



# eSMP® Flat Type Surface-Mount Packages With Space-Saving Footprints



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## RESOURCES

- For technical questions contact [Diodes@vishay.com](mailto:Diodes@vishay.com)



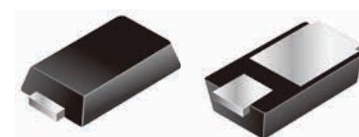
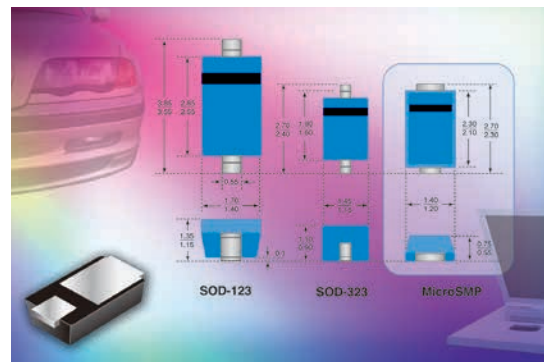


## MicroSMP (DO-219AD) Package

### MicroSMP (DO-219AD) Miniature, High Power Density Package for Rectifiers and Transient Voltage Suppressors (TVS)

#### Features

- High power density rectifiers and TVS in space-saving 2.5 mm by 1.3 mm footprint with a 0.65 mm height
- High forward current up to 1 A for rectifiers and 150 W (10/1000  $\mu$ s waveform) clamping power capability in TVS
- All the devices offer a high 25 A forward surge current capability for an 8.3 ms pulse for rectifiers
- Up to 175 °C maximum operation junction temperature for rectifiers
- Provide improved reliability and a longer operational life span
- Improve on all previous TVS products in similar package types by combining ESD transient protection with a superior surge clamping capability



**eSMP® Series — MicroSMP (DO-219AD)**

#### Applications

- Secondary rectification and freewheeling diode functions for miniature AC/DC and DC/DC converters
- Flywheel and polarity protection for miniature power converters and portable electronic equipment such as digital cameras, MP3 players, navigation systems, GPS, and cellular phones
- Polarity protection of power lines and signal lines for industrial systems
- Power and signal line protection for microprocessors, signal processing ICs, and logic circuits
- High power voltage regulation for non-sensitive input voltage circuits in automotive and industrial electronics



# DIODES

## MicroSMP (DO-219AD) Package

### Schottky Rectifiers

Device	V <sub>RRM</sub> Range	I <sub>F(AV)</sub>	Max V <sub>F</sub> @ I <sub>F</sub>		I <sub>FSM</sub>	T <sub>J</sub> Max
	(V)	(A)	(V)	(A)	(A)	(°C)
<a href="#">MSS1P2L, MSS1P3L</a>	20 - 30	1.0	0.50	1.0	25	150
<a href="#">MSS1P3, MSS1P4</a>	30 - 40	1.0	0.55	1.0	25	150
<a href="#">MSS1P5, MSS1P6</a>	50 - 60	1.0	0.68	1.0	25	150
<a href="#">MSS2P2, MSS2P3</a>	20 - 30	2.0	0.6	2.0	30	150
<a href="#">V1PM10</a>	100	1.0	0.77	1.0	25	175

### Standard ESD Capability Rectifiers

Device	V <sub>RRM</sub> Range	I <sub>F(AV)</sub>	Max V <sub>F</sub> @ I <sub>F</sub>		t <sub>rr</sub> Typical	I <sub>FSM</sub>	T <sub>J</sub> Max
	(V)	(A)	(V)	(A)	(ns)	(A)	(°C)
<a href="#">MSE07PB thru MSE07PJ</a>	100 - 600	0.7	1.08	0.7	780	20	175
<a href="#">MSE1PB thru MSE1PJ</a>	100 - 600	1.0	1.1	1.0	780	30	175
<a href="#">MSX1PB thru MSX1PJ</a>	100 - 600	1.0	1.1	1.0	960	18	175

### TransZorb® TVS

Device	V <sub>(BR)</sub> Range	V <sub>WM</sub> Range	P <sub>PPM</sub> (10 x 1000 μs)	P <sub>PPM</sub> (8 x 20 μs)	T <sub>J</sub> Max
	(V)	(V)	(W)	(W)	(°C)
<a href="#">MSP3V3, MSP5.0A</a>	4.1 - 6.4	3.3 - 5.0	150	1000	150
<a href="#">MSMP6.0A thru MSMP20A</a>	6.67 - 24.5	6.0 - 20	150	1000	150



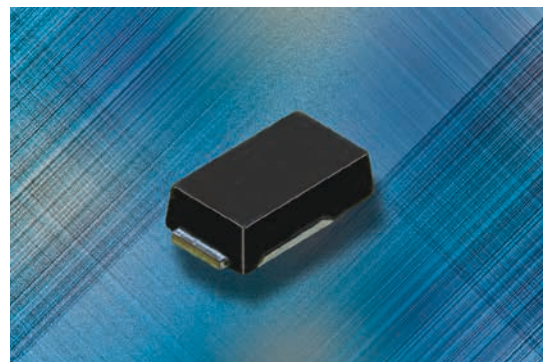
# DIODES

## SMP (DO-220AA) Package

### SMP (DO-220AA) Miniature, High Power Density Package for Rectifiers and Transient Voltage Suppressors (TVS)

#### Features

- High power density rectifiers and TVS in space-saving 3.8 mm by 2 mm footprint with a 1 mm height
- Low forward voltage drop
- Provide space savings with:
  - Rectifiers rated up to 3 A
  - TVS rated up to 400 W (for above 13 V)
- 1 mm device height
- Solder pad compatible with other SMD devices
- Low thermal resistance
- Wide product offering
- Available for TVS and Schottky, Ultrafast, and standard rectifiers



**eSMP® Series – SMP  
(DO-220AA)**

#### Applications

- Secondary rectification of AC/DC and DC/DC converters, freewheeling and polarity protection
- General purpose, polarity protection, and rail to rail protection in automotive applications
- Secondary rectification and freewheeling for ultrafast switching speeds of AC/DC and DC/DC converters in computer and consumer end products and in high-temperature conditions such as automotive applications
- Protection for ICs, drive transistors, signal lines of sensor units, and electronic units in consumer, computer, industrial, and automotive applications



# DIODES

## SMP (DO-220AA) Package

### Schottky Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	( $^{\circ}$ C)
<a href="#">SS1P3L, SS1P4L</a>	1.0	30 - 40	0.45, 0.48	1.0	150	50	150
<a href="#">SS1P3, SS1P4</a>	1.0	30 - 40	0.53	1.0	150	30	150
<a href="#">SS1P5L, SS1P6L</a>	1.0	50 - 60	0.59	1.0	100	50	150
<a href="#">SS2P2, SS2P3, SS2P4</a>	2.0	20 - 40	0.55	2.0	150	50	150
<a href="#">SS2P2L, SS2P3L</a>	2.0	20 - 30	0.50	2.0	200	50	150
<a href="#">SS2P5, SS2P6</a>	2.0	50 - 60	0.70	2.0	100	50	150
<a href="#">SS2PH9, SS2PH10</a>	2.0	90 - 100	0.80	2.0	1.0	50	150
<a href="#">SS3P3</a>	3.0	30	0.58	3.0	200	50	150
<a href="#">SS3P4</a>	3.0	40	0.60	3.0	150	50	150
<a href="#">SS3P5, SS3P6</a>	3.0	50 - 60	0.78	3.0	100	50	150
<a href="#">SS2PH5, SS2PH6</a>	2.0	50 - 60	0.80	2.0	2	50	175

### TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{BR}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	( $^{\circ}$ C)
<a href="#">V3P6</a>	3	60	0.63	3.0	900	60	150

### Ultrafast Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$t_{tr}$ Max	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(ns)	( $^{\circ}$ C)
<a href="#">ES1PB, ES1PC, ES1PD</a>	1.0	100 - 200	0.865 / 0.92	0.6 / 1.0	5	30	15	150
<a href="#">ESH1PB, ESH1PC, ESH1PD</a>	1.0	100 - 200	0.86 / 0.90	0.7 / 1.0	1	50	25	175
<a href="#">ESH2PB, ESH2PC, ESH2PD</a>	2.0	100 - 200	0.98	2.0	1	50	25	175

### Standard Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$t_{tr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">S1PB thru S1PM</a>	1.0	100 - 1000	1.1	1.0	1	1800	30	150



## DIODES

## SMP (DO-220AA) Package

## Standard ESD Capability Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$t_{rr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">SE07PB thru SE07PJ</a>	0.7	100 - 600	1.05	0.7	5		20	175
<a href="#">SE10PB thru SE10PJ</a>	1.0	100 - 600	1.05	1.0	5	780	25	175
<a href="#">SE15PB thru SE15PJ</a>	1.5	100 - 600	1.05	1.5	5	900	30	175
<a href="#">SE20PB thru SE20PJ</a>	2.0	100 - 600	1.05	2.0	5	1200	32	175

## Avalanche Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$E_R$	$t_{rr}$ Max	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(mJ)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">AS1PD thru AS1PM</a>	1.5	200 - 1000	1.15	1.5	5	20	1500	30	175
<a href="#">AR1PD, AR1PG, AR1PJ</a>	1	200 - 600	1.25	1	1	20	140	20	175
<a href="#">AR1PK, AR1PM</a>	1	800 - 1000	1.6	1	1	20	120	20	175
<a href="#">AU1PD, AU1PG, AU1PJ</a>	1	200 - 600	1.5	1	1	20	75	100	175
<a href="#">AU1PK, AU1PM</a>	1	800 - 1000	1.85	1	1	20	75	100	175

## Fast Switching Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$E_R$	$t_{rr}$ Max	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(mJ)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">RS1PB thru RS1PG</a>	1	100 - 400	1.3	1	1	N/A	150	30	150
<a href="#">RS1PJ</a>	1	600	1.3	1	1	N/A	250	30	150

PAR<sup>®</sup> TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(W)	(V)	(V)	( $^{\circ}$ C)
<a href="#">TPSMP6.8(A)</a>	250	6.8	5.8	185
<a href="#">TPSMP7.5 thru TPSMP12(A)</a>	300	7.5 - 12	6.40 - 10.2	185
<a href="#">TPSMP13 thru TPSMP43(A)</a>	400	13 - 43	11.1 - 36.8	185



# DIODES

## SMP (DO-220AA) Package

### TransZorb® TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(W)	(V)	(V)	(°C)
<a href="#">SMP3V3 thru SMP36A</a>	400	4.10 - 44.2	3.3 - 36	150

### Power Voltage-Regulating Diodes

Device	$P_D$	$V_z$ Range	$T_J$ Max
	(mW)	(V)	(°C)
<a href="#">PTV3.9B thru PTV36B</a>	1500	3.9 - 36	150
<a href="#">SMPZ3919B thru SMPZ3940B</a>	1500	5.6 - 43	150



## TMBS<sup>®</sup> Trench MOS Barrier Schottky and Standard Rectifiers in Low Profile SMPA (DO-221BC) Package

### Common Features

- Low profile SMPA (DO-221BC) package
- Typical height of 0.95 mm
- Ideal for automated placement
- Meets MSL moisture sensitivity level of 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to JEDEC JS709A standards
- Maximum operation junction temperature of 175 °C
- AEC-Q101 qualified (50 V TMBS devices not yet qualified)

### Features for TMBS Rectifiers

- Current ratings from 3 A to 8 A
- Low forward voltage drop down to 0.37 V at 3 A
- Low power losses and high efficiency
- Trench MOS Schottky technology

### Features for Standard Rectifiers

- Current ratings from 2 A to 5 A
- Low forward voltage drop
- Low leakage current
- Oxide planar chip technology
- ESD capability

### Applications

- Low voltage, high frequency DC/DC converters, switching power supplies, freewheeling diodes, and polarity protection in automotive applications and mobile device chargers
- General purpose, power line polarity protection in automotive applications



eSMP<sup>®</sup> Series — SMPA (DO-221BC)





# DIODES

## SMPA (DO-221BC) Package

### TMBS® (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(°C)
<a href="#">V3PAL45</a>	3	45	0.54	3.0	450	80	150
<a href="#">V3PAN50</a>	3	50	0.54	3.0	600	80	150
<a href="#">V4PAL45</a>	4	45	0.57	4.0	450	80	150
<a href="#">V4PAN50</a>	4	50	0.59	4.0	600	80	150
<a href="#">V8PA10</a>	8	100	0.76	8.0	800	100	150
<a href="#">V8PA12</a>	8	120	0.87	8.0	600	100	150
<a href="#">V8PA15</a>	8	150	1.20	8.0	500	100	150
<a href="#">V8PA6</a>	8	60	0.63	8.0	600	100	150
<a href="#">V8PAL45</a>	8	45	0.57	8.0	1850	120	150
<a href="#">V8PAL50</a>	8	50	0.57	8.0	400	120	150
<a href="#">V8PAM10</a>	8	100	0.78	8.0	200	100	175
<a href="#">V8PAM12</a>	8	120	0.88	8.0	500	100	175
<a href="#">V8PAN50</a>	8	50	0.57	8.0	400	120	150

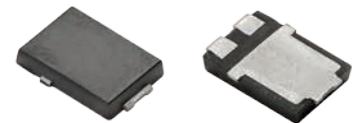
### Standard Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$t_{rr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	(°C)
<a href="#">SE20PAB thru SE20PAJ</a>	2.0	100 - 600	1.1	2.0	5	1300	32	175
<a href="#">SE30PAB thru SE30PAJ</a>	3.0	100 - 600	1.16	3.0	5	1300	32	175
<a href="#">SE50PAB thru SE50PAJ</a>	5.0	100 - 600	1.16	5.0	10	2000	42	175

## SMPC (TO-277A) Miniature, High Power Density Package for Rectifiers and Transient Voltage Suppressors (TVS)

### Features

- Enable higher current density power supply designs
- Very small 1.1 mm height and 4.8 mm by 6.7 mm footprint saves space
- Provide more power in a smaller package
  - TMBS<sup>®</sup> rectifiers rated up to 15 A
  - Planar Schottky rectifiers rated up to 15 A
- Industry-standard SMPC (TO-277A) package outline for easy outline compatibility
- Low forward voltage drops and special wide-bottom plate designs provide greater heat dissipation than other packages of similar sizes
- Ideal for automated placement
- Single- or dual-chip, surface-mount SMPC (TO-277A) package features solder pads that are compatible with other SMD devices



**eSMP<sup>®</sup> Series – SMPC (TO-277A)**

### Applications

- Secondary rectifiers and freewheeling circuitry for AC/DC and DC/DC converters
- Output rectification for small and medium power adapters
- Switchmode power supplies in consumer electronics such as computers, LCD monitors, and cell phones
- Flywheel and polarity protection for solenoid drive circuits in automotive and industry systems
- OR-ing diodes for telecommunication and industrial systems

### Schottky Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	( $^{\circ}$ C)
<a href="#">SS3P3L, SS3P4L</a>	3.0	30 - 40	0.47	3.0	250	150	150
<a href="#">SS3P5L, SS3P6L</a>	3.0	50 - 60	0.60	3.0	150	150	150
<a href="#">SS5P3, SS5P4</a>	5.0	50 - 60	0.52	5.0	250	150	150
<a href="#">SS5P5, SS5P6</a>	5.0	50 - 60	0.69	5.0	150	150	150
<a href="#">SS5P9, SS5P10</a>	5.0	90 - 100	0.88	5.0	15	150	150
<a href="#">SS6P4C</a>	6.0	40	0.65	3.0	200	70	150
<a href="#">SS8P2L, SS8P3L</a>	8.0	20 - 30	0.57	8.0	200	150	150
<a href="#">SS8PH9, SS8PH10</a>	8.0	90 - 100	0.9	8.0	2	150	175
<a href="#">SS8P2CL, SS8P3CL</a>	8.0	20 - 30	0.54	4.0	300	120	150
<a href="#">SS8P3C, SS8P4C</a>	8.0	30 - 40	0.58	4.0	300	120	150
<a href="#">SS8P5C, SS8P6C</a>	8.0	50 - 60	0.70	4.0	50	120	150
<a href="#">SS10P2CL, SS10P3CL</a>	10	20 - 30	0.52	5.0	850	200	150
<a href="#">SS10P3C, SS10P4C</a>	10	30 - 40	0.53	5	550	200	150
<a href="#">SS10P3, SS10P4</a>	10	30 - 40	0.56	10	800	280	150
<a href="#">SS10P5, SS10P6</a>	10	50 - 60	0.67	10	150	280	150
<a href="#">SS10PH45</a>	10	45	0.72	10	80	200	175
<a href="#">SS10PH9, SS10PH10</a>	10	90 - 100	0.88	10	10	200	175
<a href="#">SS12P2L, SS12P3L</a>	12	20 - 30	0.56	12	1000	280	150
<a href="#">SS12P4C</a>	12	40	0.52	6	500	150	150
<a href="#">SS12P4S</a>	12	40	0.60	12	800	280	150
<a href="#">SS15P3S</a>	15	30	0.57	15	1000	280	150



## DIODES

## SMPC (TO-277A) Package

## TMBS® (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(°C)
<a href="#">V10P10</a>	10	100	0.68	10	150	180	150
<a href="#">V10P12</a>	10	120	0.82	10	400	160	150
<a href="#">V10P15</a>	10	150	1.08	10	200	180	150
<a href="#">V10P20</a>	10	200	1.34	10	400	180	150
<a href="#">V10P45</a>	10	45	0.57	10	800	180	150
<a href="#">V10P45S</a>	10	45	0.57	10	800	180	150
<a href="#">V10P6</a>	10	60	0.59	10	1600	180	150
<a href="#">V10P8</a>	10	80	0.68	10	800	180	150
<a href="#">V10PL45</a>	10	45	0.52	10	5000	200	150
<a href="#">V10PM10</a>	10	100	0.75	10	120	180	150
<a href="#">V10PM12</a>	10	120	0.83	10	400	160	150
<a href="#">V10PN50</a>	10	50	0.55	10	150	180	150
<a href="#">V12P10</a>	12	100	0.70	12	250	200	150
<a href="#">V12P12</a>	12	120	0.80	12	500	150	150
<a href="#">V12P15</a>	12	150	1.08	12	250	200	150
<a href="#">V12P45</a>	12	45	0.58	12	1000	200	150
<a href="#">V12P6</a>	12	60	0.61	12	2900	200	150
<a href="#">V12P8</a>	12	80	0.66	12	1000	200	150
<a href="#">V12PM10</a>	12	100	0.75	12	200	200	150
<a href="#">V12PM12</a>	12	120	0.80	12	500	160	150
<a href="#">V15P10</a>	15	100	0.71	15	500	220	150
<a href="#">V15P12</a>	15	120	0.81	15	1000	220	150
<a href="#">V15P15</a>	15	150	1.08	15	300	220	150
<a href="#">V15P45</a>	15	45	0.58	15	1500	210	150
<a href="#">V15P45S</a>	15	45	0.58	15	1500	210	150
<a href="#">V15P6</a>	15	60	0.62	15	3600	220	150
<a href="#">V15P8</a>	15	80	0.66	15	1200	220	150
<a href="#">V15PL50</a>	15	50	0.58	15	1500	200	150
<a href="#">V15PM10</a>	15	100	0.75	15	400	220	150
<a href="#">V15PM12</a>	15	120	0.84	15	800	220	150
<a href="#">V15PN50</a>	15	50	0.56	15	3000	200	150
<a href="#">V20PL50</a>	20	50	0.59	20	3000	240	150
<a href="#">V20PL60</a>	20	60	0.59	20	4000	240	150
<a href="#">V25PL60</a>	25	60	0.59	25	4000	240	150
<a href="#">V25PN60</a>	25	60	0.59	25	6000	300	150
<a href="#">V8P10</a>	8	100	0.68	8.0	70	150	150
<a href="#">V8P12</a>	8	120	0.84	8.0	300	140	150
<a href="#">V8P15</a>	8	150	1.08	8.0	150	140	150
<a href="#">V8P45</a>	8	45	0.58	8.0	600	140	150
<a href="#">V8P6</a>	8	60	0.61	8.0	600	140	150
<a href="#">V8P8</a>	8	80	0.66	8.0	700	140	150
<a href="#">V8PL6</a>	8	60	0.58	8.0	2400	140	150
<a href="#">V8PM10</a>	8	100	0.75	8.0	60	140	150
<a href="#">V8PM12</a>	8	120	0.84	8.0	300	140	150
<a href="#">V8P20</a>	8	200	1.40	8.0	250	150	150



## Standard ESD Capability Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$t_{rr}$ Max	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">SE40PB thru SE40PJ</a>	4.0	100 - 600	1.1	4.0	10	2200	60	175
<a href="#">SE70PB thru SE70PJ</a>	7.0	100 - 600	1.05	7.0	20	2600	120	175

## Standard Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$t_{rr}$ Max	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">S4PB thru S4PM</a>	4.0	100 - 1000	1.10	4.0	10	2500	100	150
<a href="#">S5PMS</a>	5.0	1000	1.15	5.0	10	2500	100	150

## Fred Pt® Ultrafast Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$t_{rr}$ Max	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(ns)	( $^{\circ}$ C)
<a href="#">VS-4CSH01HM3</a>	4.0	100	0.95	2.0	2	16	90	175
<a href="#">VS-4CSH01-M3</a>	4.0	100	0.95	2.0	2	16	90	175
<a href="#">VS-4CSH02HM3</a>	4.0	200	0.95	2.0	2	16	90	175
<a href="#">VS-4CSH02-M3</a>	4.0	200	0.95	2.0	2	16	90	175
<a href="#">VS-4ESH01HM3</a>	4.0	100	0.93	4.0	2	20	130	175
<a href="#">VS-4ESH01-M3</a>	4.0	100	0.93	4.0	2	20	130	175
<a href="#">VS-4ESH02HM3</a>	4.0	200	0.93	4.0	2	20	130	175
<a href="#">VS-4ESH02-M3</a>	4.0	200	0.93	4.0	2	20	130	175
<a href="#">VS-6ESH01HM3</a>	6.0	100	0.94	6.0	2	22	150	175
<a href="#">VS-6ESH01-M3</a>	6.0	100	0.94	6.0	2	22	150	175
<a href="#">VS-6ESH02HM3</a>	6.0	200	0.94	6.0	2	22	150	175
<a href="#">VS-6ESH02-M3</a>	6.0	200	0.94	6.0	2	22	150	175
<a href="#">VS-6CSH01HM3</a>	6.0	100	0.94	3.0	2	20	150	175
<a href="#">VS-6CSH01-M3</a>	6.0	100	0.94	3.0	2	20	150	175
<a href="#">VS-6CSH02HM3</a>	6.0	200	0.94	3.0	2	20	150	175
<a href="#">VS-6CSH02-M3</a>	6.0	200	0.94	3.0	2	20	150	175
<a href="#">VS-8CSH01HM3</a>	8.0	100	0.95	4.0	2	18	130	175
<a href="#">VS-8CSH01-M3</a>	8.0	100	0.95	4.0	2	18	130	175
<a href="#">VS-8CSH02HM3</a>	8.0	200	0.95	4.0	2	18	130	175
<a href="#">VS-8CSH02-M3</a>	8.0	200	0.95	4.0	2	18	130	175
<a href="#">VS-10CSH01HM3</a>	10	100	0.98	5.0	2	18	130	175
<a href="#">VS-10CSH01-M3</a>	10	100	0.98	5.0	2	18	130	175
<a href="#">VS-10CSH02HM3</a>	10	200	0.98	5.0	2	18	130	175
<a href="#">VS-10CSH02-M3</a>	10	200	0.98	5.0	2	18	130	175
<a href="#">VS-6ESU06HM3</a>	6.0	600	1.3	6.0	5	58	120	175
<a href="#">VS-6ESU06-M3</a>	6.0	600	1.3	6.0	5	58	120	175
<a href="#">VS-6ESH06HM3</a>	6.0	600	1.8	6.0	5	40	90	175
<a href="#">VS-6ESH06-M3</a>	6.0	600	1.8	6.0	5	40	90	175



# DIODES

## SMPC (TO-277A) Package

### Avalanche Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$E_R$	$t_{rr}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(mJ)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">AS3PD thru AS3PM</a>	1.5	100 - 1000	1.1	3	10	20	1200	70	175
<a href="#">AS4PD thru AS4PM</a>	1	100 - 1000	1.1	4	10	20	1800	100	175
<a href="#">AR3PD, AR3PG, AR3PJ</a>	3	100, 400, 600	1.6	3	10	20	140	50	175
<a href="#">AR3PK, AR3PM</a>	3	800, 1000	1.9	3	10	20	120	50	175
<a href="#">AR4PD, AR4PG, AR4PJ</a>	4	100, 400, 600	1.6	4	10	20	140	65	175
<a href="#">AR4PK, AR4PM</a>	4	800, 1000	1.9	4	10	20	120	65	175
<a href="#">AU2PD, AU2PG, AU2PJ</a>	2	100, 400, 600	1.9	2	10	20	75	30	175
<a href="#">AU2PK, AU2PM</a>	2	800, 1000	2.5	2	10	20	75	30	175
<a href="#">AU3PD, AU3PG, AU3PJ</a>	3	100, 400, 600	1.9	3	10	20	75	45	175
<a href="#">AU3PK, AU3PM</a>	3	800, 1000	2.5	3	10	20	75	45	175

### PAR<sup>®</sup> TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(W)	(V)	(V)	( $^{\circ}$ C)
<a href="#">TPC6.8(A) thru TPC51(A)</a>	1500	6.8 - 51	5.5 - 43.6	185
<a href="#">TPC11CA thru TPC36CA</a>	1500	10.5 - 37.8	9.4 - 30.8	185

### TRANSZORB<sup>®</sup> TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(W)	(V)	(V)	( $^{\circ}$ C)
<a href="#">SMPC5.0A thru SMP36A</a>	1500	6.4 - 40.0	5.0 - 36	150
<a href="#">SMPC22AN thru SMP85AN</a>	1500	24.4 - 104	22 - 85	150



## SlimDPAK (TO-252AE) Package

## TMBS® Trench MOS Barrier Schottky and Standard Rectifiers in SlimDPAK (TO-252AE) Package

### Features for TMBS Rectifiers

- Very low profile: typical height of 1.3 mm
- Trench MOS Schottky technology
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available



### Features for Standard Rectifiers

- Very low profile: typical height of 1.3 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available



eSMP® Series – SlimDPAK (TO-252AE)

### Applications

- For use in low voltage, high frequency DC/DC converters, freewheeling diodes, and polarity protection applications
- General purpose, power line polarity protection in both industry and automotive applications

### TMBS (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(°C)
<a href="#">V20PW10</a>	20	100	0.86	20.0	500	200	150
<a href="#">V20PW10C</a>	20	100	0.79	10.0	300	150	150
<a href="#">V20PW12</a>	20	120	1.02	20.0	800	200	150
<a href="#">V20PW12C</a>	20	120	0.92	10.0	700	150	150
<a href="#">V20PW15</a>	20	150	1.47	20.0	250	200	150
<a href="#">V20PW15C</a>	20	150	1.24	10.0	150	150	150
<a href="#">V20PW45</a>	20	45	0.61	20.0	1500	200	150
<a href="#">V20PW45C</a>	20	45	0.60	10.0	1000	150	150
<a href="#">V20PW60</a>	20	60	0.66	20.0	3600	200	150
<a href="#">V20PW60C</a>	20	60	0.64	10.0	1500	150	150
<a href="#">V20PWM10</a>	20	100	0.90	20.0	200	200	175
<a href="#">V20PWM10C</a>	20	100	0.82	10.0	150	150	175
<a href="#">V20PWM12</a>	20	120	1.02	20.0	500	200	175
<a href="#">V20PWM12C</a>	20	120	0.92	10.0	300	150	175



## DIODES

## SlimDPAK (TO-252AE) Package

## TMBS® (Trench MOS Barrier Schottky) Rectifiers (cont.)

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	(°C)
<a href="#">V20PWM15</a>	20	150	1.47	20.0	250	200	175
<a href="#">V20PWM15C</a>	20	150	1.24	10.0	150	150	175
<a href="#">V20PWM45</a>	20	45	0.66	20.0	700	200	175
<a href="#">V20PWM45C</a>	20	45	0.62	10.0	200	150	175
<a href="#">V20PWM60</a>	20	60	0.70	20.0	1200	200	175
<a href="#">V20PWM60C</a>	20	60	0.66	10.0	600	150	175
<a href="#">V35PW10</a>	35	100	0.88	35.0	1000	260	150
<a href="#">V35PW12</a>	35	120	1.05	35.0	1000	260	150
<a href="#">V35PW15</a>	35	150	1.40	35.0	250	260	150
<a href="#">V35PW45</a>	35	45	0.62	35.0	2500	260	150
<a href="#">V35PW60</a>	35	60	0.72	35.0	5000	260	150
<a href="#">V35PWM10</a>	35	100	0.90	35.0	800	260	175
<a href="#">V35PWM12</a>	35	120	1.05	35.0	1200	260	175
<a href="#">V35PWM15</a>	35	150	1.40	35.0	500	260	175
<a href="#">V35PWM45</a>	35	45	0.67	35.0	1100	260	175
<a href="#">V35PWM60</a>	35	60	0.77	35.0	2100	260	175
<a href="#">V40PW10C</a>	40	100	0.89	20.0	500	240	150
<a href="#">V40PW12C</a>	40	120	1.03	20.0	750	240	150
<a href="#">V40PW15C</a>	40	150	1.45	20.0	500	240	150
<a href="#">V40PW45C</a>	40	45	0.64	20.0	1200	240	150
<a href="#">V40PW60C</a>	40	60	0.68	20.0	2400	240	150
<a href="#">V40PWM10C</a>	40	100	0.89	20.0	400	240	175
<a href="#">V40PWM12C</a>	40	120	1.00	20.0	500	240	175
<a href="#">V40PWM15C</a>	40	150	1.45	20.0	500	240	175
<a href="#">V40PWM45C</a>	40	45	0.67	20.0	400	240	175
<a href="#">V40PWM60C</a>	40	60	0.72	20.0	1400	240	175

## Standard ESD Capability Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F @ I_F$		$I_R @ V_{RRM}$	$t_{tr}$ Max	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	(°C)
<a href="#">SE80PWB thru SE80PWJ</a>	8	100 - 600	1.12	8	15	2400	110	175
<a href="#">SE100PWB thru SE100PWJ</a>	10	100 - 600	1.14	10	20	2600	110	175





## TMBS® Trench MOS Barrier Schottky and Standard Rectifiers in SMPD (TO-263AC) Package

### Common Features

- Low profile (< 1.7 mm height) SMPD (TO-263AC) package is footprint compatible with D2PAK (TO-263AB) package
- Ideal for automated placement
- Meets MSL moisture sensitivity level of 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to JEDEC JS709A standards

### Features for TMBS Rectifiers

- Current ratings from 10 A to 60 A
- Low forward voltage drop down to 0.40 V at 15 A
- Low power losses and high efficiency
- Trench MOS Schottky technology
- Maximum operation junction temperature of 150 °C

### Features for Standard Rectifiers

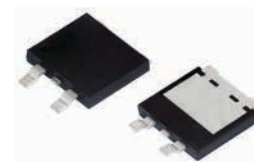
- Oxide planar chip technology
- Current ratings range from 10 A to 20 A
- Low forward voltage drop down to 0.75 V typical with fast recovery time down to 25 ns
- ESD capability
- High operating temperature up to 175 °C
- Soft recovery behavior over a temperature range of -40 °C to 175 °C at any di / dt
- Available in AEC-Q101 qualified and standard versions

### Features for FRED Pt® Rectifiers

- High operating temperature up to 175 °C
- Low forward voltage drop down to 0.75 V typical with fast recovery time down to 25 ns
- Soft recovery behavior over a temperature range of -40 °C to 175 °C at any di / dt
- Available in AEC-Q101 qualified and standard versions

### Applications

- For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diodes, and reverse battery protection
- General purpose, power line polarity protection in automotive applications
- Automotive
  - EV / HEV battery charging systems
  - Power supply PFC
- Industrial
  - APD in inverters for motor drives, UPS, and LED and HID lighting systems



**eSMP® Series — SMPD (TO-263AC)**





## DIODES

## SMPD (TO-263AC) Package

## TMBS® (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(A)	( $^{\circ}$ C)
<a href="#">V10D100C</a>	10	100	0.75	5.0	500	100	150
<a href="#">V10D120C</a>	10	120	0.94	5.0	500	100	150
<a href="#">V10D202C</a>	10	200	0.90	5.0	50	100	175
<a href="#">V10D45C</a>	10	45	0.58	5.0	500	100	150
<a href="#">V10D60C</a>	10	60	0.70	5.0	700	100	150
<a href="#">V20D202C</a>	20	200	0.90	10.0	150	150	175
<a href="#">V20DL45</a>	20	45	0.64	20	2500	160	150
<a href="#">V20DL45BP</a>	20	45	0.64	20	2500	160	150
<a href="#">V20DM120</a>	20	120	1.1	20.0	800	150	175
<a href="#">V20DM120C</a>	20	120	0.93	10	600	120	150
<a href="#">V30D202C</a>	30	200	0.88	15.0	200	260	175
<a href="#">V30D45C</a>	30	45	0.57	15	1500	200	150
<a href="#">V30D60C</a>	30	60	0.70	15	1200	170	150
<a href="#">V30D60CL</a>	30	60	0.61	15	4000	200	150
<a href="#">V30DL45</a>	30	45	0.65	30	3000	200	150
<a href="#">V30DL45BP</a>	30	45	0.65	30	3000	200	150
<a href="#">V30DL50C</a>	30	50	0.57	15	1800	300	150
<a href="#">V30DM120</a>	30	120	1.06	30.0	1000	250	175
<a href="#">V30DM120C</a>	30	120	0.93	15	800	150	150
<a href="#">V35DM120</a>	30	120	1.05	35.0	1200	320	175
<a href="#">V40D100C</a>	40	100	0.75	20.0	1000	250	175
<a href="#">V40D120C</a>	40	120	0.89	20.0	500	250	175
<a href="#">V40DL45</a>	40	45	0.66	40	5000	240	150
<a href="#">V40DL45BP</a>	40	45	0.66	40	5000	240	150
<a href="#">V40DM120C</a>	40	120	0.89	20	500	250	150
<a href="#">V60D100C</a>	60	100	0.81	30	1000	320	150
<a href="#">V60D120C</a>	60	120	0.96	30	800	320	150
<a href="#">V60D45C</a>	60	45	0.64	30	2500	320	150
<a href="#">V60DM120C</a>	60	120	0.97	30.0	700	320	175

## Standard ESD Capability Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	trr Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	( $^{\circ}$ C)
<a href="#">SE10DB thru SE10DJ</a>	10	100 - 600	1.15	10	15	3000	110	175
<a href="#">SE12DB thru SE12DJ</a>	12	100 - 600	1.15	12	20	3000	125	175
<a href="#">SE20DB thru SE20DJ</a>	20	100 - 600	1.20	20	25	3000	150	175



## DIODES

## SMPD (TO-263AC) Package

## FRED Pt® Ultrafast Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	trr Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	(A)	(°C)
<a href="#">VS-16CDH02-M3/I</a>	16	200	0.77	8	2	27	190	175
<a href="#">VS-16CDH02HM3/I</a>	16	200	0.77	8	2	27	190	175
<a href="#">VS-16EDH02-M3/I</a>	16	200	0.75	16	15	32	250	175
<a href="#">VS-16EDH02HM3/I</a>	16	200	0.75	16	15	32	250	175
<a href="#">VS-20CDH02-M3/I</a>	20	200	0.77	10	2	25	210	175
<a href="#">VS-20CDH02HM3/I</a>	20	200	0.77	10	2	25	210	175
<a href="#">VS-10CDH06-M3/I</a>	10	600	1	5	3	35	110	175
<a href="#">VS-10CDH06HM3/I</a>	10	600	1	5	3	35	110	175
<a href="#">VS-12CDU06-M3/I</a>	12	600	0.89	6	5	45	200	175
<a href="#">VS-12CDU06HM3/I</a>	12	600	0.89	6	5	45	200	175
<a href="#">VS-16CDU06-M3/I</a>	16	600	0.94	8	5	45	200	175
<a href="#">VS-16CDU06HM3/I</a>	16	600	0.94	8	5	45	200	175
<a href="#">VS-16EDU06-M3/I</a>	16	600	0.91	16	15	55	160	175
<a href="#">VS-16EDU06HM3/I</a>	16	600	0.91	16	15	55	160	175
<a href="#">VS-30CDU06-M3/I</a>	30	600	0.9	15	15	55	300	175
<a href="#">VS-30CDU06HM3/I</a>	30	600	0.9	15	15	55	300	175



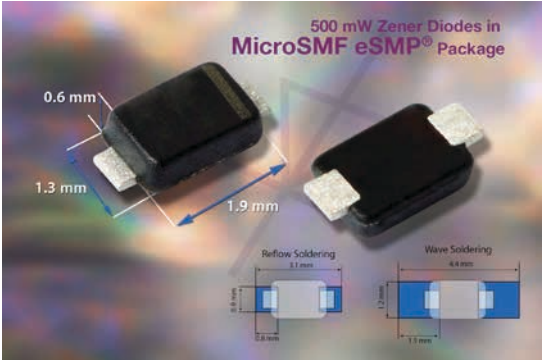
# DIODES

## MicroSMF (DO-219AC) Package

### PLZ Series 500 mW Zener Diodes in New Low Profile MicroSMF (DO-219AC) eSMP® Series Package

#### Features

- New MicroSMF package (JEDEC registration: DO-219AC)
- SOD-323FL package size
- Cu wire bonded
- 500 mW power dissipation
- Excellent thermal characteristics: RthJA 130 K/W
- Very tight Zener voltage tolerances: ± 2.5 % in six inch Planar technology
- Surge current and ESD rated
- Excellent stability, low leakage, and low noise current
- RoHS-compliant, halogen-free, and Vishay Green
- Symmetrical leads
- Wave and reflow solderable
- Visual solder quality inspection possible (no x-ray needed)
- Whisker Level 2 qualified according to JESD 201
- AEC-Q101 qualified



**eSMP Series – MicroSMF (DO-219AC)**

Device	T <sub>J</sub> Max	V <sub>F</sub> @ 0.01 A	P <sub>tot</sub>	V <sub>Z</sub>
	(°C)	(V)	(W)	(V)
<a href="#">PLZ Series</a>	150	0.9	0.5	2.0 to 39



## Diodes in SMF (DO-219AB) Package: Improved Performance in a Smaller Footprint

### Introduction

Vishay provides innovative SMD solutions in a wide range of new devices in the SMF (DO-219AB) package. The SMF package meets the demand for smaller and thinner diodes that enable small and light portable products, such as cellular phones, notebook PCs, and portable consumer products, as well as space-constrained automotive modules. With its exceptionally low height profile of 0.98 mm, the SMF package reduces space requirements and improves circuit board density. Vishay Semiconductors diode products offered in the SMF package address all industry segments and include switching, fast switching, ultrafast switching, Schottky diodes, TVS and ESD protection, zener diodes, and rectifiers.



### Features

- SOD-123 footpad size
- 0.98 mm package height
- 0.8 W power dissipation
- Broad product range
- Excellent stability
- Best in class reliability
- Flat terminal allows stable mounting on PCB
- High reliability due to planar structure of the die
- High surge current capability due to soldered construction
- High power rating despite small package size
- Ultra low stress epoxy molding compound
- AEC-Q101 qualified
- Reflow and wave solderable
- Symmetrical leads allow visual inspection after soldering
- Reverse voltage up to 1000 V
- Halogen-free versions available
- Package dimensions are common industry standard

### Applications

- Fast and superfast diodes
  - Portable products
  - Reverse current protection
  - DC/DC converters
  - Lighting
- General purpose and rectifiers
  - Rectification
  - Reverse polarity protection
  - Free wheeling
  - Automotive
- Zener, TVS, and ESD protection diodes
  - Voltage stabilization
  - Gate protection for MOSFETs
  - ESD protection
  - Lighting



**eSMP® Series —  
SMF  
(DO-219AB)**

### Patented





# DIODES

## SMF (DO-219AB) Package

### ESD Protection Diodes

Device	T <sub>J</sub> Max	V <sub>F</sub>	P <sub>PPM</sub> @ 10/1000 μs	P <sub>PPM</sub> @ 8/20 μs	V <sub>(BR)</sub>	ESD Protection Air / Contact
	(°C)	(V)	(W)	(W)	(V)	(kV)
<a href="#">VTVS5V0ASMF to VTVS63GSMF</a>	175	1.8 @ 50 A	400	–	6.4 to 78.2	30/30
<a href="#">SMF5V0A to SMF85A</a>	175	2.5 @ 50 A	200	1000	6.4 to 64.4	30/30
<a href="#">BZD27C Series</a>	175	1.2 @ 0.2 A	150	–	7.0 to 188	30/8
<a href="#">BZD27B Series</a>	175	1.2 @ 0.2 A	150	–	7.35 to 196	30/8

### Zener Diodes

Device	T <sub>J</sub> Max	V <sub>F</sub> @ 0.2 A	P <sub>tot</sub>	V <sub>z</sub>
	(°C)	(V)	(W)	(V)
<a href="#">BZD27C3V6P - BZD27C200P</a>	175	1.2	0.8	3.6 to 200
<a href="#">BZD27B3V6P - BZD27B200P</a>	175	1.2	0.8	3.6 to 200

### Schottky Diodes

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	V <sub>F</sub> @ 0.5 A	V <sub>F</sub> @ 1.1 A	I <sub>R</sub> @ 25 °C	I <sub>R</sub> @ 100 °C
	(°C)	(A)	(A)	(V)	(V)	(V)	(μA)	(mA)
<a href="#">SL02</a>	125	40	1.1	20	0.36	0.42	250	8
<a href="#">SL03</a>	125	40	1.1	30	0.395	0.45	130	6
<a href="#">SL04</a>	175	40	1.1	40	0.41	0.48	20	2.6

### Schottky Rectifiers

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	Max V <sub>F</sub> @ I <sub>F</sub>	I <sub>R</sub> @ 25 °C
	(°C)	(A)	(A)	(V)		(μA)
<a href="#">SS1F4</a>	150	40	1	40	0.52	150
<a href="#">SS1FH10</a>	175	40	1	100	0.80	5
<a href="#">SS1FH6</a>	175	40	1	60	0.70	3
<a href="#">SS1FL3</a>	150	40	1	30	0.48	200
<a href="#">SS1FL4</a>	150	40	1	40	0.5	200
<a href="#">SS1FN6</a>	150	40	1	60	0.53	800
<a href="#">SS2FH10</a>	175	50	2	100	0.86	5
<a href="#">SS2FH6</a>	175	40	2	60	0.78	3
<a href="#">SS2FL3</a>	150	50	2	30	0.54	200
<a href="#">SS2FL4</a>	150	50	2	40	0.58	220
<a href="#">SS2FN6</a>	150	50	2	60	0.6	900



# DIODES

## SMF (DO-219AB) Package

### Standard Rectifiers

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	Max V <sub>F</sub> @ I <sub>F</sub>	I <sub>R</sub> @ 25 °C	I <sub>R</sub> @ 125 °C	t <sub>r</sub>
	(°C)	(A)	(A)	(V)		(μA)	(μA)	(μs)
<a href="#">SE10FD thru SE10FJ</a>	175	25	1	200 - 600	1.05	5	50	780
<a href="#">SE15FD thru SE15FJ</a>	175	30	1.5	200 - 600	1.05	5	50	900
<a href="#">SE20FD thru SE20FJ</a>	175	35	2	200 - 600	1.10	5	100	920

### Switching Diodes

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	V <sub>F</sub> @ 1.0 A	I <sub>R</sub> @ 25 °C	I <sub>R</sub> @ 125 °C	t <sub>r</sub>
	(°C)	(A)	(A)	(V)	(V)	(μA)	(μA)	(μs)
<a href="#">S07B</a>	175	25	1.5	100	1.1	10	50	1.8
<a href="#">S07D</a>	175	25	1.5	200	1.1	10	50	1.8
<a href="#">S07G</a>	175	25	1.5	400	1.1	10	50	1.8
<a href="#">S07J</a>	175	25	1.5	600	1.1	10	50	1.8
<a href="#">S07M</a>	175	25	1.5	1000	1.1	10	50	1.8

### Fast Switching Diodes

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	V <sub>F</sub> @ 0.7 A	I <sub>R</sub> @ 25 °C	I <sub>R</sub> @ 125 °C	t <sub>r</sub>
	(°C)	(A)	(A)	(V)	(V)	(μA)	(μA)	(ns)
<a href="#">RS07B</a>	150	30	1.4	100	1.15	10	50	150
<a href="#">RS07D</a>	150	30	1.4	200	1.15	10	50	150
<a href="#">RS07G</a>	150	30	1.4	400	1.15	10	50	150
<a href="#">RS07J</a>	150	30	1.4	600	1.15	10	50	250
<a href="#">RS07K</a>	150	30	1.4	800	1.3 @ 1 A	2	150	300

### Ultrafast Switching Diodes

Device	T <sub>J</sub> Max	I <sub>FSM</sub>	I <sub>F(AV)</sub>	V <sub>RRM</sub>	V <sub>F</sub> @ 1.0 A	I <sub>R</sub> @ 25 °C	I <sub>R</sub> @ 100 °C	t <sub>r</sub>
	(°C)	(A)	(A)	(V)	(V)	(μA)	(μA)	(ns)
<a href="#">ES07B</a>	150	30	1.2	100	0.98	10	50	25
<a href="#">ES07D</a>	150	30	1.2	200	0.98	10	50	25



## DIODES

## SMF (DO-219AB) Package

## FRED Pt® Ultrafast Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$t_{tr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(V)	( $\mu$ A)	( $^{\circ}$ C)
<a href="#">VS-1EFH01-M3/I</a>	1	100	0.74	1	2	25	35	175
<a href="#">VS-1EFH01HM3/I</a>	1	100	0.74	1	2	25	35	175
<a href="#">VS-1EFH02-M3/I</a>	1	200	0.74	1	2	25	35	175
<a href="#">VS-1EFH02HM3/I</a>	1	200	0.74	1	2	25	35	175
<a href="#">VS-1EFU06-M3/I</a>	1	600	0.83	1	3	55	30	175
<a href="#">VS-1EFU06HM3/I</a>	1	600	0.83	1	3	55	30	175
<a href="#">VS-2EFH01-M3/I</a>	2	100	0.75	2	2	25	50	175
<a href="#">VS-2EFH01HM3/I</a>	2	100	0.75	2	2	25	50	175
<a href="#">VS-2EFH02-M3/I</a>	2	200	0.75	2	2	25	50	175
<a href="#">VS-2EFH02HM3/I</a>	2	200	0.75	2	2	25	50	175
<a href="#">VS-2EFU06-M3/I</a>	2	600	0.95	2	3	55	30	175
<a href="#">VS-2EFU06HM3/I</a>	2	600	0.95	2	3	55	30	175

## Compatible With Common Industry-Standard Packages

Package	SMF Mounting Pad Compatibility	SMF Package Height Comparison	SMF Mounting Pad Area Comparison
SMA	-	120 %	110 %
M1F	Yes	40 %	5 %
SOD-123W	Yes	2 %	5 %
SMF Competition	Yes	0%	19 %
PMDU	Yes	8%	17 %
SubSMA	Yes	36 %	0 %
SOD-123FL	Yes	0 %	5 %
S-Flat	Yes	0 %	93 %
Mini2-F3-B	Yes	18 %	14 %
SOD-123F	Yes	0 %	5 %
SOD-123FA	Yes	6 %	1 %



# DIODES

## SlimSMA (DO-221AC) Package

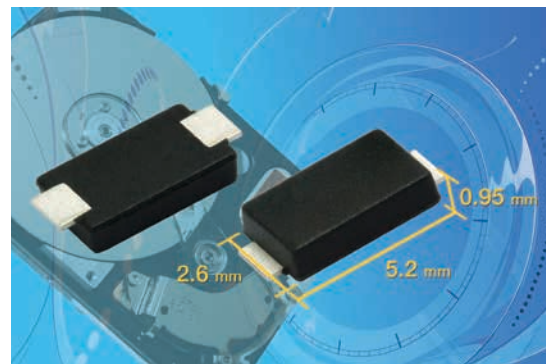
### Low Profile SlimSMA (DO-221AC) Package for Rectifiers and Transient Voltage Suppressors (TVS)

#### Features

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- AEC-Q101 qualified
- Halogen-free, RoHS-compliant
- Meet the MSL Level 1 standard, per J-STD-020, LF maximum peak of 260 °C

#### Applications

- Consumer
- Computer
- Telecommunication
- Industrial
- Automotive



eSMP® Series – SlimSMA (DO-221AC)

#### TMBS® (Trench MOS Barrier Schottky) Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R @ V_{RRM}$	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	( $\mu$ A)	(°C)
<a href="#">VSSAF3L45</a>	3	45	0.54	3.0	450	80	150
<a href="#">VSSAF3M10</a>	3	100	0.72	3.0	200	80	175
<a href="#">VSSAF3M6</a>	3	60	0.62	3.0	300	80	175
<a href="#">VSSAF3N50</a>	3	50	0.54	3.0	1000	80	150
<a href="#">VSSAF510</a>	5	100	0.75	5.0	500	100	150
<a href="#">VSSAF512</a>	5	120	0.88	5.0	400	100	150
<a href="#">VSSAF515</a>	5	150	1.1	5.0	200	100	150
<a href="#">VSSAF56</a>	5	60	0.62	5.0	400	100	150
<a href="#">VSSAF5L45</a>	5	45	0.56	5.0	650	100	150
<a href="#">VSSAF5M10</a>	5	100	0.79	5.0	400	100	175
<a href="#">VSSAF5M12</a>	5	120	0.89	5.0	350	100	175
<a href="#">VSSAF5M15</a>	5	150	1.15	5.0	180	100	175
<a href="#">VSSAF5M6</a>	5	60	0.66	5.0	350	100	175
<a href="#">VSSAF5N50</a>	5	50	0.56	5.0	1400	1000	150





# DIODES

## SlimSMA (DO-221AC) Package

### Standard Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$t_{rr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	( $\mu$ A)	( $^{\circ}$ C)
<a href="#">S1AFG thru S1AFM</a>	1.0	400 - 1000	1.1	1.0	5	1470	35	150
<a href="#">SE20AFB thru SE20AFJ</a>	2.0	100 - 600	1.1	2.0	5	1200	35	175
<a href="#">SE30AFB thru SE30AFJ</a>	3.0	100 - 600	1.1	2.0	10	1500	40	175

### FRED Pt<sup>®</sup> Ultrafast Recovery Rectifiers

Device	$I_{F(AV)}$	$V_{RRM}$ Range	Max $V_F$ @ $I_F$		$I_R$ @ $V_{RRM}$	$t_{rr}$ Typ	$I_{FSM}$	$T_J$ Max
	(A)	(V)	(V)	(A)	( $\mu$ A)	(ns)	( $\mu$ A)	( $^{\circ}$ C)
<a href="#">VS-2EJH01-M3</a>	2	100	0.72	2	2	25	65	175
<a href="#">VS-2EJH01HM3</a>	2	100	0.72	2	2	25	65	175
<a href="#">VS-2EJH02-M3</a>	2	200	0.72	2	2	25	65	175
<a href="#">VS-2EJH02HM3</a>	2	200	0.72	2	2	25	65	175
<a href="#">VS-3EJH01-M3</a>	3	100	0.74	3	2	30	85	175
<a href="#">VS-3EJH01HM3</a>	3	100	0.74	3	2	30	85	175
<a href="#">VS-3EJH02-M3</a>	3	200	0.74	3	2	30	85	175
<a href="#">VS-3EJH02HM3</a>	3	200	0.74	3	2	30	85	175
<a href="#">VS-3EJU06-M3</a>	3	600	1.35	3	3	45	50	175
<a href="#">VS-3EJU06HM3</a>	3	600	1.35	3	3	45	50	175

### PAR<sup>®</sup> TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(A)	(V)	( $\mu$ A)	( $^{\circ}$ C)
<a href="#">TA6F6.8A thru TA6F51A</a>	600	6.45 - 53.6	5.8 - 43.6	185

### TransZorb<sup>®</sup> TVS

Device	$P_{PPM}$ (10 x 1000 $\mu$ s)	$V_{(BR)}$ Range	$V_{WM}$ Range	$T_J$ Max
	(A)	(V)	( $\mu$ A)	( $^{\circ}$ C)
<a href="#">SMA6F5.0A thru SMA6F20A</a>	600	6.4 - 24.5	5.0 - 20	175



High Power Density  
 isoCink+™ Bridge  
 Fast Response Time  
 Small-Signal Schottky  
 Low Capacitance  
**AEC-Q101**  
 Automotive  
 Zener  
 Ultrafast Recovery  
 Medium Power  
 Industrial  
**HEXFRED®**  
 Green  
 Fast Recovery  
 Power Package  
 Low Forward Voltage Drop  
 Low Profile

High ESD Immunity  
**TRANSZORB® TVS**  
 Load Dump  
 ESD Protection  
 EMI Filter  
 High Power  
 Surface-Mount  
 Standard Recovery  
 Halogen-Free  
**PAR® TVS**  
 Space-Saving  
**FRED Pt®**  
 Bridge

Small-Signal Switching  
 FlipKY®  
**Diodes**  
**Rectifiers**  
 eSMP® Series  
 Packages **TMBS®**  
 ESD Capability Rectifiers  
 Avalanche Schottky  
 High-Performance Planar  
**SUPERECTIFIER®**