



**THE DATASHEET OF  
GRM033R61E151KA01D**



## Product Summary

$V_{BR}$ (min)	$I_{PP}$ (max)	$C_T$ (typ)
6.4	15A	156pF

## Description

The DIODES™ D5V0HA2U3SO is a dual voltage suppressor designed to protect components which are connected to data and transmission lines against Electronic Static Discharge (ESD).

The device clamps the voltage just above the logic level supply for positive transients and to a diode drop below ground for negative transients. It works as bi-directional suppressor by connecting only pin 1 to 2.

## Applications

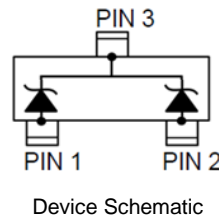
- Computers and peripherals
- Communication systems
- Portable electronics
- Cellular handset and accessories

## Features

- 300W Peak Power Dissipation per Line (8/20 $\mu$ s Waveform)
- Provides ESD Protection per IEC 61000-4-2 Standard: Air  $\pm$ 30kV, Contact  $\pm$ 30kV
- 2 Channels Unidirectional of ESD Protection
- Ultra-Low Leakage Current:  $I_{RM} < 1 \mu A @ V_{BR}$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208<sup>(e3)</sup>
- Weight: 0.009 grams (Approximate)

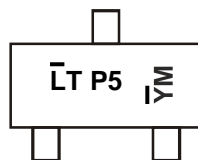


## Ordering Information

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
D5V0HA2U3SO-7	LT P5	7	8	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



LT P5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: J = 2022)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2019	.....	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	G	.....	J	K	L	M	N	O	P	R	S	T

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Peak Pulse Power Dissipation	P <sub>PP</sub>	300	W	8/20μs, per Figure 1
Peak Pulse Current	I <sub>PP</sub>	15	A	8/20μs, per Figure 1
ESD Protection – Contact Discharge	V <sub>ESD_Contact</sub>	±30	kV	IEC 61000-4-2 Standard
ESD Protection – Air Discharge	V <sub>ESD_Air</sub>	±30	kV	IEC 61000-4-2 Standard

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Package Power Dissipation (Note 4)	P <sub>D</sub>	250	mW
Thermal Resistance, Junction to Ambient (Note 4)	R <sub>θJA</sub>	500	°C/W
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C
Soldering Temperature, t max =10s	T <sub>L</sub>	260	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Standoff Voltage	V <sub>RWM</sub>	—	—	5	V	—
Channel Leakage Current (Note 5)	I <sub>RM</sub>	—	—	1	uA	V <sub>RWM</sub> = 5V
Breakdown Voltage	V <sub>BR</sub>	6.4	—	7.2	V	I <sub>R</sub> = 1mA
Clamping Voltage, Positive Transients	V <sub>CL</sub>	—	—	9.8	V	I <sub>PP</sub> = 1A, tp = 8/20μS, Figure 1
		—	—	20	V	I <sub>PP</sub> = 15A, tp = 8/20μS, Figure 1
Channel Input Capacitance	C <sub>T</sub>	—	156	160	pF	V <sub>R</sub> = 0V, f = 1MHz

- Notes: 4. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on our website at <http://www.diodes.com/package-outlines.html>  
 5. Short duration pulse test used to minimize self-heating effect.

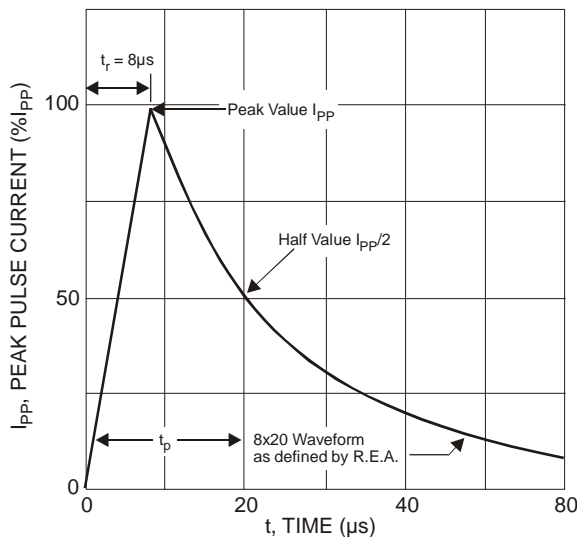
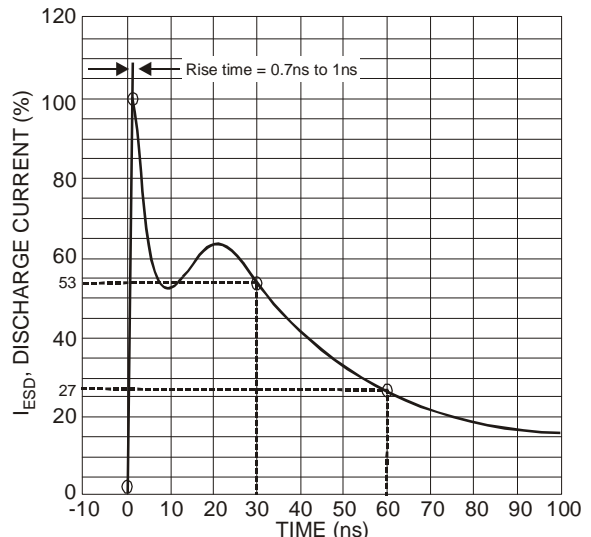
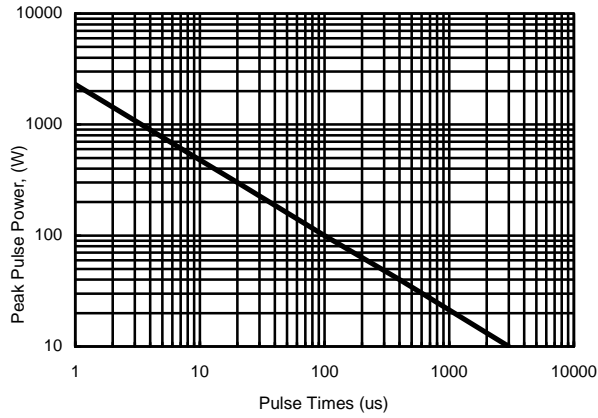


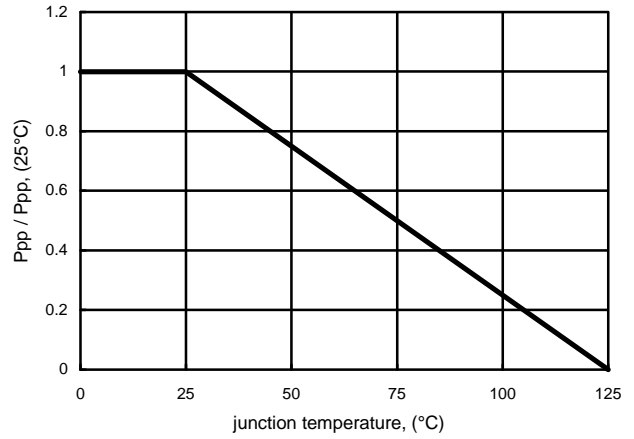
Figure 1 Pulse Waveform


 Figure 2 ESD Discharge Current Wave Form  
 IEC 6100-4-2 (330Ω/150pF)

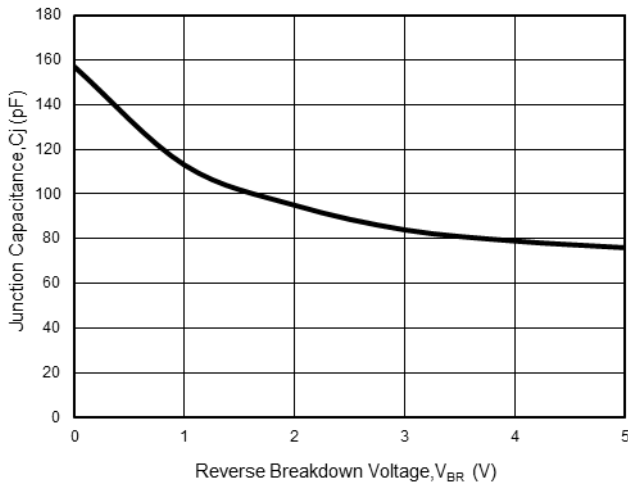
**FIG.3- Power Dissipation Versus Pulse Time**



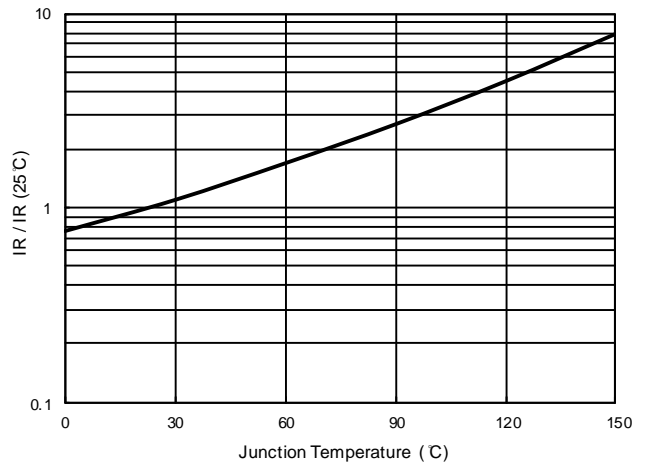
**FIG.4- Peak Pulse Power Versus Tj**



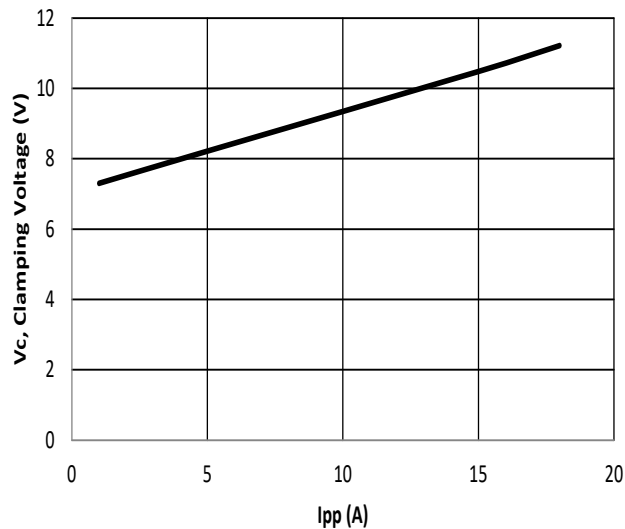
**FIG.5- Typical Junction Capacitance**



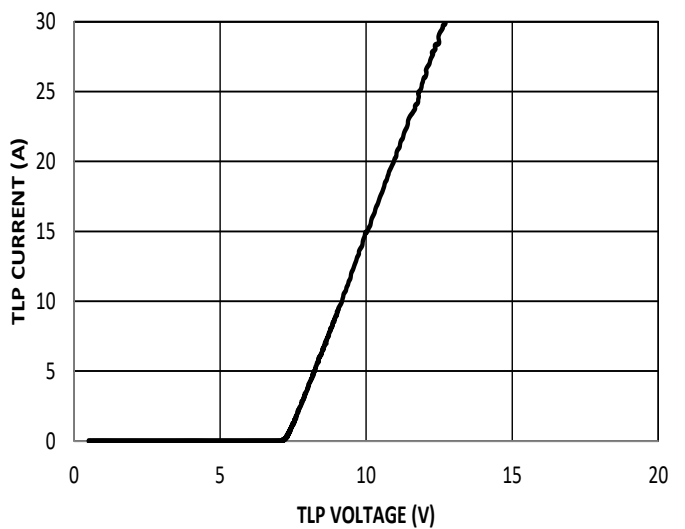
**FIG.6- Reverse Leakage Current Versus Tj**



**FIG.7- Clamping Voltage Characteristics (tp=8/20μs)**

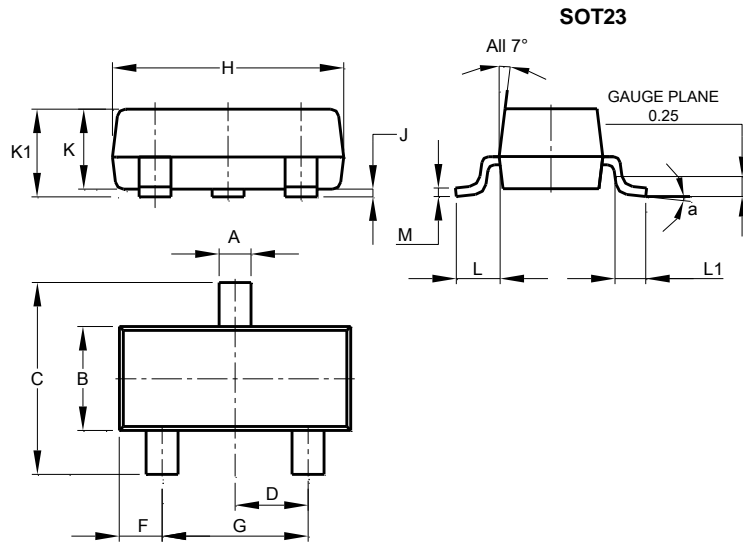


**FIG.8- TLP Curve (tp=100ns)**



## Package Outline Dimensions

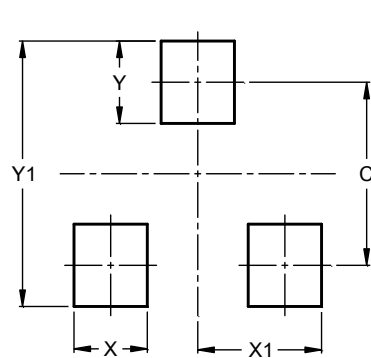
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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