MUR560

Ultrafast power diode

Rev.05 - 19 March 2024 Product data sheet

1. General description

Ultrafast power diode in a SMC package.

2. Features and benefits

- Fast switching
- SMC package
- High voltage capability
- Low forward voltage drop
- Low leakage current
- Low thermal resistance
- Soft recovery characteristic

3. Applications

- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- High frequency switched-mode power supplies

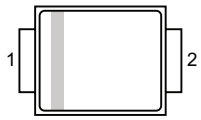
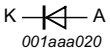
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage		600				V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; $T_{lead} \leq 96$ °C; Fig. 1; Fig. 2; Fig. 3	5				A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{lead} \leq 96$ °C; square-wave pulse	10				A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	130				A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	143				A
Symbol	**Parameter**	**Conditions**	**Notes**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
V_F	forward voltage	I_F = 5 A; T_j = 25 °C		-	1.10	1.35	V
		I_F = 5 A; T_j = 150 °C		-	0.9	1.15	V
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt= 50 A/us; T_j = 25 °C; Fig. 7		-	45	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
MUR560	SMC	MUR560J	Reel	3000	SMCS	16-Aug-2017
		MUR560,118				

7. Marking

Table 4. Marking codes

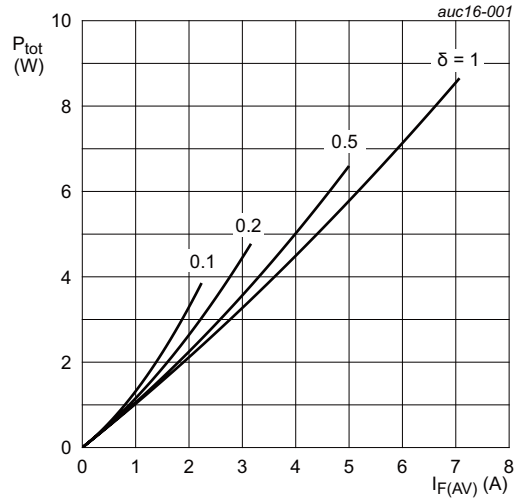
Type number	Marking codes	
	Assembly factory: S	Assembly factory: E
MUR560	560JS	560JE

8. Limiting values

Table 5. Limiting values

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

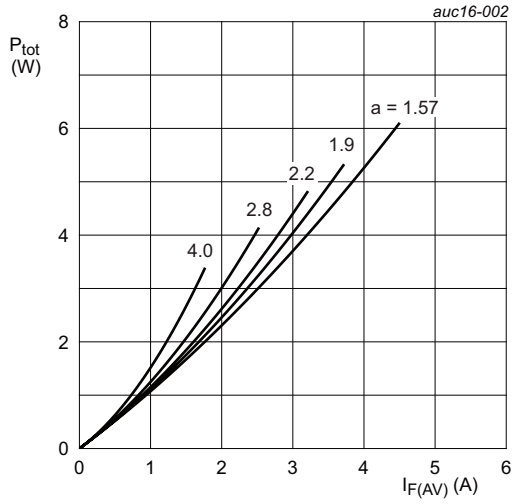
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		600	V
V_{RWM}	crest working reverse voltage		600	V
V_R	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; $T_{lead} \leq 96$ °C; Fig. 1; Fig. 2; Fig. 3	5	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{lead} \leq 96$ °C; square-wave pulse	10	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	130	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	143	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 = 0.992 V; R_s = 0.0327 Ω

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



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

V_o = 0.992 V; R_s = 0.0327 Ω

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

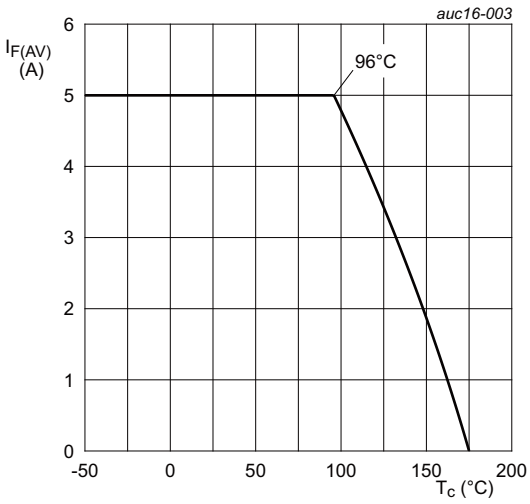


Fig. 3. Forward current as a function of lead temperature; maximum values

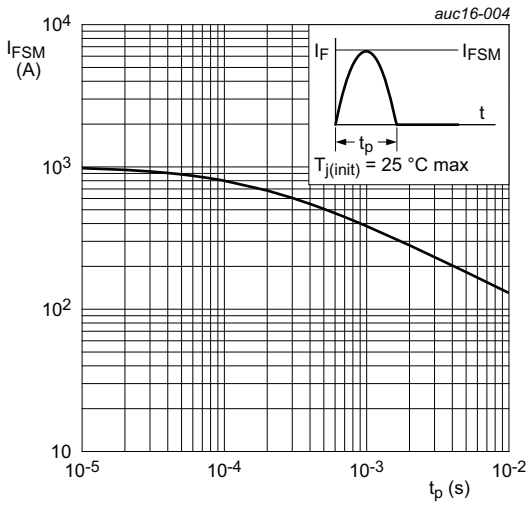


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	mounted on a minimum footprint printed-circuit board (FR4); Fig. 5		-	-	12	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	mounted on a minimum footprint printed-circuit board (FR4)		-	75	-	K/W

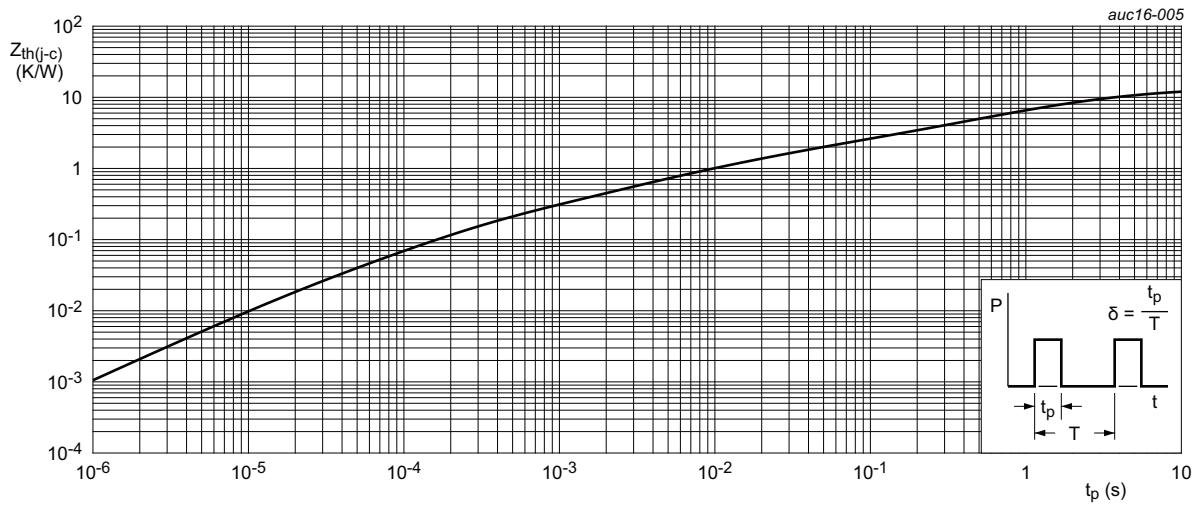
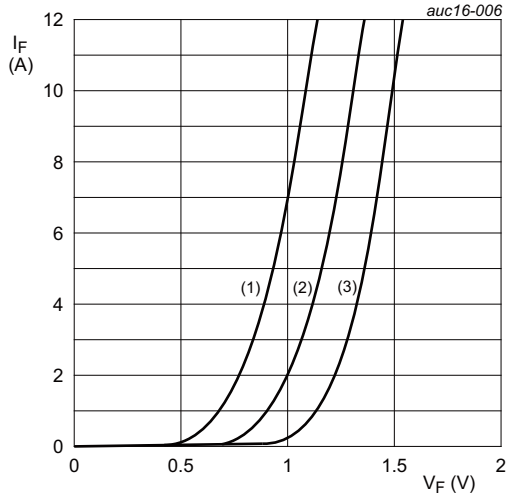


Fig. 5. Transient thermal impedance from junction to case as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 5 A; T_j = 25 °C; Fig. 6		-	1.10	1.35	V
		I_F = 5 A; T_j = 150 °C; Fig. 6		-	0.9	1.15	V
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	-	3	µA
		V_R = 600 V; T_j = 150 °C		-	-	250	µA
Dynamic characteristics							
Q_r	reverse charge	I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 25 °C; Fig. 7		-	216	-	nC
		I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 125 °C; Fig. 7		-	420	-	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R = 30 V; dI_F/dt= 50 A/us; T_j = 25 °C; Fig. 7		-	45	-	ns
		I_F = 0.5 A; I_R = 1 A; $I_{R(meas)}$ = 0.25 A; T_j = 25 °C; Step recovery		-	-	65	ns
		I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 25 °C; Fig. 7		-	64	-	ns
		I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 125 °C; Fig. 7		-	88	-	ns
I_{RM}	peak reverse recovery current	I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 25 °C; Fig. 7		-	6.7	-	A
		I_F = 5 A; V_R = 400 V; dI_F/dt = 100 A/us; T_j = 125 °C; Fig. 7		-	9.5	-	A
E_{as}	non-repetitive avalanche energy	I_R = 1.2 A; $T_{j(init)}$ = 25 °C; L = 15 mH		10.8	-	-	mJ



V_o = 0.992 V; R_s = 0.0327 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

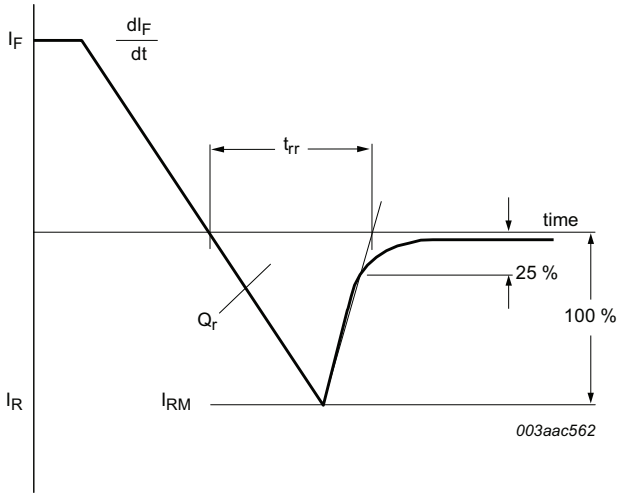
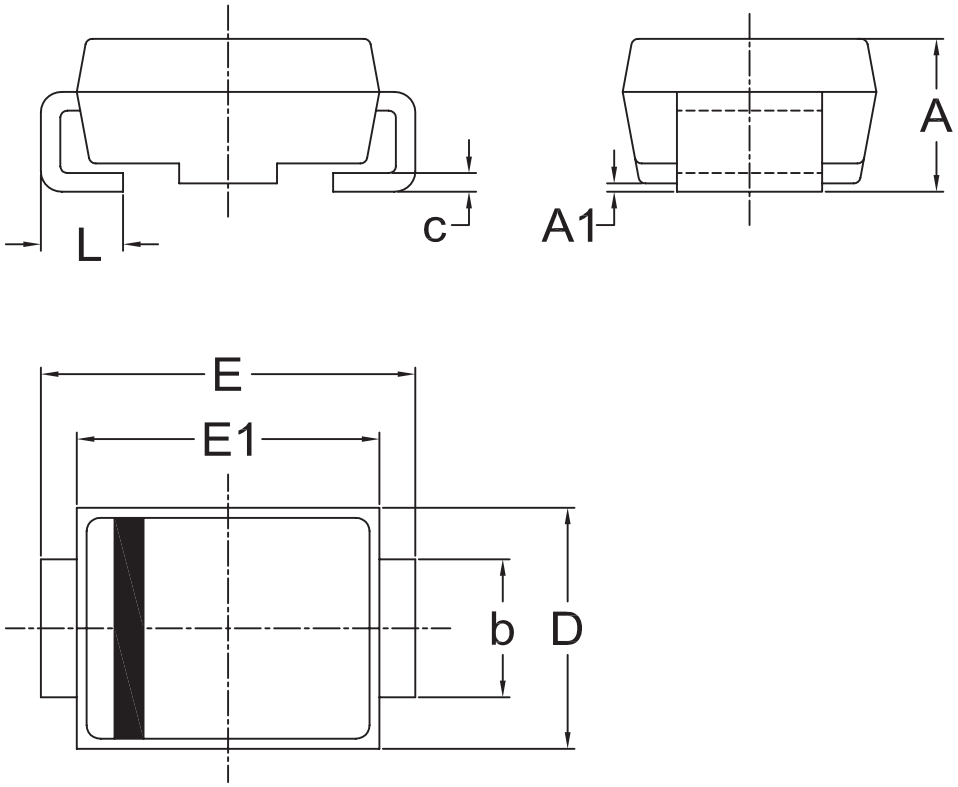


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline



UNIT		A	A1	b	c	D	E	E1	L
mm	Max	2.40	0.22	3.18	0.31	6.22	8.13	7.11	1.52
	Min	2.01	0.05	2.92	0.15	5.59	7.70	6.60	0.76

Remark: Dimensions D and E1 do not include mold flash.

12. Legal information

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

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