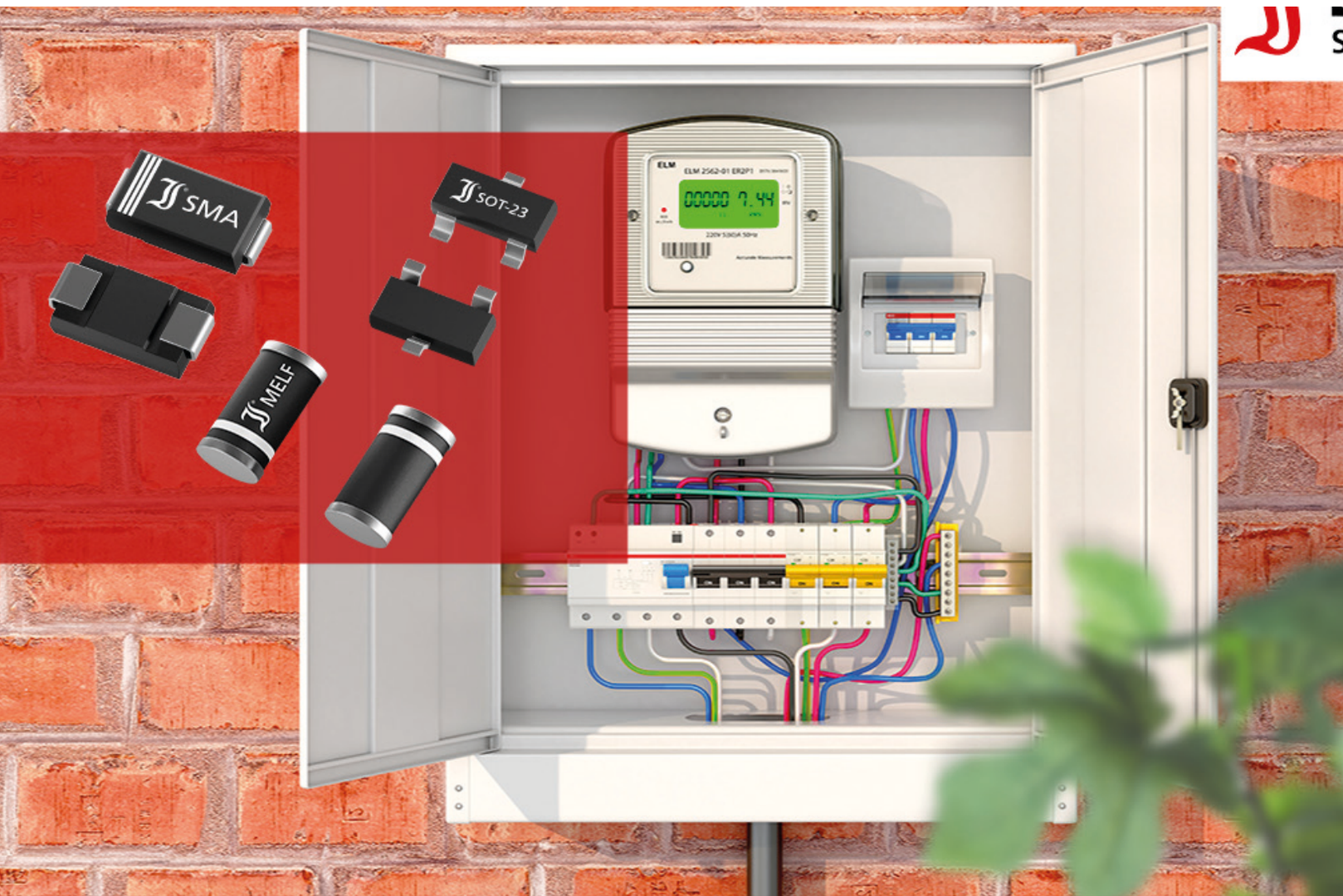
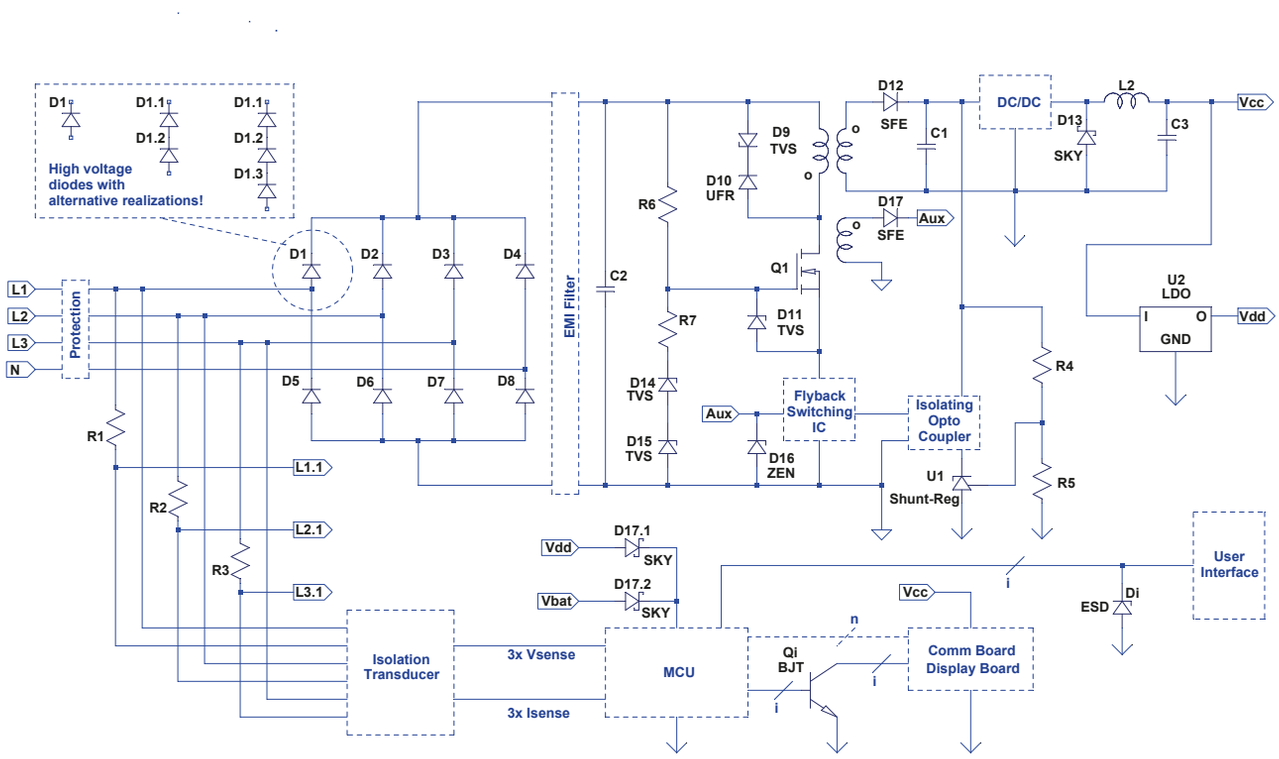
APPLICATION NOTE



Smart Meter

Smart Meters are getting the standard in electricity metering and replace the formerly used electro-mechanical solutions. „Smart" has several meanings and starts with electronic/micro-controller based metering, goes via comfortable user interface and display solutions and does still not end at various ways of connectivity. They are prepared for future ways of „smart" billing, offering e. g. low costs for electric energy in times where wind and solar power is highly available.

The main function blocks for these devices are the power supply unit, the micro-controller board (MCU) and the communication and display boards. This application note focuses on the power supply unit, where Diotec offers several semiconductor solutions dedicated for Smart Meter needs. Take the example of input rectifier stage; it is connected directly to the landline and thus highly affected by excessive voltage peaks caused by lightning strikes. No matter if you prefer single diodes connected in series, avalanche rated rectifiers or Diotec's brand new 3000 V diodes: we offer you any solution according to your requirements.



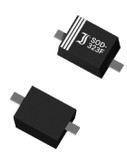
Mains Rectification D1 ... D8	Number per leg	V_{RRM}	I_{FAV}	Outline
SL1M	3	1000 V	1A	SOD-123 
AL1M Avalanche	3	1000 V	1A	DO-213AA 
S3000MC	1	3000 V	2 A	SMC 
S4000MC	1	4000 V	2 A	
S1M	3	1000 V	1A	SMA 
S1W	2	1600 V	1A	
S1YL Reduced I_{FSM}	1	2000 V	1A	
S1Y	1	2000 V	1A	
SM516	2	1600 V	1A	DO-213AB 
AM2000 Avalanche	2	1600 V	1A	
SM2000	1	2000 V	1A	
SM2000GP V_{DC} rated	1	2000 V	1A	
SM3000	1	3000 V	1A	
SM4000	1	4000 V	1 A	
BY1600 BY2000	1 1	1600 V 2000 V	3A	DO-201 

Snubber / Flyback IC TVS D9, D14, D15	P_{PPM}	V_{WM}	Outline
P6SMBJ170CA P6SMB250A	600 W	170 V 214 V	**SMB** **~ DO-214AA** 
P6KE200CA	600 W	171 V	**~ DO-15** **~ DO-214AC** 

Snubber UFR D10	V_{RRM}	I_{FAV}	Outline
US1M US3M	1 000 V	1 A 3 A	**SMA** 
ES1J	600 V	1 A	

Output Rectification SFE D12	V_{RRM}	I_{FAV}	Outline
ES2GSMA	400 V	2 A	**SMA** 
ES3GSMB	400 V	3 A	**DO-214AA** 

Shunt Regulator U1	V_{KA}	$I_{K(min)}$	Outline
MMTL431A/AR MMTL431BR	2.495 V ... 36 V	1 mA 450 µA	**SOT-23** 

Flyback IC TVS | Zener D11 | D16	P_{PPM} | P_{tot}	V_{BR} | V_Z	Outline
TGL41-15A SMZ15	400W 1W	15V	**DO-213AB (Melf)** 
P4SMAJ13A Z1SMA15	400W 1W	15V	**DO-214AC (SMA)** 
MMS3Z2V4...MM3Z47	300mW	2.4..47V	**SOD-323F** 

Output Rectification SKY D13	V_{RRM}	I_{FAV}	Outline
SK540-3G	40V	5A	**SMB** **~ DO-214AA**
SL54-3G	40V	5A	
SK34SMA-3G	40V	3A	**SMA** **~ DO-214AC**
SL34SMA-3G	40V	3A	
SK14..SK115	40V...150V	1A	
SK34SMA-3G	40V	3A	
SB3100	100V	1A	**~ DO-201** 

Voltage Regulator LDO U2	V_{IN}	I_{OUT}	Outline
DI62063.3S1	7 V	200 mA	SOT-23 TO-236 
DI78L05UAB	30 V	100 mA	SOT-89 
LDI1117-05H	20 V	1 A	SOT-223 

Line Protection ESD Di	P_{PPM}	V_{WM}	Outline
ESD3V3CA	200 W	3.3 V	SOT-23 TO-236 
ESD03B3Z	170 W	3.3 V	0201 0603 metric 

Schottky Diode OR-ing D17	V_{RRM}	I_{FAV}	Outline
BAT54C	30 V	200 mA	SOT-23 

Transistors BJT Qi	V_{CE}	I_C	Outline
MMBT3904	40 V	200 mA	**SOT-23** 
BC817	45 V	800 mA	

ESD Protection / Di	P_{PM}	V_{WM}	Outline
ESDBK3V3	60 W	3.3 V	**DFN1006-2** **TBD**
ESD03B3Z	170 W	3.3 V	**0201**