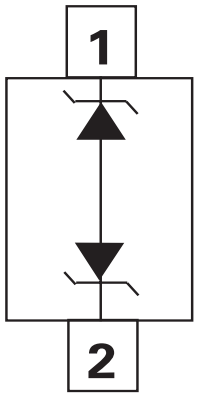
SD-C Series 450W Discrete Bidirectional TVS Diode

RoHS Pb GREEN

Pinout and Functional Block Diagram



Description

The SD-C series can safely absorb repetitive ESD strikes at ±30kV (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 30A (SD05C) of 8/20µs induced surge current (IEC 61000-4-5 2nd Edition) with very low clamping voltages.

Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, 30A (8/20µs as defined in IEC 61000-4-5 2nd edition) SD05C
- Low clamping voltage
- Low leakage current
- Small SOD323 package fits 0805 footprints
- AEC-Q101 qualified
- RoHS Compliant and Lead Free
- Moisture Sensitivity Level

Applications

- Switches / Buttons
- Test Equipment / Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals
- Automotive Electronics

Additional Information

Datasheet | **Resources** | **Samples**

Revision: 08/22/19

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
P_{pk}	Peak Pulse Power (t_p=8/20µs)	450	W
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

Note:

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

SD05C Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	5.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	6.0	-	-	V
Reverse Leakage Current	I_{LEAK}	V_R=5V	-	-	1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	10.0	V
		I_{PP}=10A, t_p=8/20µs, Fwd	-	-	14.5	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to Ground	-	0.31	-	Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs	-	-	30.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-	-	kV
		IEC 61000-4-2 (Air Discharge)	±30	-	-	kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	-	200	pF

SD12C Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	12.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	13.3	-	-	V
Reverse Leakage Current	I_{LEAK}	V_R=12V	-	-	1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	18.5	V
		I_{PP}=10A, t_p=8/20µs, Fwd	-	-	23.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, tp=100ns, I/O to Ground	-	0.41	-	Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs	-	-	17.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-	-	kV
		IEC 61000-4-2 (Air Discharge)	±30	-	-	kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	-	100	pF

Revision: 08/22/19

SD15C Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	15.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	16.7	-	-	V
Reverse Leakage Current	I_{LEAK}	V_R=15V	-	-	1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	24.0	V
		I_{PP}=10A, t_p=8/20µs, Fwd	-	-	31.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, tp=100ns, I/O to Ground	-	0.46	-	Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs	-	-	12.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-	-	kV
		IEC 61000-4-2 (Air Discharge)	±30	-	-	kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	-	75	pF

SD24C Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	24.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	26.7	-	-	V
Reverse Leakage Current	I_{LEAK}	V_R=24V	-	-	1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	34.0	V
		I_{PP}=5A, t_p=8/20µs, Fwd	-	-	42.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, tp=100ns, I/O to Ground	-	0.62	-	Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs	-	-	7.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-	-	kV
		IEC 61000-4-2 (Air Discharge)	±30	-	-	kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	-	50	pF

SD36C Electrical Characteristics (T_{OP}=25°C)

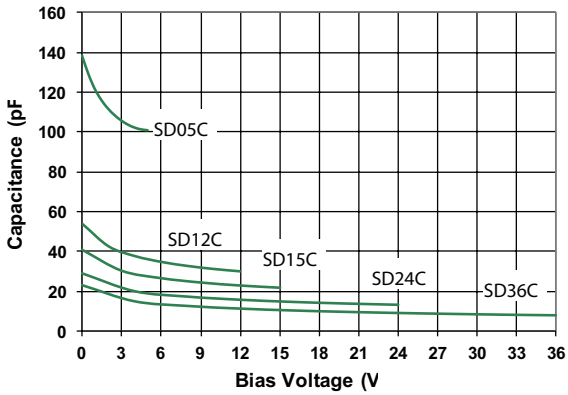
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA	-	-	36.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	40.0	-		V
Reverse Leakage Current	I_{LEAK}	V_R=36V	-	-	1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd	-	-	50.0	V
		I_{PP}=4A, t_p=8/20µs, Fwd	-	-	60.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, tp=100ns, I/O to Ground	-	0.68		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs	-	-	5.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30	-		kV
		IEC 61000-4-2 (Air Discharge)	±30	-		kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz	-	-	30	pF

Note:

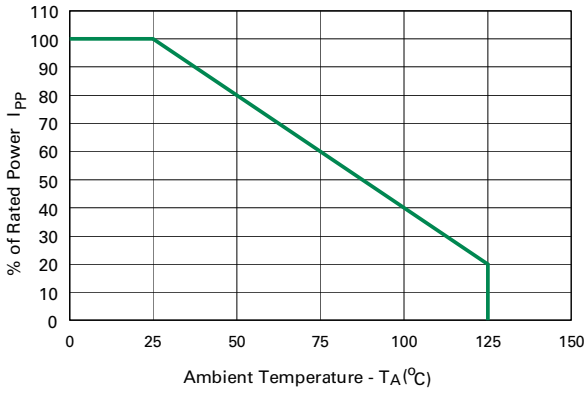
1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

Revision: 08/22/19

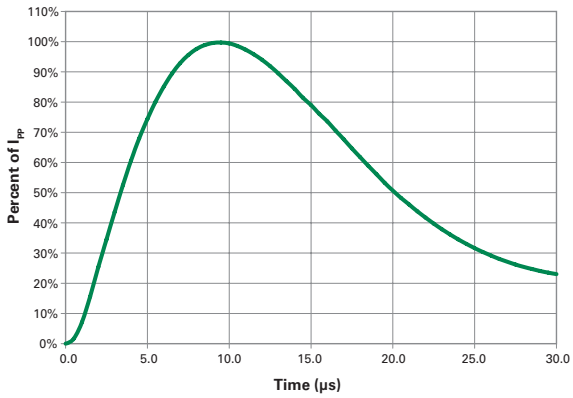
Capacitance vs. Bias



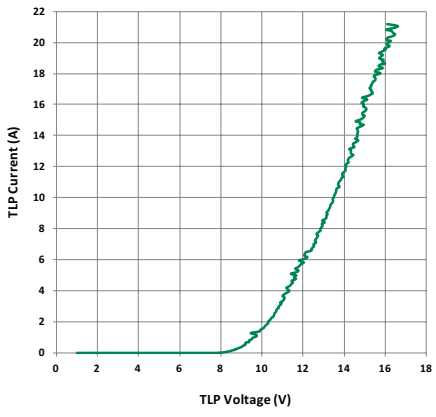
Power Derating Curve



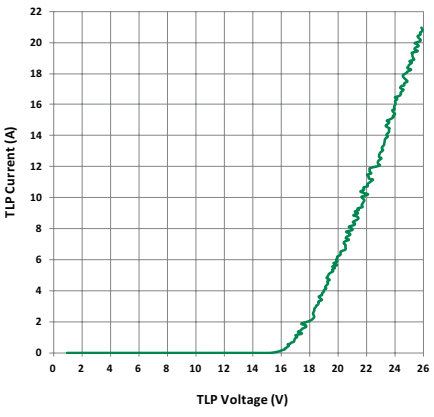
8/20 µs Pulse Waveform



SD05C Transmission Line Pulsing(TLP) Plot

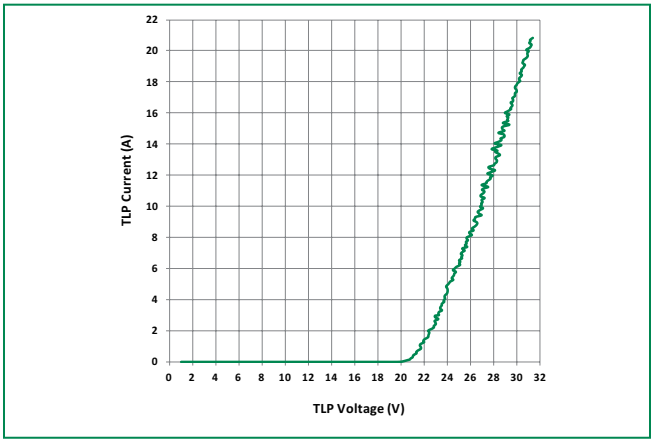


SD12C Transmission Line Pulsing(TLP) Plot

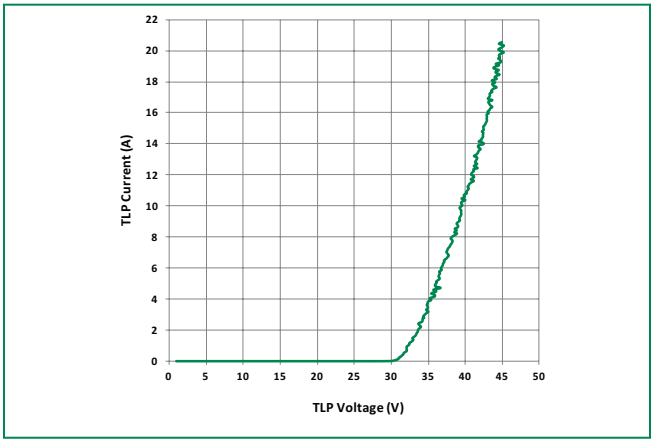


Revision: 08/22/19

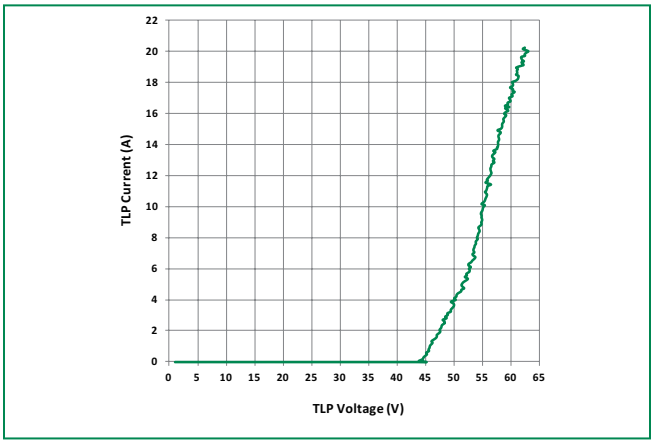
SD15C Transmission Line Pulsing(TLP) Plot



SD24C Transmission Line Pulsing(TLP) Plot

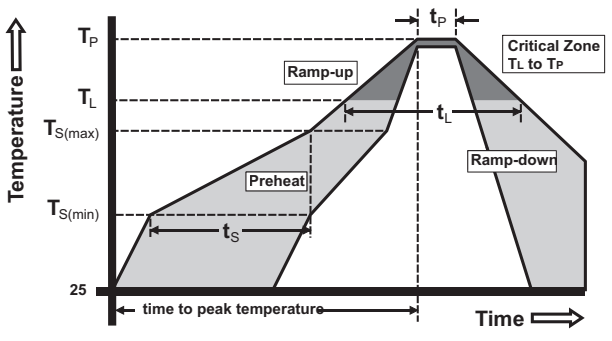


SD36C Transmission Line Pulsing(TLP) Plot



Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



Revision: 08/22/19

Littelfuse
Expertise Applied | Answers Delivered

TVS Diode Array (SPA® Diodes)

General Purpose ESD Protection - SD-C Series

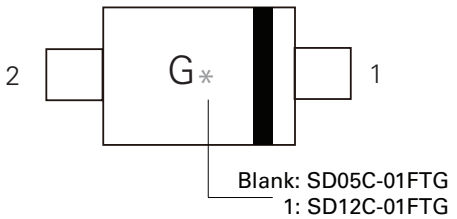
Product Characteristics

Lead Plating	Matte Tin
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Substrate material	Silicon
Body Material	Molded Compound
Flammability	UL Recognized compund meeting flammability rating V-0

Ordering Information

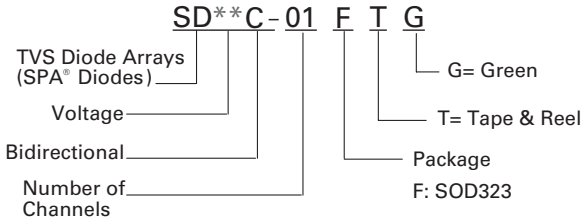
Part Number	Package	Min. Order Qty.
SD05C-01FTG	SOD323	3000
SD12C-01FTG	SOD323	3000
SD15C-01FTG	SOD323	3000
SD24C-01FTG	SOD323	3000
SD36C-01FTG	SOD323	3000

Part Marking System

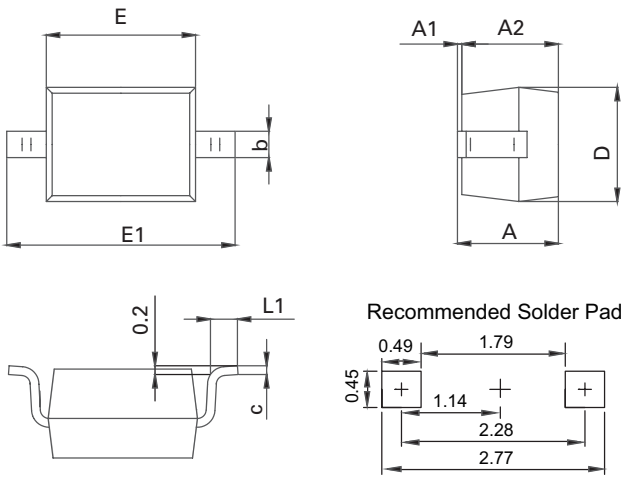


Blank: SD05C-01FTG
1: SD12C-01FTG
2: SD15C-01FTG
3: SD24C-01FTG
4: SD36C-01FTG

Part Numbering System



Package Dimensions -SOD323

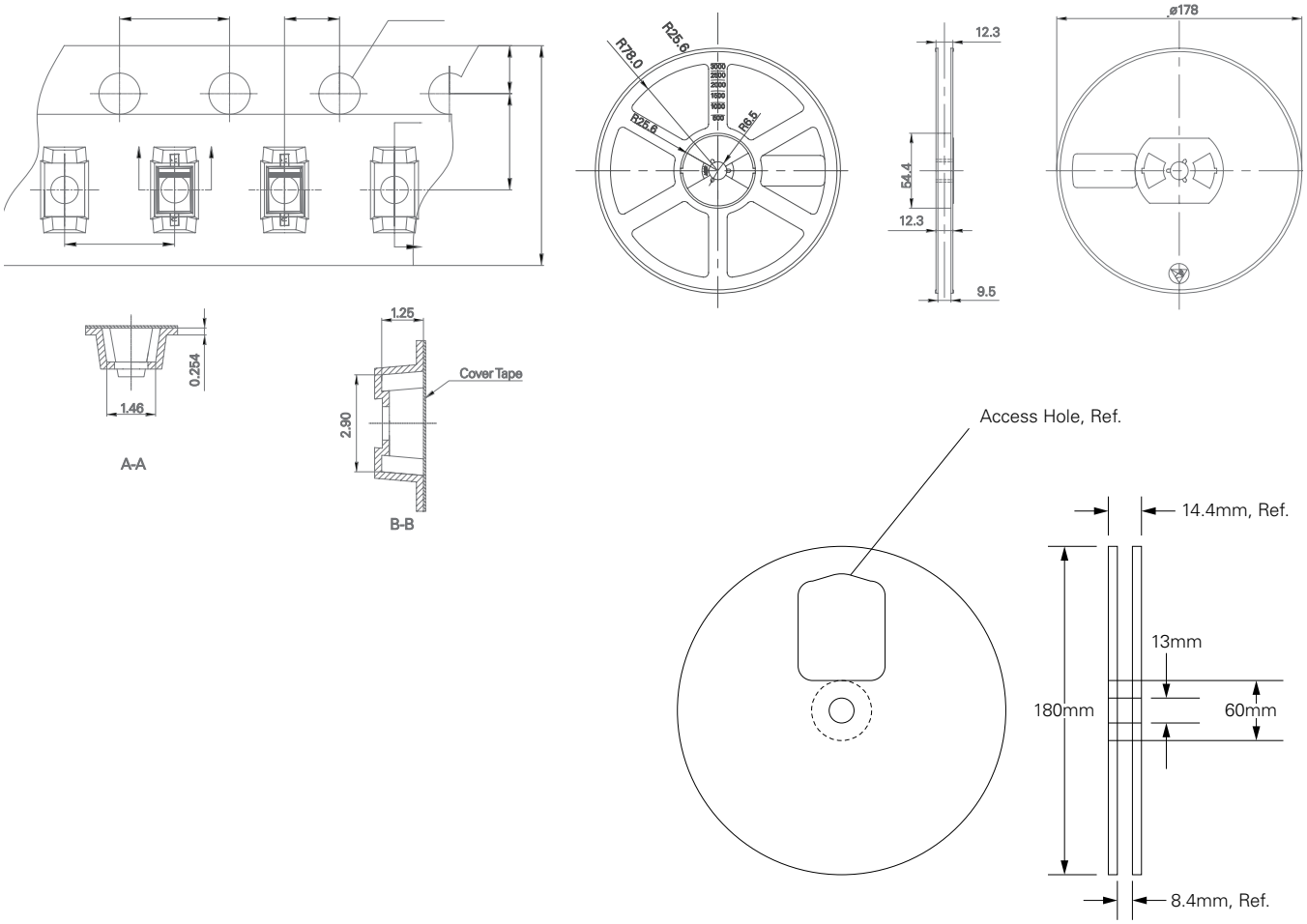


Unit: mm

Symbol	SOD323			
	Millimeters		Inches	
	Min	Max	Min	Max
A	0.8	1.14	0.031	0.045
A1	0.00	0.10	0.000	0.004
A2	0.80	1.04	0.031	0.014
b	0.25	0.35	0.010	0.014
c	0.08	0.15	0.003	0.006
D	1.15	1.45	0.045	0.057
E	1.60	1.90	0.063	0.075
E1	2.44	2.70	0.096	0.106
L1	0.25	0.45	0.010	0.018

Revision: 08/22/19

Embossed Carrier Tape & Reel Specification — SOD323



Revision: 08/22/19

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for ESD Suppressors / TVS Diodes ***category:***

Click to view products by Littelfuse ***manufacturer:***

Other Similar products are found below :

60KS200C D12V0H1U2WS-7 D18V0L1B2LP-7B 82356050220 D5V0F4U5P5-7 D5V0M5U6V-7 NTE4902 P4KE27CA P6KE11CA P6KE39CA-TP P6KE8.2A SA110CA SA60CA SA64CA SMBJ12CATR SMBJ8.0A SMLJ30CA-TP ESD112-B1-02EL E6327 ESD119B1W01005E6327XTSA1 ESD5V0J4-TP ESD5V0L1B02VH6327XTSA1 ESD7451N2T5G 19180-510 CPDT-5V0USP-HF 3.0SMCJ33CA-F 3.0SMCJ36A-F HSPC16701B02TP D3V3Q1B2DLP3-7 D55V0M1B2WS-7 DESD5V0U1BL-7B DRTR5V0U4SL-7 SCM1293A-04SO ESD203-B1-02EL E6327 SM12-7 SMF8.0A-TP SMLJ45CA-TP CEN955 W/DATA 82350120560 82356240030 VESD12A1A-HD1-GS08 CPDUR5V0R-HF CPDUR24V-HF CPDQC5V0U-HF CPDQC5V0USP-HF CPDQC5V0-HF D1213A-01LP4-7B D1213A-02WL-7 ESDLIN1524BJ-HQ 5KP100A 5KP15A