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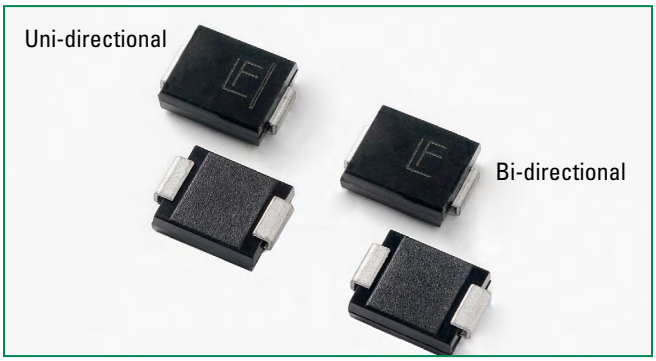
SMDJ-HR Series



Agency Approvals

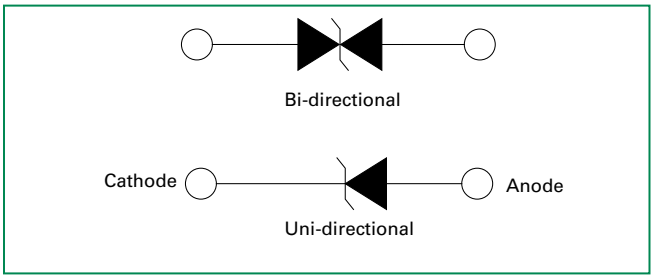
AGENCY	AGENCY FILE NUMBER
®	E230531

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T_A=25°C by 10/1000µs waveform (Fig.1)(Note 1), (Note 2)	P_{PPM}	3000	W
Power Dissipation on infinite heat sink at T_A=50°C	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A
Maximum Instantaneous Forward Voltage at 100A for Unidirectional only	V_F	3.5	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-65 to 150	°C
Typical Thermal Resistance Junction to Lead	R_{uJL}	15	°C/W
Typical Thermal Resistance Junction to Ambient	R_{uJA}	75	°C/W

Notes:
1. Non-repetitive current pulse , per Fig. 3 and derated above T_A = 25°C per Fig. 2.
2. Mounted on copper pad area of 0.31x0.31" (8.0 x 8.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Functional Diagram



Description

The SMDJ-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- V_{BR} @T_J= V_{BR}@25°C x (1+ αT x (T_J - 25))
  (αT:Temperature Coefficient)
- Glass passivated chip junction
- 3000W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 2µA above 12V
- High temperature soldering guaranteed: 260°C/40 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-O
- Meet MSL level1, per J-STD-020, LF maximun peak of 260°C
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- 2nd level interconnect is Pb-free per IPC/JEDEC J-STD-609A.01

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

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Electrical Characteristics

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (µA)	Agency Approval
		UNI	BI		MIN	MAX					
SMDJ5.0A-HR	SMDJ5.0CA-HR	RDE	DDE	5.0	6.40	7.00	10	9.2	326.1	800	X
SMDJ6.0A-HR	SMDJ6.0CA-HR	RDG	DDG	6.0	6.67	7.37	10	10.3	291.3	800	X
SMDJ6.5A-HR	SMDJ6.5CA-HR	RDK	DDK	6.5	7.22	7.98	10	11.2	267.9	500	X
SMDJ7.0A-HR	SMDJ7.0CA-HR	PDM	DDM	7.0	7.78	8.60	10	12.0	250.0	200	X
SMDJ7.5A-HR	SMDJ7.5CA-HR	PDP	DDP	7.5	8.33	9.21	1	12.9	232.6	100	X
SMDJ8.0A-HR	SMDJ8.0CA-HR	PDR	DDR	8.0	8.89	9.83	1	13.6	220.6	50	X
SMDJ8.5A-HR	SMDJ8.5CA-HR	PDT	DDT	8.5	9.44	10.40	1	14.4	208.3	20	X
SMDJ9.0A-HR	SMDJ9.0CA-HR	PDV	DDV	9.0	10.00	11.10	1	15.4	194.8	10	X
SMDJ10A-HR	SMDJ10CA-HR	PDX	DDX	10.0	11.10	12.30	1	17.0	176.5	5	X
SMDJ11A-HR	SMDJ11CA-HR	PDZ	DDZ	11.0	12.20	13.50	1	18.2	164.8	2	X
SMDJ12A-HR	SMDJ12CA-HR	PEE	DEE	12.0	13.30	14.70	1	19.9	150.8	2	X
SMDJ13A-HR	SMDJ13CA-HR	PEG	DEG	13.0	14.40	15.90	1	21.5	139.5	2	X
SMDJ14A-HR	SMDJ14CA-HR	PEK	DEK	14.0	15.60	17.20	1	23.2	129.3	2	X
SMDJ15A-HR	SMDJ15CA-HR	PEM	DEM	15.0	16.70	18.50	1	24.4	123.0	2	X
SMDJ16A-HR	SMDJ16CA-HR	PEP	DEP	16.0	17.80	19.70	1	26.0	115.4	2	X
SMDJ17A-HR	SMDJ17CA-HR	PER	DER	17.0	18.90	20.90	1	27.6	108.7	2	X
SMDJ18A-HR	SMDJ18CA-HR	PET	DET	18.0	20.00	22.10	1	29.2	102.7	2	X
SMDJ20A-HR	SMDJ20CA-HR	PEV	DEV	20.0	22.20	24.50	1	32.4	92.6	2	X
SMDJ22A-HR	SMDJ22CA-HR	PEX	DEX	22.0	24.40	26.90	1	35.5	84.5	2	X
SMDJ24A-HR	SMDJ24CA-HR	PEZ	DEZ	24.0	26.70	29.50	1	38.9	77.1	2	X
SMDJ26A-HR	SMDJ26CA-HR	PFE	DFE	26.0	28.90	31.90	1	42.1	71.3	2	X
SMDJ28A-HR	SMDJ28CA-HR	PFG	DFG	28.0	31.10	34.40	1	45.4	66.1	2	X
SMDJ30A-HR	SMDJ30CA-HR	PFK	DFK	30.0	33.30	36.80	1	48.4	62.0	2	X
SMDJ33A-HR	SMDJ33CA-HR	PFM	DFM	33.0	36.70	40.60	1	53.3	56.3	2	X
SMDJ36A-HR	SMDJ36CA-HR	PFP	DFP	36.0	40.00	44.20	1	58.1	51.6	2	X
SMDJ40A-HR	SMDJ40CA-HR	PFR	DFR	40.0	44.40	49.10	1	64.5	46.5	2	X
SMDJ43A-HR	SMDJ43CA-HR	PFT	DFT	43.0	47.80	52.80	1	69.4	43.2	2	X
SMDJ45A-HR	SMDJ45CA-HR	PFV	DFV	45.0	50.00	55.30	1	72.7	41.3	2	X
SMDJ48A-HR	SMDJ48CA-HR	PFX	DFX	48.0	53.30	58.90	1	77.4	38.8	2	X
SMDJ51A-HR	SMDJ51CA-HR	PFZ	DFZ	51.0	56.70	62.70	1	82.4	36.4	2	X
SMDJ54A-HR	SMDJ54CA-HR	RGE	DGE	54.0	60.00	66.30	1	87.1	34.4	2	X
SMDJ58A-HR	SMDJ58CA-HR	PGG	DGG	58.0	64.40	71.20	1	93.6	32.1	2	X
SMDJ60A-HR	SMDJ60CA-HR	PGK	DGK	60.0	66.70	73.70	1	96.8	31.0	2	X
SMDJ64A-HR	SMDJ64CA-HR	PGM	DGM	64.0	71.10	78.60	1	103.0	29.1	2	X
SMDJ70A-HR	SMDJ70CA-HR	PGP	DGP	70.0	77.80	86.00	1	113.0	26.5	2	X
SMDJ75A-HR	SMDJ75CA-HR	PGR	DGR	75.0	83.30	92.10	1	121.0	24.8	2	X
SMDJ78A-HR	SMDJ78CA-HR	PGT	DGT	78.0	86.70	95.80	1	126.0	23.8	2	X
SMDJ85A-HR	SMDJ85CA-HR	PGV	DGV	85.0	94.40	104.00	1	137.0	21.9	2	X
SMDJ90A-HR	SMDJ90CA-HR	PGX	DGX	90.0	100.00	111.00	1	146.0	20.5	2	X
SMDJ100A-HR	SMDJ100CA-HR	PGZ	DGZ	100.0	111.00	123.00	1	162.0	18.5	2	X
SMDJ110A-HR	SMDJ110CA-HR	PHE	DHE	110.0	122.00	135.00	1	177.0	16.9	2	X
SMDJ120A-HR	SMDJ120CA-HR	PHG	DHG	120.0	133.00	147.00	1	193.0	15.5	2	X
SMDJ130A-HR	SMDJ130CA-HR	PHK	DHK	130.0	144.00	159.00	1	209.0	14.4	2	X

Note:

1. For bidirectional type having V_R of 10 volts and less, the I_R limit is double.
2. 100% High Temperature Storage Life test and Reflow Simulation.
3. 100% HTRB(High Temperature Reverse Bias). For Unidirectional, 150C/100%VR/96hours, for Bidirectional, 150C/100%VR/192hrs(96hours for each direction for Bidirectional).
4. Each lot of parts will pass group B test requirement.

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Screen Process

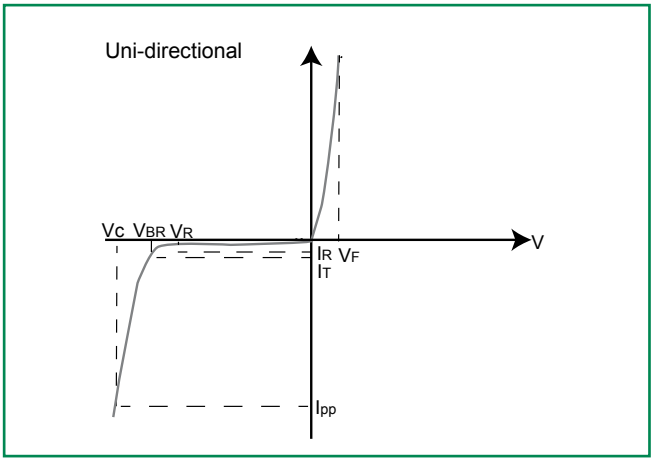
100% Vision Inspection	MIL-STD-750 method 2074
100% High Temperature Storage Life (168hrs,150°C)	MIL-STD-750 method 1031
100% X-RAY inspection	MIL-STD-750 method 2076
100% Temperature Cycle Test (-55 to150°C, 20 cycles, dwell time 15 min)	MIL-STD-750 method 1051
100% Reflow (2X)	JEDEC J-STD-020
100% Surge Test (2x)	MIL-STD-750 method 4066
100% HTRB 150°C Bias=VR(80% breakdown voltage, 96hrs, and each direction at 96 hrs for Bi-directional products)	MIL–STD–750 method 1038
Final Electrical Test(100% 3 sigma limit, 100% dynamic test and PAT limit)	MIL-STD-750 method 4016.4021.4011

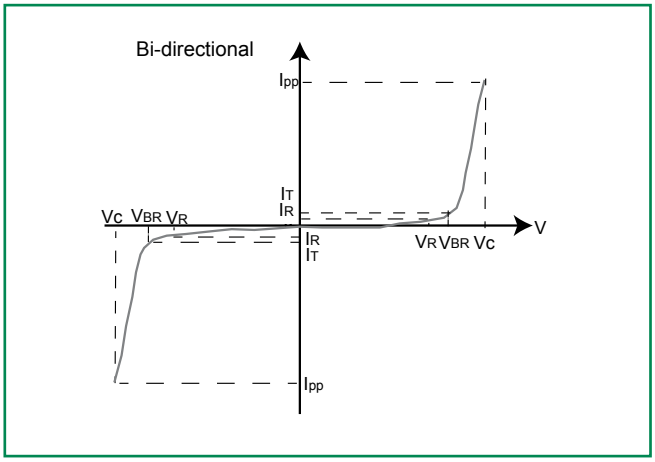
Note: Up-screen program can be specified by customer's request via contacting Littelfuse service

Group B Test Requirement

Screen	Method	Condition	Requirement
Surge test	10/1000 µs Peak Pluse Waveform	Maximum clamping Voltage (V_C) @ Peak Plus Current (I_{PP})	Sample Size 45 perform 10x Accept 0 failures
Burn - In (HTRB)	MIL-STD-750, Method 1038.5	Applied voltage 100% V_R@150°C	Sample size 45 340 hours (680 hours for bi-direction products, each direction 340 hours) Accept 0 failures
Electrical test	–	I_R@V_R, $V_{(BR)}$@I_T	Sample size 45 Accept 0 failures

I-V Curve Characteristics





P_{PPM} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage – Maximum voltagethat flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage – Peak voltage measured across the suppressor at a specified Ippm (peak impulse current)
I_R Reverse Leakage Current – Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

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Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

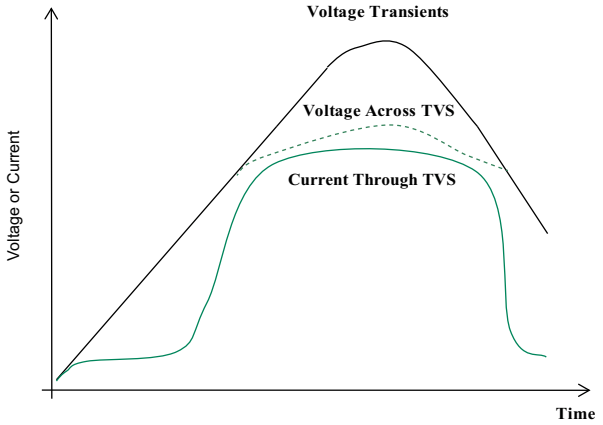

Figure 2 - Peak Pulse Power Rating

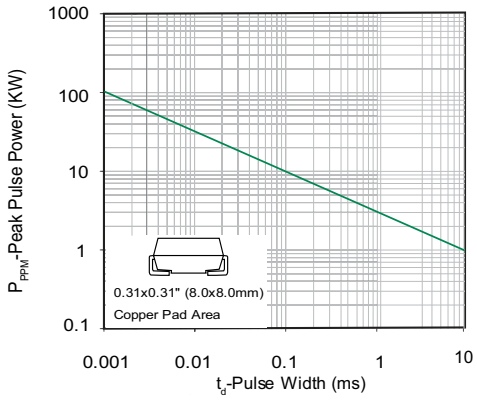

Figure 3 - Peak Pulse Power

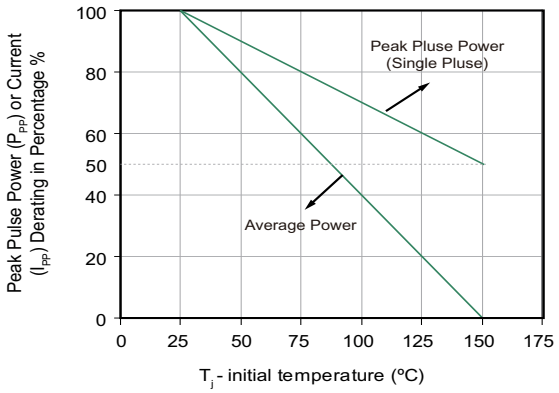

Figure 4 - Pulse Waveform

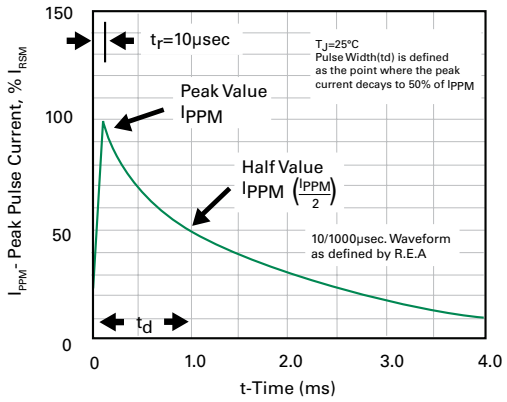

Figure 5 - Typical Junction Capacitance

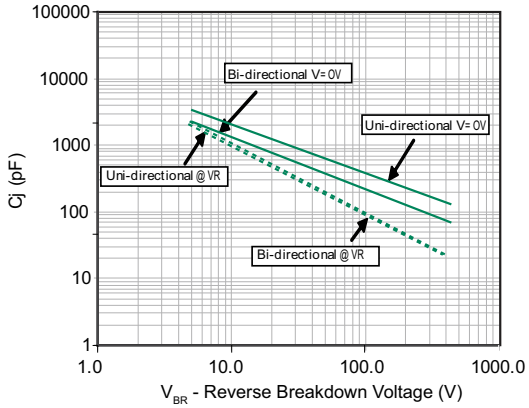

Figure 6 - Steady State Power Derating Curve

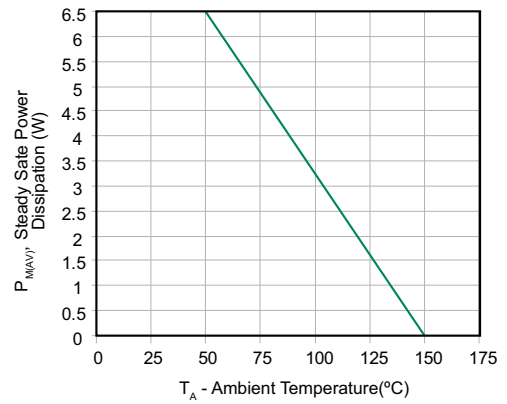

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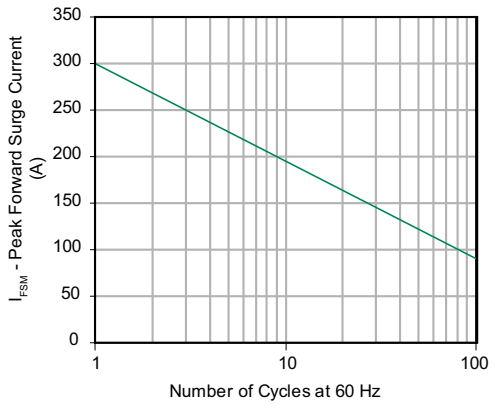
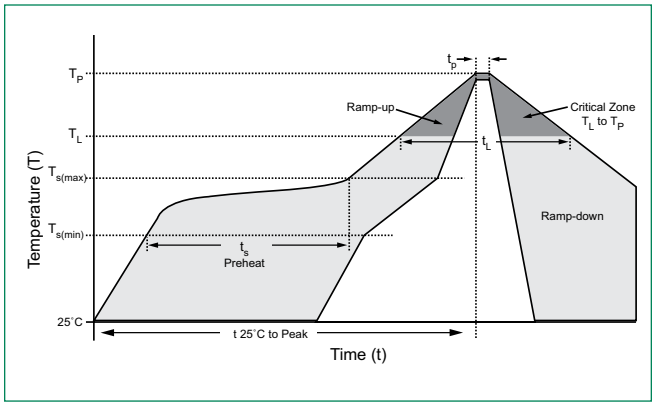
Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional only



Soldering Parameters

Reflow Condition		Lead–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
	-Time (min to max) (t_s)	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		280°C



Physical Specifications

Weight	0.007 ounce, 0.21 grams
Case	JEDEC DO214AB. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106
MSL	JEDEC-J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-B106

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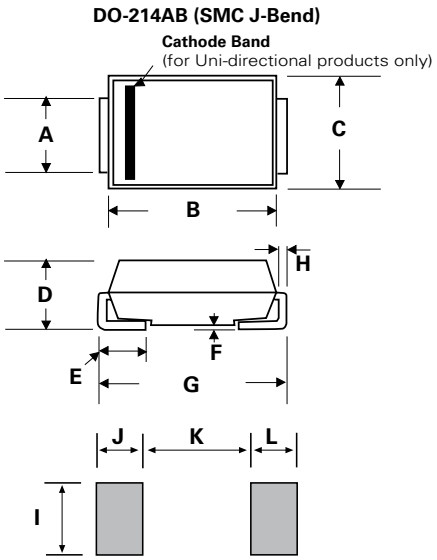
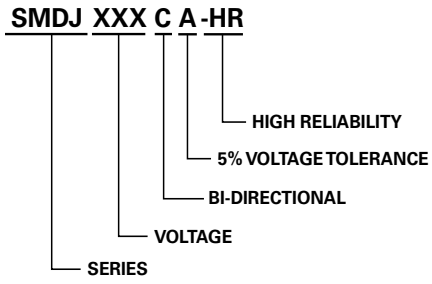
Dimensions

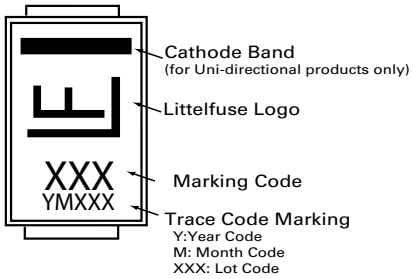


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	0.002	0.008	0.051	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165		4.200
L	0.094	-	2.400	-

Part Numbering System



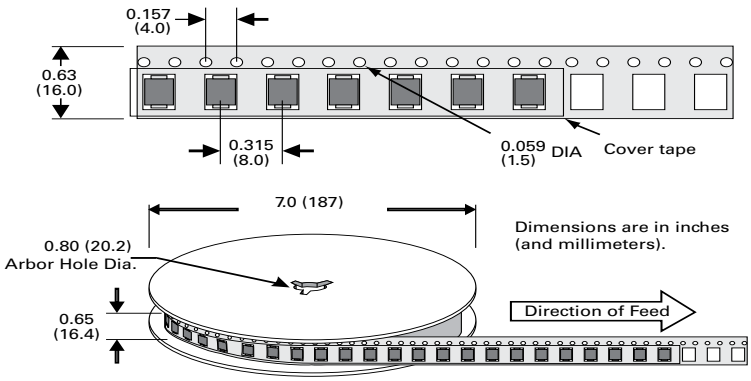
Part Marking System

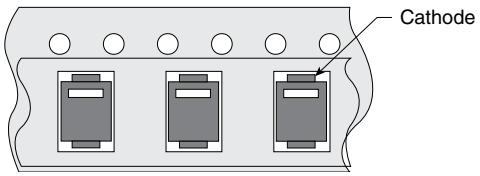


Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMDJxxxXX-HR	DO-214AB	500	Tape & Reel – 16mm tape/7" reel	EIA STD RS-481

Tape and Reel Specification





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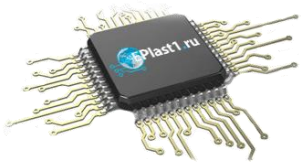
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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