MUR440

Ultrafast power diode

Rev.02 - 19 March 2024 Product data sheet

1. General description

Ultrafast power diode in a SMC package.

2. Features and benefits

- Low on-state loss
- Low leakage current
- Low thermal resistance
- Surface-mountable package

3. Applications

- Switching mode power supply
- High frequency rectifiers in buck and fly-back circuits
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)
- Terminal Adapter
- Inverter freewheeling and protection diode
- TV Power and LED Power

4. Quick reference data

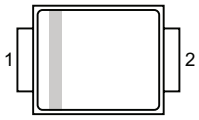
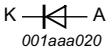
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
Absolute maximum rating				
V_{RRM}	repetitive peak reverse voltage		400	V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; T_{lead} ≤ 124 °C; Fig. 1; Fig. 2; Fig. 3	4	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; T_{lead} ≤ 124 °C; square-wave pulse	8	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	140	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	150	A

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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
MUR440	SMC	MUR440J	Reel	3000	SMCS	16-Aug-2017
		MUR440,18				

7. Marking

Table 4. Marking codes

Type number	Marking codes	
	Assembly factory: S	Assembly factory: E
MUR440	440JS	440JE

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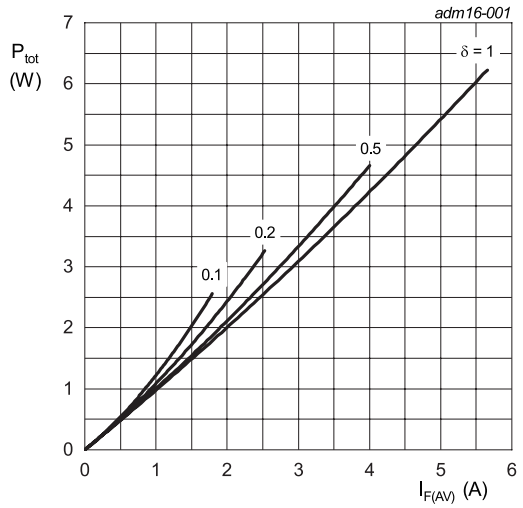
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8. Limiting values

Table 5. Limiting values

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

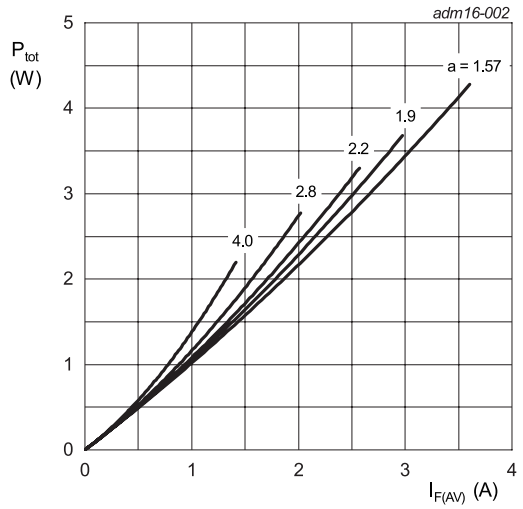
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		400	V
V_{RWM}	crest working reverse voltage		400	V
V_R	reverse voltage	DC	400	V
$I_{F(AV)}$	average forward current	δ = 0.5; square-wave pulse; $T_{lead} \leq 124$ °C; Fig. 1; Fig. 2; Fig. 3	4	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; $T_{lead} \leq 124$ °C; square-wave pulse	8	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse; Fig. 4	140	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse	150	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 = 0.950 V; R_s = 0.0268 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 = 0.950 V; R_s = 0.0268 Ω

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

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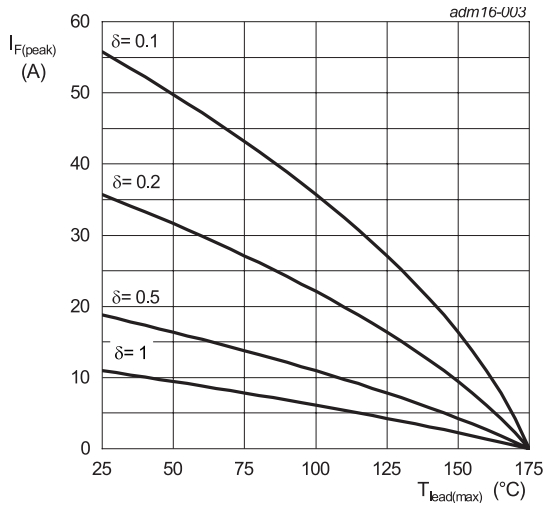


Fig. 3. Forward current as a function of lead temperature; maximum values

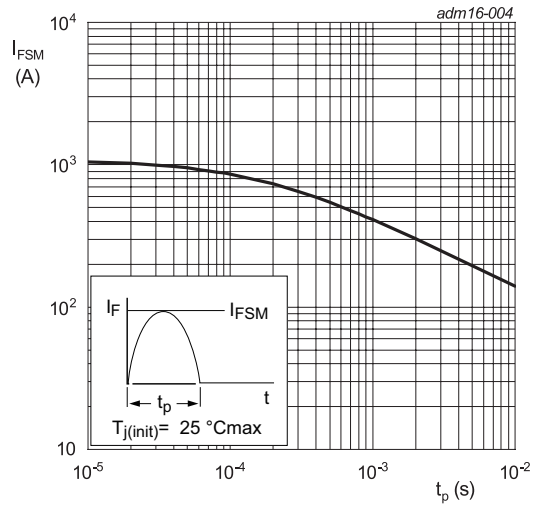


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j\text{-}lead)}$	thermal resistance from junction to lead	Fig. 5		-	-	11	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient free air	in free air		-	70	-	K/W

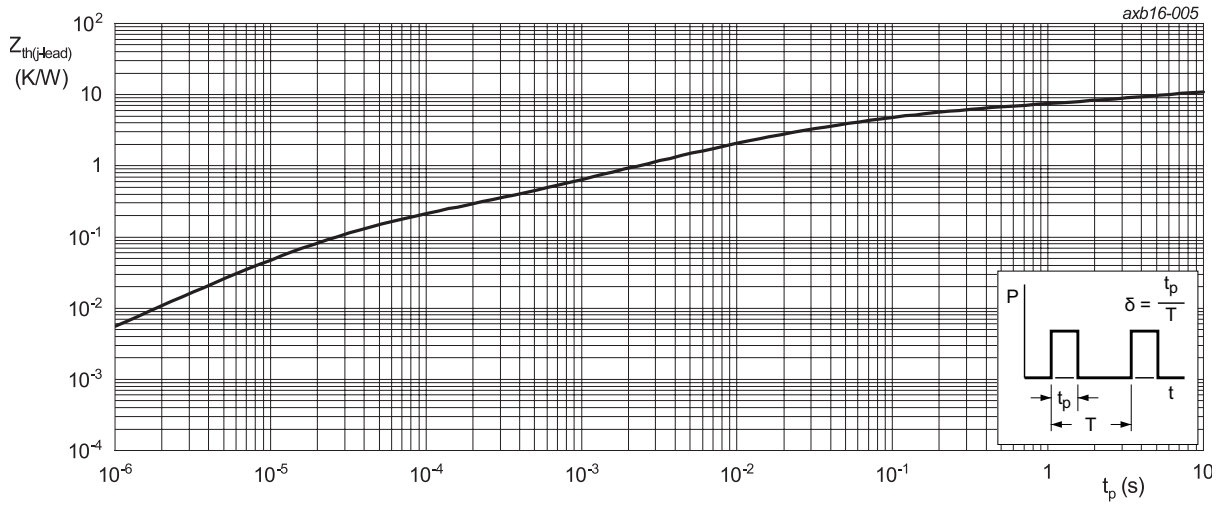


Fig. 5. Transient thermal impedance from junction to lead as a function of pulse duration

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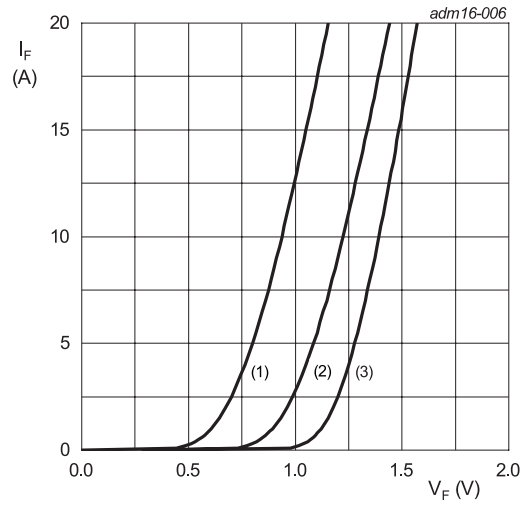
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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	I_F = 4 A; T_j = 25 °C; Fig. 6		-	-	1.25	V
		I_F = 4 A; T_j = 150 °C; Fig. 6		-	-	1.05	V
I_R	reverse current	V_R = 400 V; T_j = 25 °C		-	-	10	µA
		V_R = 400 V; T_j = 150 °C		-	-	250	µA
Dynamic characteristics							
Q_r	reverse charge	I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 25 °C; Fig. 7		-	69	-	nC
		I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 125 °C; Fig. 7		-	197	-	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		-	-	75	ns
		I_F = 0.5 A; I_R = 1 A; $I_{R(meas)}$ = 0.25 A; T_j = 25 °C; Step Recovery		-	-	50	ns
		I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 25 °C; Fig. 7		-	55	-	ns
		I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 125 °C; Fig. 7		-	90	-	ns
I_{RM}	peak reverse recovery current	I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 25 °C; Fig. 7		-	2.6	-	A
		I_F = 4 A; V_R = 200 V; dI_F/dt = 50 A/us; T_j = 125 °C; Fig. 7		-	4.4	-	A



V_o = 0.950 V; R_s = 0.0268 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

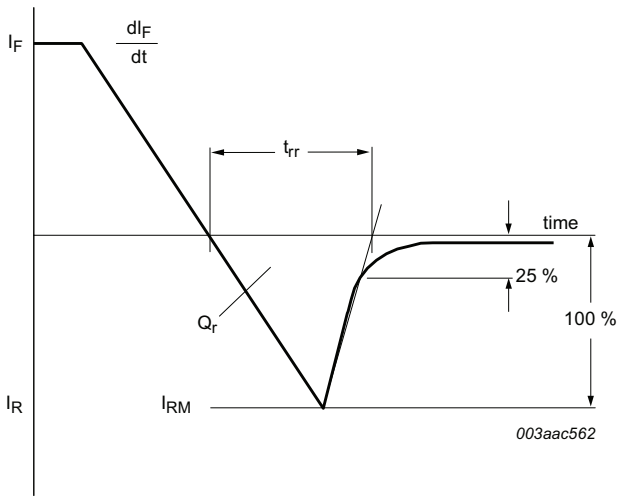


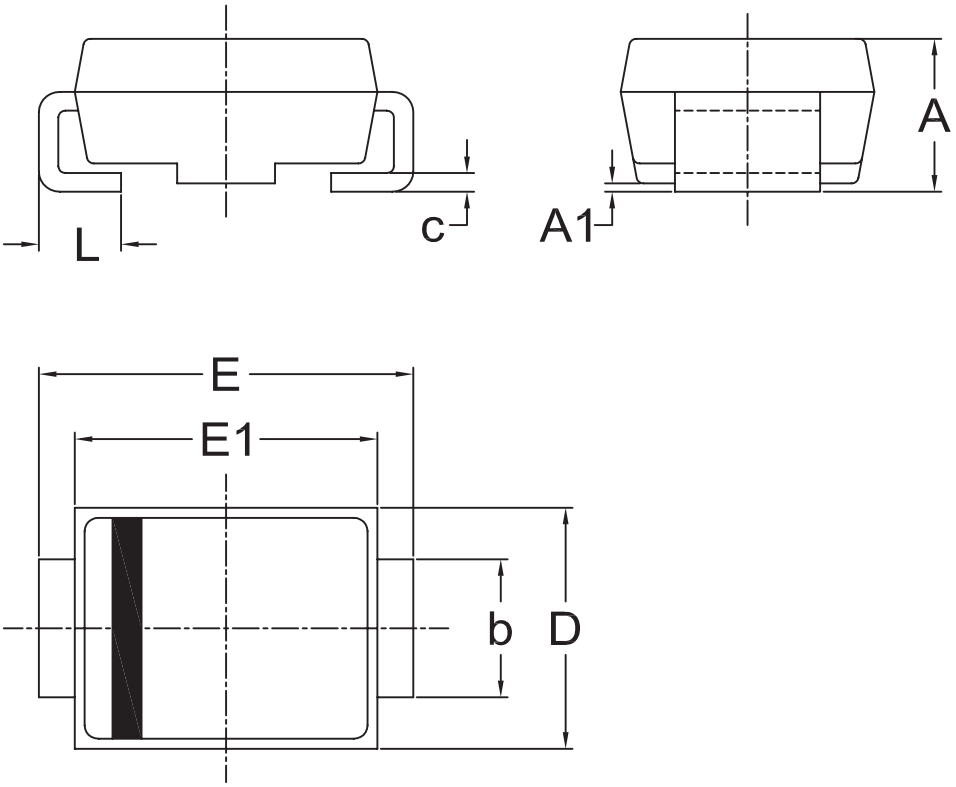
Fig. 7. Reverse recovery definitions; ramp recovery

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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.

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