

1. General description

EEPP™ - Efficiency Enhanced Pt Planar rectifier in a 2-lead TO220 plastic package.

2. Features and benefits

- Fast switching
- Reduces switching losses with improved lower reverse recovery charge
- Soft recovery characteristics
- Low thermal resistance
- Low leakage current
- Planar termination structure
- High operating temperature capability ($T_{j(max)} = 175^{\circ}\text{C}$)
- Higher I_{FSM} capability

3. Applications

- Switched-Mode Power Supplies
- Power factor correction diode
- Uninterrupted Power Supply

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		1200			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 120^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	15			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25 \mu\text{s}$; $T_{mb} \leq 120^{\circ}\text{C}$; square-wave pulse	30			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10 \text{ ms}$; $T_{j(init)} = 25^{\circ}\text{C}$; sine-wave pulse; Fig. 4	180			A
		$t_p = 8.3 \text{ ms}$; $T_{j(init)} = 25^{\circ}\text{C}$; sine-wave pulse	200			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 15 \text{ A}$; $T_j = 25^{\circ}\text{C}$; Fig. 6	-	2.5	3.2	V
		$I_F = 15 \text{ A}$; $T_j = 150^{\circ}\text{C}$; Fig. 6	-	2.0	-	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}$; $V_R = 30 \text{ V}$; $dI_F/dt = 100 \text{ A}/\mu\text{s}$; $T_j = 25^{\circ}\text{C}$; Fig. 7	-	45	-	ns
Avalanche energy						
E_{AS}	non-repetitive avalanche energy	$I_R = 4 \text{ A}$; $L = 5 \text{ mH}$; $T_{j(init)} = 25^{\circ}\text{C}$	40	-	-	mJ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	mb	mounting base; connected to cathod		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BYC15-1200P	TO220-2L	BYC15-1200PQ	Tube	50	TO220E-2L (E)	26-May-2017
					SOD59 (A)	27-Nov-2012

7. Marking

Table 4. Marking codes

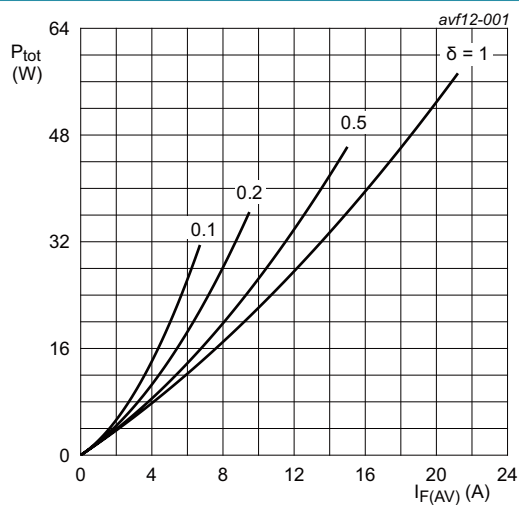
Type number	Marking codes	
	Assembly factory: E	Assembly factory: A
BYC15-1200P	BYC15 1200P PJExxxx xx	BYC15 1200P PJAxxxx xx

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

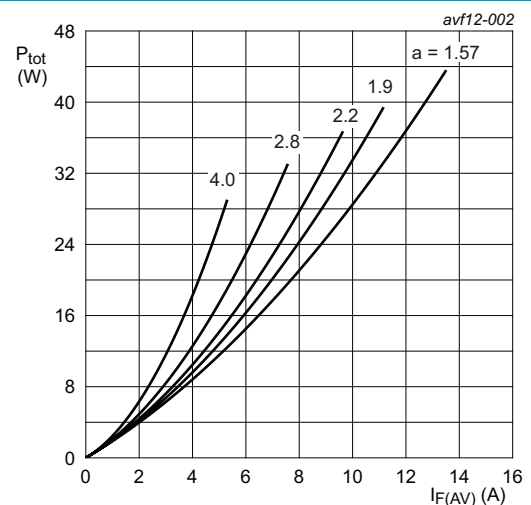
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		1200	V
V_{RWM}	crest working reverse voltage		1200	V
V_R	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; square-wave pulse; $T_{mb} \leq 120\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	15	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 120\text{ °C}$; square-wave pulse	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse; Fig. 4	180	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse	200	A
T_{stg}	storage temperature		-65 to 175	°C
T_j	junction temperature		175	°C



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 1.775\text{ V}; R_s = 0.0436\ \Omega$$

Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 1.775\text{ V}; R_s = 0.0436\ \Omega$$

Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

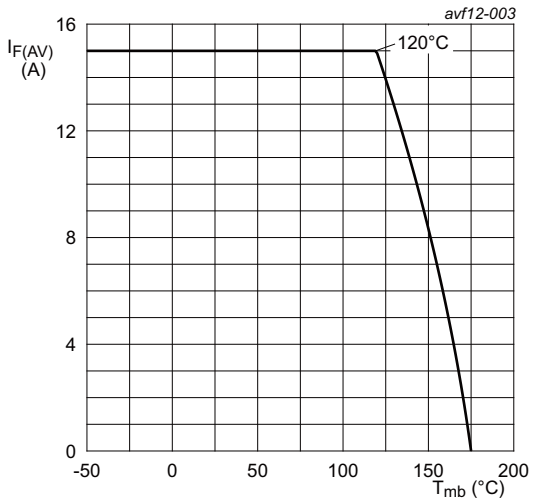


Fig. 3. Forward current as a function of mounting base temperature; maximum values

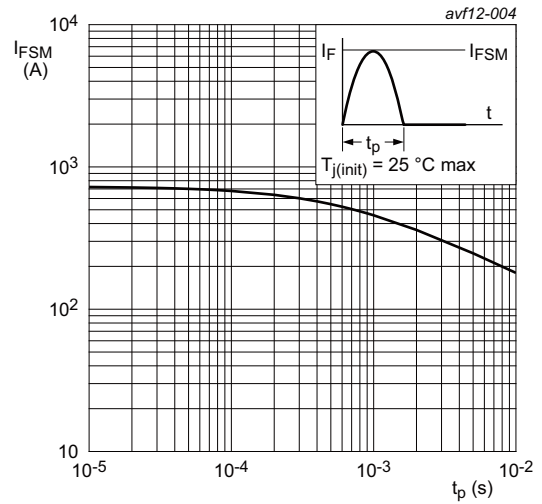


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 5	-	-	1.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

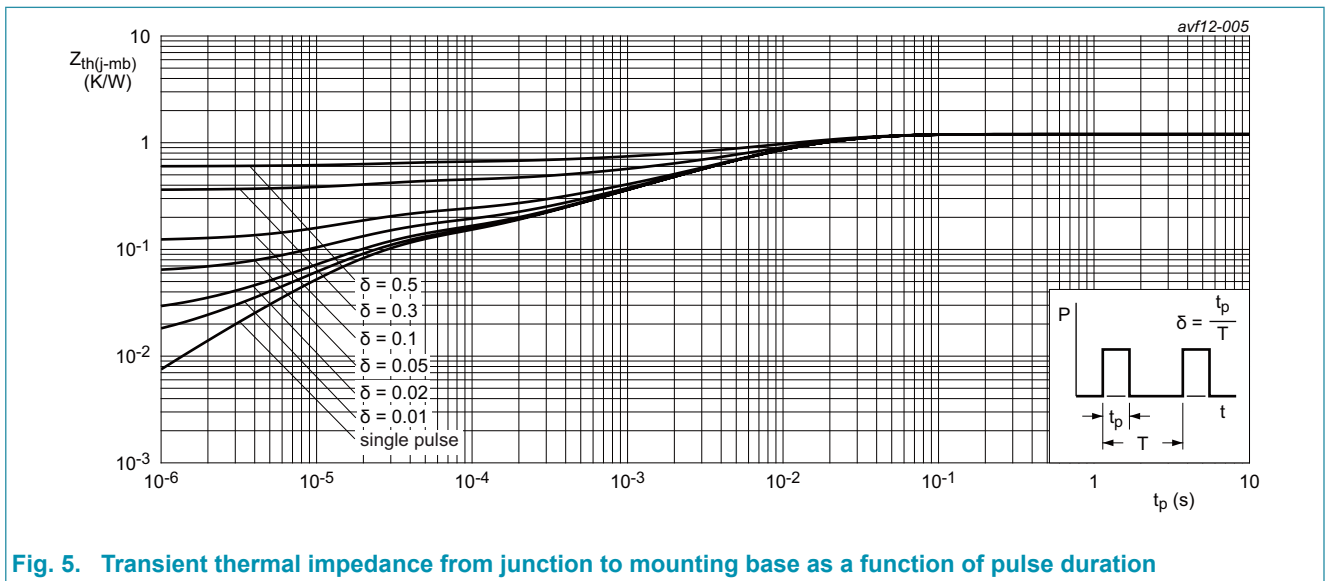
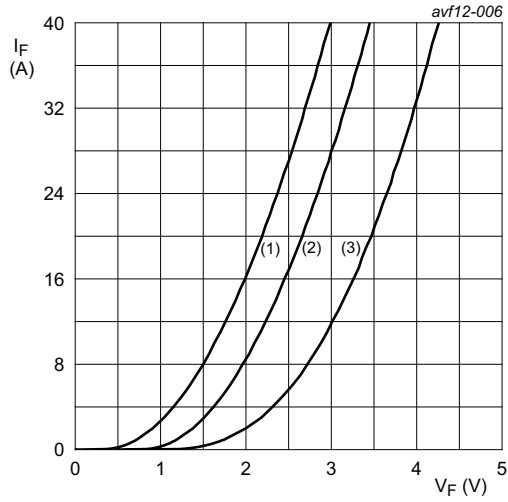


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 15\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$	-	2.5	3.2	V
		$I_F = 15\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$	-	2.0	-	V
I_R	reverse current	$V_R = 1200\text{ V}; T_j = 25\text{ °C}$	-	-	100	μA
		$V_R = 1200\text{ V}; T_j = 150\text{ °C}$	-	-	500	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	394	-	nC
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	1003	-	nC
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 150\text{ °C}; \text{Fig. 7}$	-	1143	-	nC
t_{rr}	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	45	-	ns
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	61	-	ns
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	120	-	ns
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 150\text{ °C}; \text{Fig. 7}$	-	128	-	ns
I_{RM}	peak reverse recovery current	$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 7}$	-	12.6	-	A
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 125\text{ °C}; \text{Fig. 7}$	-	16.7	-	A
		$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 150\text{ °C}; \text{Fig. 7}$	-	17.8	-	A
Avalanche energy						
E_{AS}	non-repetitive avalanche energy	$I_R = 4\text{ A}; L = 5\text{ mH}; T_{j(\text{init})} = 25\text{ °C}$	40	-	-	mJ



$V_o = 1.775 \text{ V}; R_s = 0.0436 \Omega$

(1) $T_j = 150 \text{ }^\circ\text{C}$; typical values

(2) $T_j = 150 \text{ }^\circ\text{C}$; maximum values

(3) $T_j = 25 \text{ }^\circ\text{C}$; maximum values

Fig. 6. Forward current as a function of forward voltage

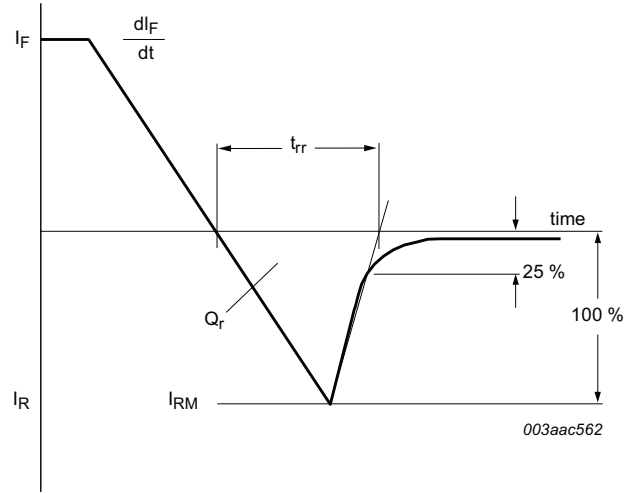
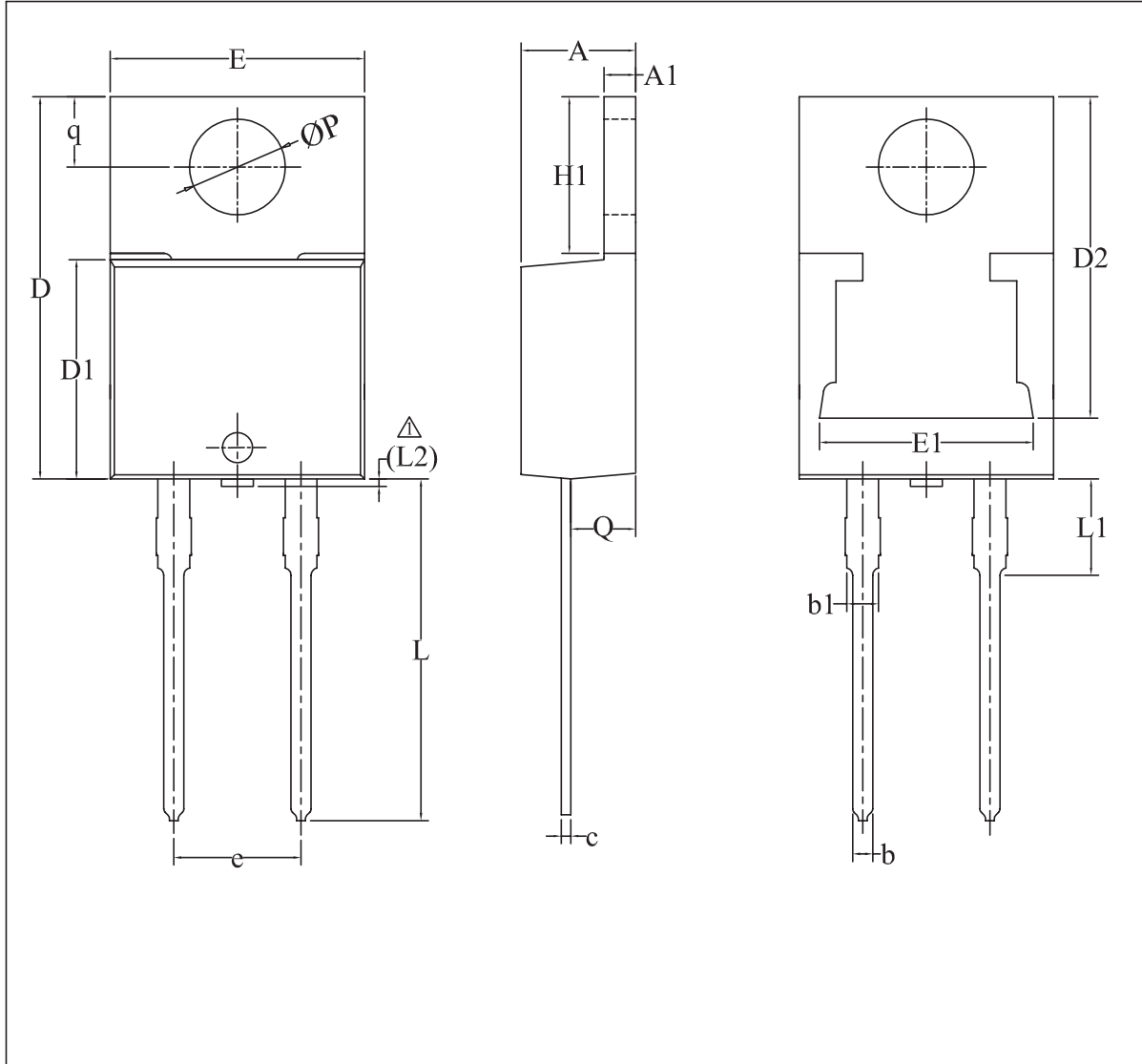


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Assembly factory: E

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2 leads TO-220AB TO220-2L



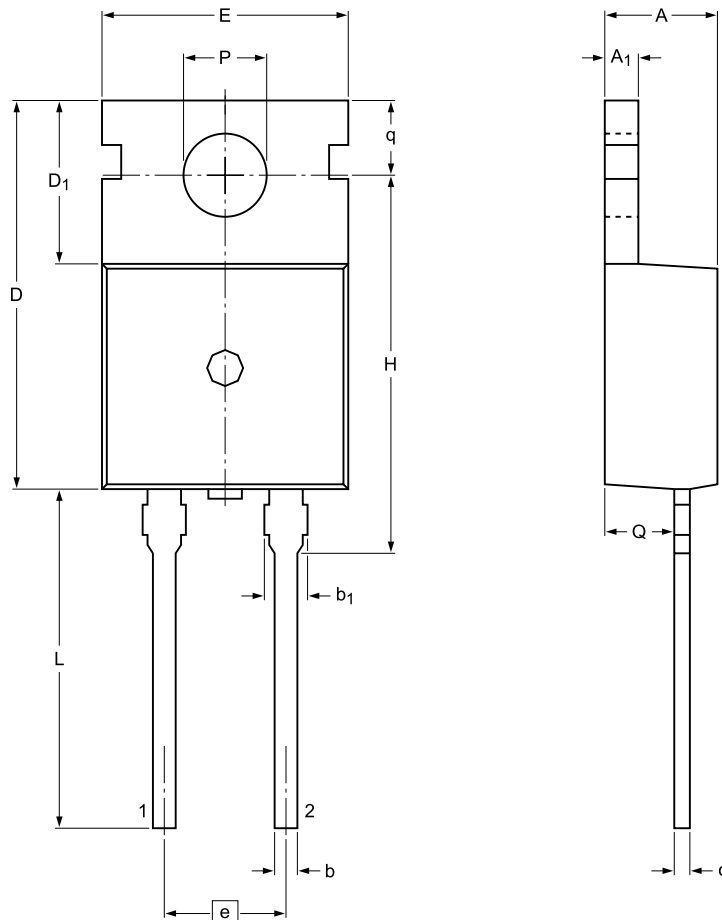
Unit	A	A1	b	b1	c	D	D1	D2	E	E1	e	H1	L	L1	L2	P	Q	q
MM	min	4.35	1.14	0.69	1.08	0.36	14.95	8.50	12.20	10.00	8.25	6.00	13.00	3.40		3.70	2.40	2.60
	max	4.75	1.40	1.01	1.67	0.61	15.55	9.02	12.88	10.40	8.89	5.08 (BSC)	6.40	14.00	3.80	0.35	3.95	2.80

Notes:
 Δ L2 protrusion is the mold resin not metal.

Assembly factory: A

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC

SOD59



Dimensions

Unit	A	A ₁	b	b ₁ ⁽¹⁾	c	D	D ₁	E	e	H	L	P	Q	q
max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	5.08	16.25	15.0	3.80	2.6	2.9
nom									(REF)					
min	4.3	1.15	0.70	1.3	0.45	15.6	6.4	9.65		15.70	12.5	3.65	2.2	2.7

Note

1. Protruded dambar are included in the dimension.

sod059_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOD59	2-lead TO-220AC				09-08-25 12-11-27

12. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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For sales office addresses, please send an email to: salesaddresses@ween-semi.com

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