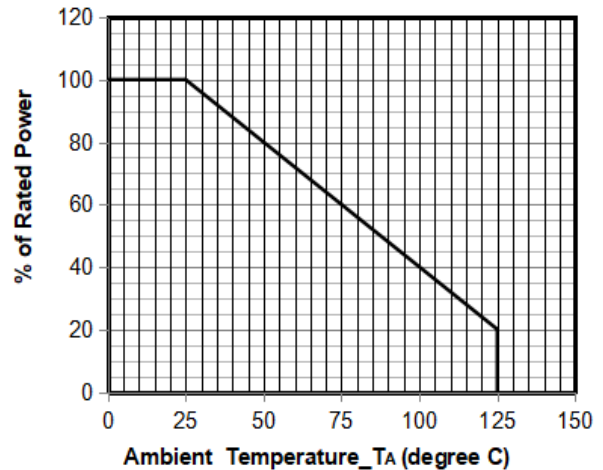
Junction Capacitance vs. Reverse Voltage



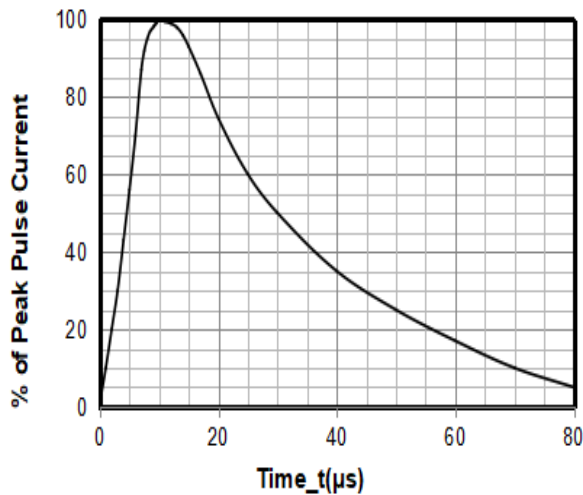
Peak Pulse Power vs. Pulse Time



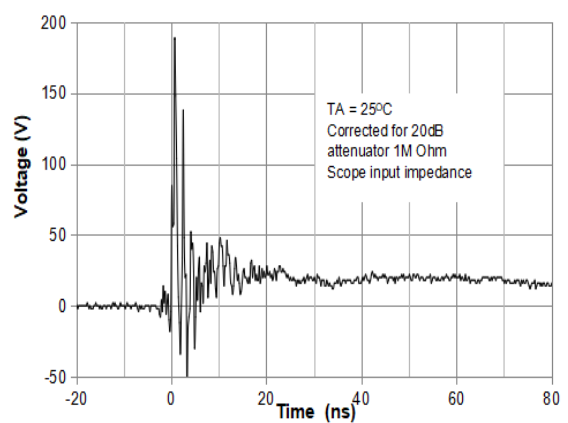
Clamping Voltage vs. Peak Pulse Current (tp = 8/20 s)



Power Derating Curve



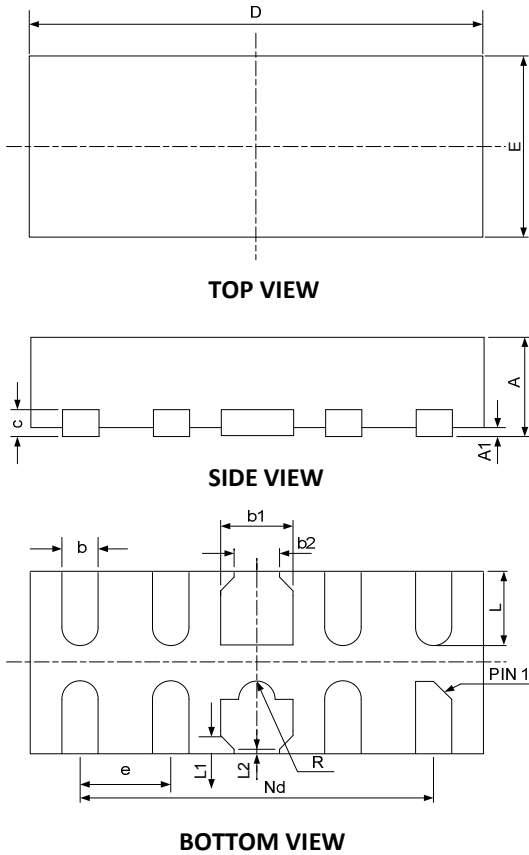
8 X 20 s Pulse Waveform



ESD Clamping Voltage

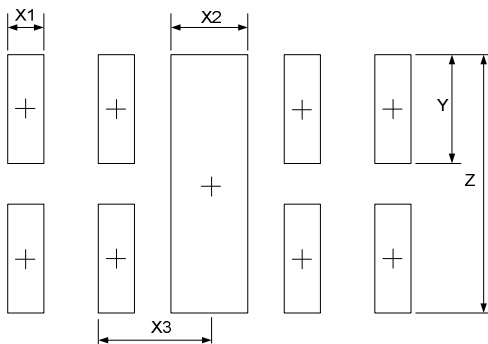
8 kV Contact per IEC61000-4-2

DFN2510-10 Package Outline Drawing



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	0.35	0.40	0.45	0.014	0.016	0.018
b2	0.20	0.25	0.30	0.008	0.010	0.012
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.45	2.50	2.55	0.098	0.100	0.102
e	0.50BSC			0.020BSC		
Nd	2.00BSC			0.080BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.35	0.40	0.45	0.014	0.016	0.018
L1	0.075REF			0.003REF		
L2	0.050REF			0.002REF		
h	0.08	0.12	0.15	0.003	0.005	0.006
R	0.05	0.10	0.15	0.002	0.004	0.006

Suggested Land Pattern



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X1	0.200	0.008
X2	0.400	0.016
X3	0.500	0.020
Y	0.600	0.024
Z	1.400	0.056

Contact Information

Changzhou D-first Electronics CO.,Ltd.

www.first-electronic.com

Email: xhf@first-electronic.cn

Phone: +86 (0519) -8817 1671