1 A very low V_F MEGA Schottky barrier rectifiers

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in small and flat lead Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
PMEG4010CEH	SOD123F	-	single
PMEG4010CEJ	SOD323F	SC-90	single

1.2 Features

- Forward current: $I_F \leq 1$ A
- Reverse voltage: $V_R \leq 40$ V
- Very low forward voltage
- Small and flat lead SMD plastic packages

1.3 Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	$T_{sp} \leq 55$ °C		-	-	1	A
V_R	reverse voltage			-	-	40	V
V_F	forward voltage	$I_F = 1$ A	[1]	-	490	570	mV

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode [1]		
2	anode		

001aab540

sym001

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PMEG4010CEH	-	plastic surface-mounted package; 2 leads	SOD123F
PMEG4010CEJ	SC-90	plastic surface-mounted package; 2 leads	SOD323F

4. Marking

Table 5. Marking codes

Type number	Marking code
PMEG4010CEH	C9
PMEG4010CEJ	EP

5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_R	reverse voltage			-	40	V
I_F	forward current	$T_{sp} \leq 55$ °C		-	1	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1$ ms; $\delta \leq 0.25$		-	7	A
I_{FSM}	non-repetitive peak forward current	square wave; $t_p = 8$ ms				
	PMEG4010CEH			-	9	A
	PMEG4010CEJ			-	10	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C				
	PMEG4010CEH		[1]	-	375	mW
			[2]	-	830	mW
	PMEG4010CEJ		[1]	-	350	mW
			[2]	-	830	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–65	+150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]				
	PMEG4010CEH		[2]	-	-	330	K/W
			[3]	-	-	150	K/W
	PMEG4010CEJ		[2]	-	-	350	K/W
			[3]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]				
	PMEG4010CEH			-	-	60	K/W
	PMEG4010CEJ			-	-	55	K/W

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[4] Soldering point of cathode tab.

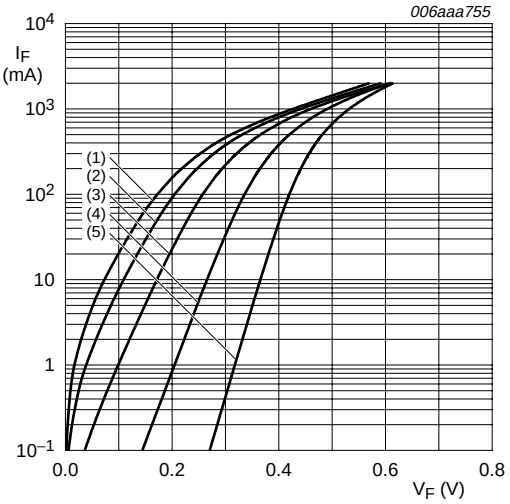
7. Characteristics

Table 8. Characteristics

T_{amb} = 25 °C unless otherwise specified.

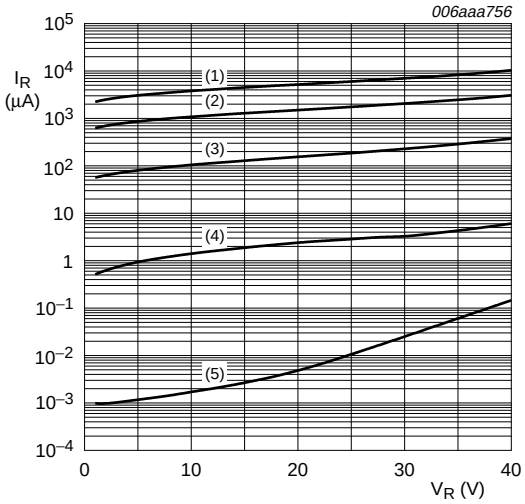
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage		[1]				
		I_F = 1 mA		-	210	240	mV
		I_F = 10 mA		-	270	310	mV
		I_F = 100 mA		-	340	390	mV
		I_F = 500 mA		-	420	490	mV
		I_F = 700 mA		-	450	520	mV
		I_F = 1 A		-	490	570	mV
I_R	reverse current	V_R = 5 V		-	0.8	-	µA
		V_R = 10 V		-	1.1	-	µA
		V_R = 40 V		-	6	50	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz		-	69	77	pF

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.



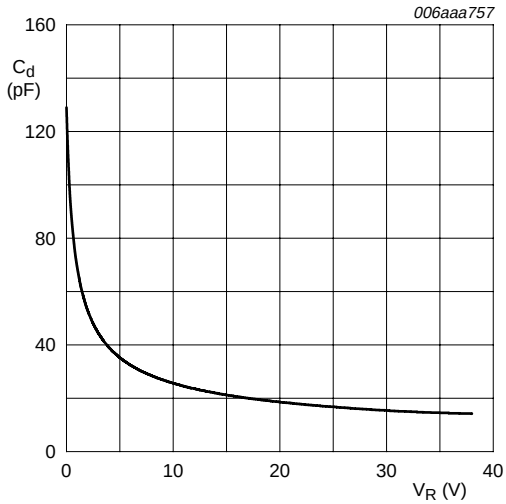
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 1. Forward current as a function of forward voltage; typical values



(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 2. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

Fig 3. Diode capacitance as a function of reverse voltage; typical values