

# SMAJ-Q Series

Surface Mount — 400W



**AUTOMOTIVE GRADE** **HF** **RoHS**



## Description

The SMAJ-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. For surface mounted applications in order to optimize board space.

## Additional Information



## Maximum Ratings and Characteristics ( $T_A=25^{\circ}\text{C}$ )

Rating	Symbol	Value
Peak pulse power dissipation at 10/1000 $\mu\text{s}$ waveform(Note1, Note2, Fig.1)	$P_{PPM}$	400W
Peak pulse current of at 10/1000 $\mu\text{s}$ waveform (Note 1, Fig.3)	$I_{PPM}$	See Table(A)
Steady state power dissipation at $T_A=50^{\circ}\text{C}$ (Fig.5)	$P_{M(AV)}$	3.3W
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only	$V_F$	3.5V/5.0V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	$I_{FSM}$	60A
Operating junction and Storage Temperature Ranges	$T_J, T_{STG}$	$-55^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Typical thermal resistance junction to lead	$R_{\theta JL}$	$30^{\circ}\text{C/W}$
Typical thermal resistance junction to ambient	$R_{\theta JA}$	$120^{\circ}\text{C/W}$

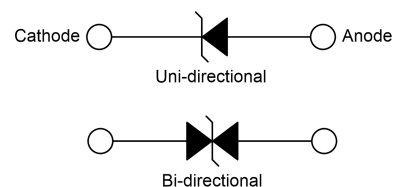
Notes:

- Non-repetitive current pulse, per Fig.3 and derating above  $T_A=25^{\circ}\text{C}$  per Fig.2.
- Each terminal is surface Mounted on the 5.0mm $\times$ 5.0mm(0.03mm thick) copper pads.
- 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.
- $V_F<3.5\text{V}$  for single die parts and  $V_F<5.0\text{V}$  for stacked-die parts.

## Features

- Halogen free and RoHS compliant
- Low profile package
- Built-in strain relief design
- Low inductance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000 $\mu\text{s}$  waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical  $I_r$  less than 1 $\mu\text{A}$  above 10V devices
- Peak 260  $^{\circ}\text{C}$  high temperature Reflow Soldering withstanding
- Meet MSL level1, per J-STD-020
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- Unit Weight: 0.07g
- AEC-Q101 Qualified

## Functional Diagram



# SMAJ-Q Series

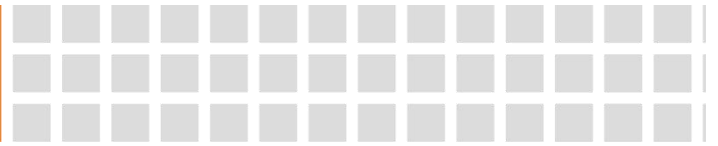
Surface Mount — 400W

## Electrical Characteristics (T<sub>A</sub>=25°C)

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>		Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>R</sub>
Uni.	Bi.		Uni.	Bi.	V <sub>R</sub> (V)	V <sub>B Min.</sub> (V)	V <sub>B Max.</sub> (V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
SMAJ5.0A	SMAJ5.0CA	Q	AE	WE	5.0	6.40	7.00	10	9.2	43.5	800
SMAJ6.0A	SMAJ6.0CA	Q	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800
SMAJ6.5A	SMAJ6.5CA	Q	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
SMAJ7.0A	SMAJ7.0CA	Q	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200
SMAJ7.5A	SMAJ7.5CA	Q	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100
SMAJ8.0A	SMAJ8.0CA	Q	AR	WR	8.0	8.89	9.83	1	13.6	29.4	50
SMAJ8.5A	SMAJ8.5CA	Q	AT	WT	8.5	9.44	10.40	1	14.4	27.8	20
SMAJ9.0A	SMAJ9.0CA	Q	AV	WV	9.0	10.00	11.10	1	15.4	26.0	10
SMAJ10A	SMAJ10CA	Q	AX	WX	10.0	11.10	12.30	1	17.0	23.5	5
SMAJ11A	SMAJ11CA	Q	AZ	WZ	11.0	12.20	13.50	1	18.2	22.0	1
SMAJ12A	SMAJ12CA	Q	BE	XE	12.0	13.30	14.70	1	19.9	20.1	1
SMAJ13A	SMAJ13CA	Q	BG	XG	13.0	14.40	15.90	1	21.5	18.6	1
SMAJ14A	SMAJ14CA	Q	BK	XK	14.0	15.60	17.20	1	23.2	17.2	1
SMAJ15A	SMAJ15CA	Q	BM	XM	15.0	16.70	18.50	1	24.4	16.4	1
SMAJ16A	SMAJ16CA	Q	BP	XP	16.0	17.80	19.70	1	26.0	15.4	1
SMAJ17A	SMAJ17CA	Q	BR	XR	17.0	18.90	20.90	1	27.6	14.5	1
SMAJ18A	SMAJ18CA	Q	BT	XT	18.0	20.00	22.10	1	29.2	13.7	1
SMAJ20A	SMAJ20CA	Q	BV	XV	20.0	22.20	24.50	1	32.4	12.3	1
SMAJ22A	SMAJ22CA	Q	BX	XX	22.0	24.40	26.90	1	35.5	11.3	1
SMAJ24A	SMAJ24CA	Q	BZ	XZ	24.0	26.70	29.50	1	38.9	10.3	1
SMAJ26A	SMAJ26CA	Q	CE	YE	26.0	28.90	31.90	1	42.1	9.5	1
SMAJ28A	SMAJ28CA	Q	CG	YG	28.0	31.10	34.40	1	45.4	8.8	1
SMAJ30A	SMAJ30CA	Q	CK	YK	30.0	33.30	36.80	1	48.4	8.3	1
SMAJ33A	SMAJ33CA	Q	CM	YM	33.0	36.70	40.60	1	53.3	7.5	1
SMAJ36A	SMAJ36CA	Q	CP	YP	36.0	40.00	44.20	1	58.1	6.9	1
SMAJ40A	SMAJ40CA	Q	CR	YR	40.0	44.40	49.10	1	64.5	6.2	1
SMAJ43A	SMAJ43CA	Q	CT	YT	43.0	47.80	52.80	1	69.4	5.8	1
SMAJ45A	SMAJ45CA	Q	CV	YV	45.0	50.00	55.30	1	72.7	5.5	1
SMAJ48A	SMAJ48CA	Q	CX	YX	48.0	53.30	58.90	1	77.4	5.2	1
SMAJ51A	SMAJ51CA	Q	CZ	YZ	51.0	56.70	62.70	1	82.4	4.9	1
SMAJ54A	SMAJ54CA	Q	RE	ZE	54.0	60.00	66.30	1	87.1	4.6	1

# SMAJ-Q Series

Surface Mount — 400W



Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ $I_T$		Test Current	Maximum Clamping Voltage @ $I_{PP}$	Peak Pulse Current	Reverse Leakage @ $V_R$
Uni.	Bi.		Uni.	Bi.	$V_R$ (V)	$V_{B Min.}$ (V)	$V_{B Max.}$ (V)	$I_T$ (mA)	$V_C$ (V)	$I_{PP}$ (A)	$I_R$ ( $\mu$ A)
SMAJ58A	SMAJ58CA	Q	RG	ZG	58.0	64.40	71.20	1	93.6	4.3	1
SMAJ60A	SMAJ60CA	Q	RK	ZK	60.0	66.70	73.70	1	96.8	4.1	1
SMAJ64A	SMAJ64CA	Q	RM	ZM	64.0	71.10	78.60	1	103.0	3.9	1
SMAJ70A	SMAJ70CA	Q	RP	ZP	70.0	77.80	86.00	1	113.0	3.5	1
SMAJ75A	SMAJ75CA	Q	RR	ZR	75.0	83.30	92.10	1	121.0	3.3	1
SMAJ78A	SMAJ78CA	Q	RT	ZT	78.0	86.70	95.80	1	126.0	3.2	1
SMAJ85A	SMAJ85CA	Q	RV	ZV	85.0	94.40	104.00	1	137.0	2.9	1
SMAJ90A	SMAJ90CA	Q	RX	ZX	90.0	100.00	111.00	1	146.0	2.7	1
SMAJ100A	SMAJ100CA	Q	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.5	1
SMAJ110A	SMAJ110CA	Q	SE	VE	110.0	122.00	135.00	1	177.0	2.3	1
SMAJ120A	SMAJ120CA	Q	SG	VG	120.0	133.00	147.00	1	193.0	2.1	1
SMAJ130A	SMAJ130CA	Q	SK	VK	130.0	144.00	159.00	1	209.0	1.9	1
SMAJ150A	SMAJ150CA	Q	SM	VM	150.0	167.00	185.00	1	243.0	1.6	1
SMAJ160A	SMAJ160CA	Q	SP	VP	160.0	178.00	197.00	1	259.0	1.5	1
SMAJ170A	SMAJ170CA	Q	SR	VR	170.0	189.00	209.00	1	275.0	1.5	1
SMAJ180A	SMAJ180CA	Q	ST	VT	180.0	201.00	222.00	1	292.0	1.4	1
SMAJ190A	SMAJ190CA	Q	SU	YU	190.0	211.00	233.00	1	308.0	1.3	1
SMAJ200A	SMAJ200CA	Q	SV	VV	200.0	224.00	247.00	1	324.0	1.2	1
SMAJ210A	SMAJ210CA	Q	SW	YW	210.0	237.00	263.00	1	340.0	1.2	1
SMAJ220A	SMAJ220CA	Q	GE	VX	220.0	246.00	272.00	1	356.0	1.1	1
SMAJ250A	SMAJ250CA	Q	SZ	VZ	250.0	279.00	309.00	1	405.0	1.0	1

**SMAJ-Q Series**  
Surface Mount — 400W

**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$ )**

Figure 1. Peak Pulse Power Rating Curve

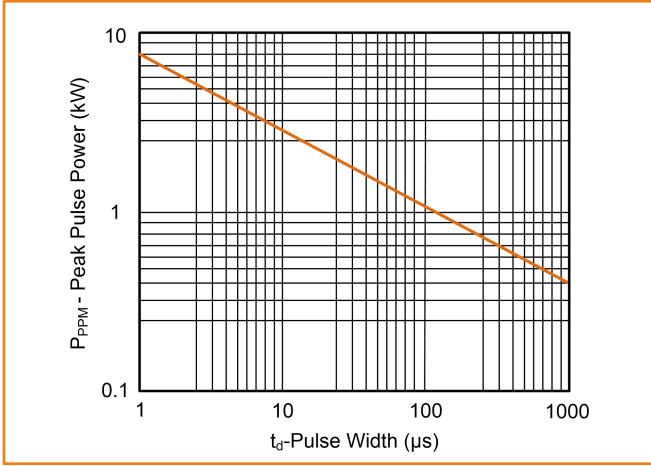


Figure 2. Pulse Derating Curve

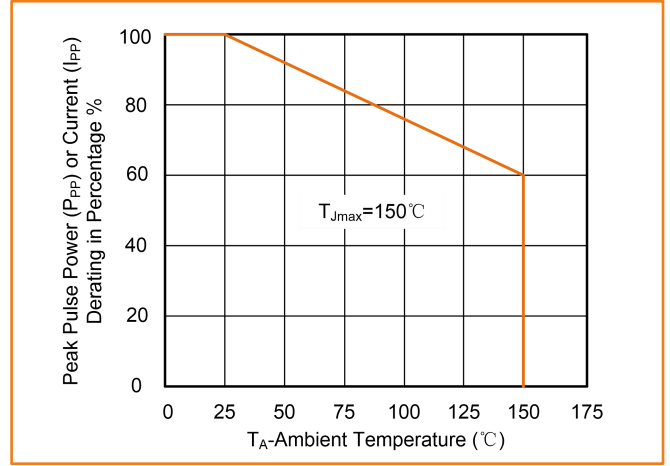


Figure 3. Pulse Waveform

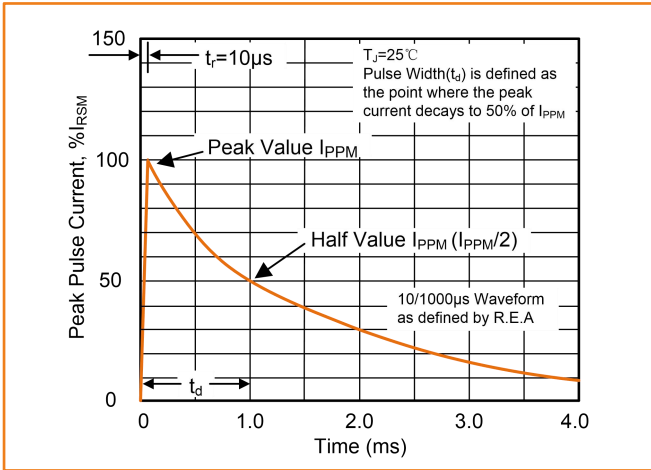


Figure 4. Typical Junction Capacitance

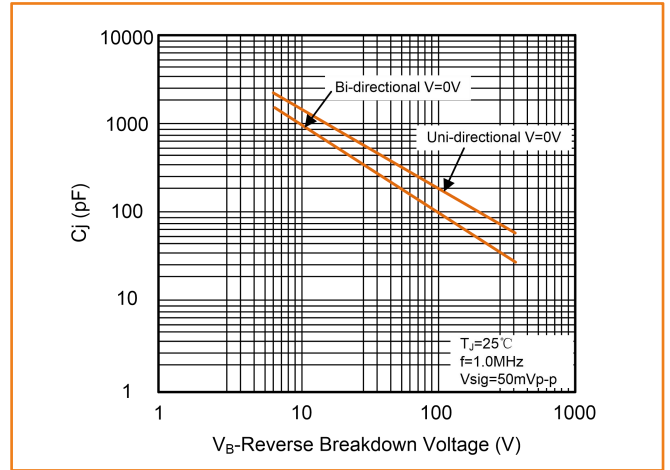


Figure 5. Steady State Power Dissipation Derating Curve

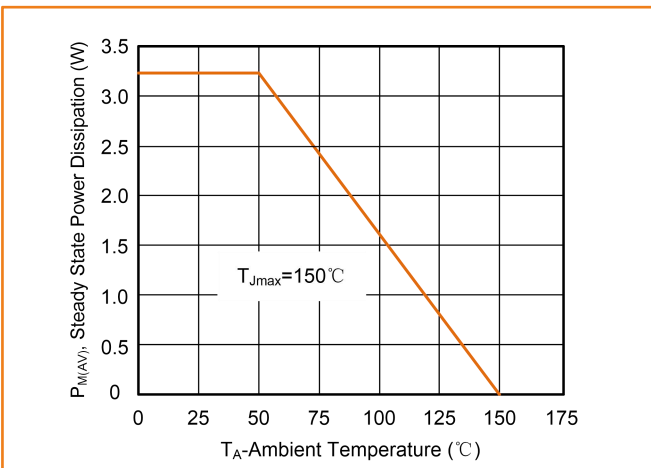
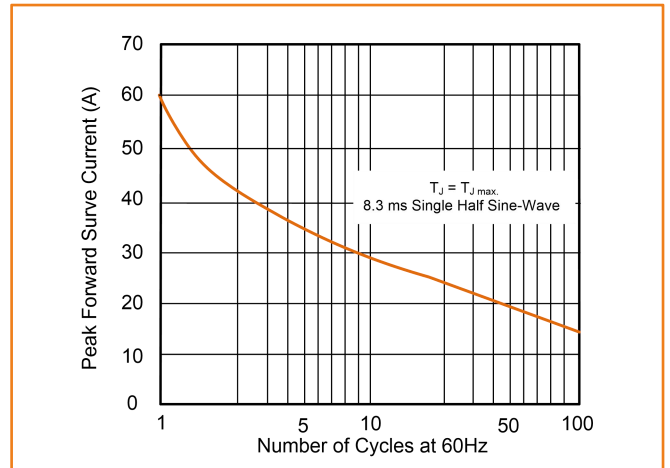


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional

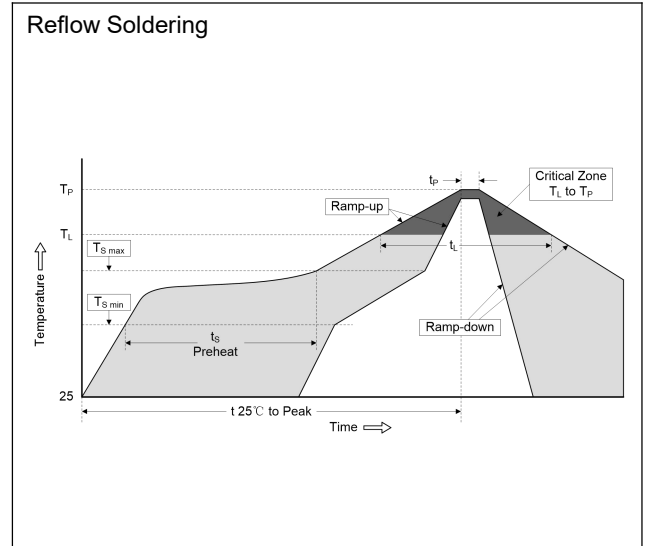


# SMAJ-Q Series

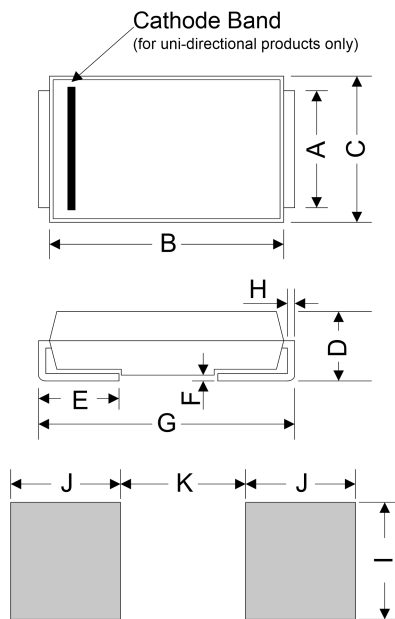
Surface Mount — 400W

## Soldering Parameters

Reflow Condition		Lead-free
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 ( $T_L$ to $T_P$ )		3°C/second max.
$T_{S\ max}$ to $T_L$ -Ramp-up Rate		3°C/second max.
Time maintained above:	-Temperature ( $T_L$ )	217°C
	-Time ( $t_L$ )	60–150 seconds
Peak Temperature ( $T_P$ )		260°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		8 minutes max.



## Dimensions (SMA/DO-214AC)

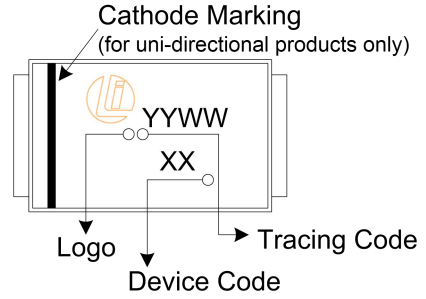
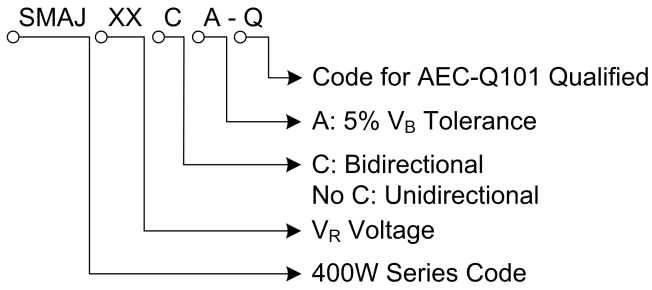


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.250	1.650	0.049	0.065
B	3.990	4.600	0.157	0.181
C	2.400	2.790	0.095	0.110
D	1.900	2.290	0.075	0.090
E	0.780	1.520	0.030	0.060
F	—	0.203	—	0.008
G	4.800	5.280	0.189	0.208
H	0.152	0.305	0.006	0.012
I	1.800	—	0.070	—
J	2.100	—	0.082	—
K	—	2.300	—	0.090

# SMAJ-Q Series

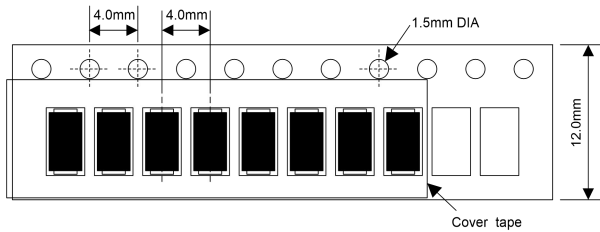
Surface Mount — 400W

## Part Number Code and Marking Code

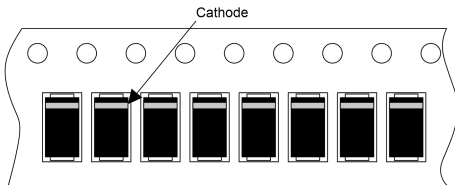


## Packaging Specification

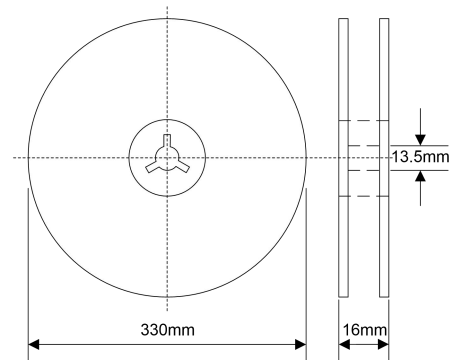
### Tape



### For Uni-Devices



### 13 Inches Reel



Quantity: 5000pcs/reel

## 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 [Liown](#) manufacturer:*

Other Similar products are found below :

[60KS200C](#) [D18V0L1B2LP-7B](#) [D5V0F4U5P5-7](#) [NTE4902](#) [P4KE27CA](#) [P6KE11CA](#) [P6KE8.2A](#) [SA60CA](#) [SA64CA](#) [SMBJ12CATR](#)  
[SMBJ33CATR](#) [SMBJ6.5A](#) [SMBJ8.0A](#) [ESD101-B1-02ELS E6327](#) [ESD112-B1-02EL E6327](#) [ESD7451N2T5G](#) [19180-510](#) [CPDT-5V0USP-](#)  
[HF](#) [3.0SMCJ33CA-F](#) [3.0SMCJ36A-F](#) [HSPC16701B02TP](#) [JANTX1N6126A](#) [D3V3Q1B2DLP3-7](#) [D55V0M1B2WS-7](#) [SCM1293A-04SO](#)  
[ESD200-B1-CSP0201 E6327](#) [SM12-7](#) [CEN955 W/DATA](#) [VESD12A1A-HD1-GS08](#) [CPDQC5V0-HF](#) [D1213A-01LP4-7B](#) [ESD101-B1-02EL](#)  
[E6327](#) [AOZ8808DI-03](#) [5KP15A](#) [5KP48A](#) [5KP90A](#) [ESD3V3D7-TP](#) [15KPA36A-LF](#) [P4KE56CA](#) [P4KE68A](#) [P4KE91CATR](#) [P6KE120A](#)  
[P6KE13CA](#) [P6KE43CA](#) [P6KE6.8CA](#) [P6KE8.2](#) [P6SMBJ20CA](#) [JANTX1N6072A](#) [SR2835ESKG](#) [SA90CA](#)