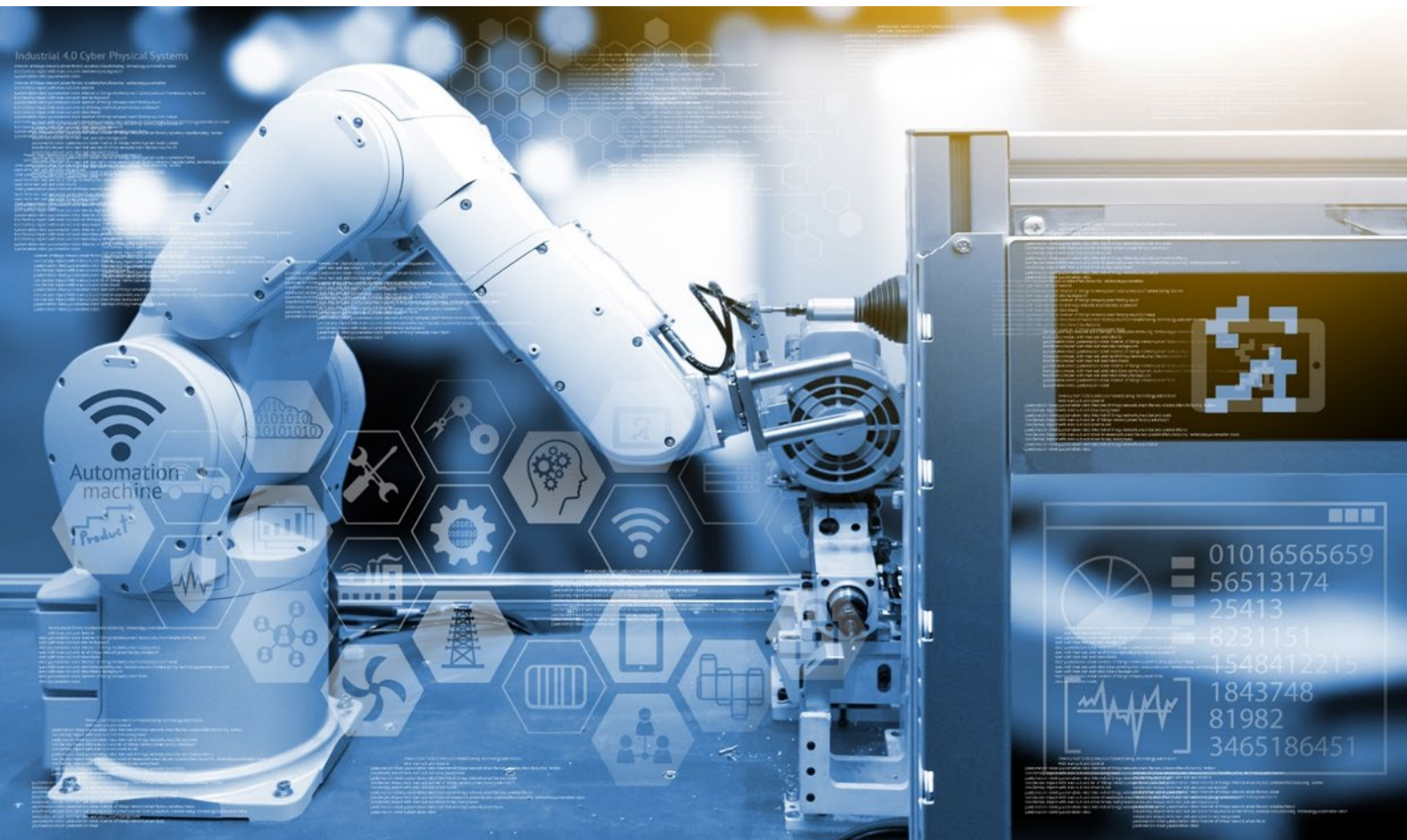




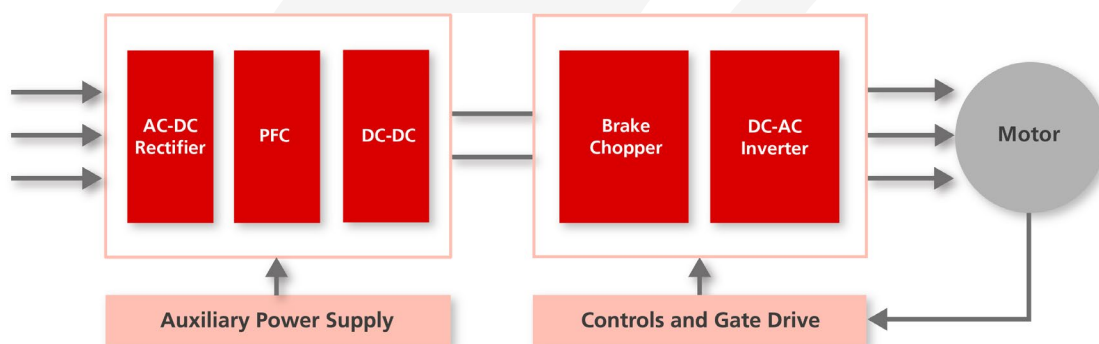
Industrial Motor Control and Drives

Electric motors are ubiquitous all over world. Almost every mechanical action taking place around the factory is induced by an AC or DC electrical motor. These motors are used in a broad range of applications such as fans, pumps, forklifts, pick and place machines, compressors, elevators, conveyor belts and many other devices that utilize a motor drive. In battery powered tools there is the trend towards the use of brushless DC motors, which are saving energy and therefore offer increased working cycles.

It is a fact that semiconductors technology and the components play a vital role in electric motors for minimizing the power losses, increased robustness against voltage transients and for improving the overall performance. Electronic designs with discrete components give the added advantage of allowing the flexibility of selecting the best suitable components for each function.

Discover our wide range of silicon based, power discrete components like diodes and bridge rectifiers. Additionally, Diotec also offers a new product portfolio of MOSFETs and linear voltage regulators fitting perfectly into a broad range of industrial applications.

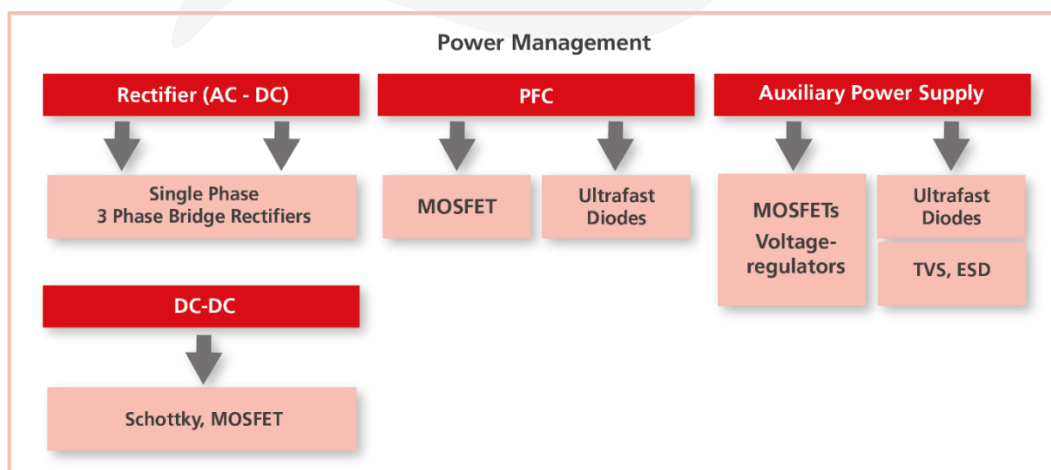
The following block diagram shows energy alteration procedure from a fixed AC voltage to a variable AC voltage:



Block diagram for industrial motor control and drives applications

The overall function of the electrical motors can be classified into two groups:

- 1) Power management system, which has different stages such as AC-DC rectification, power factor correction, DC-DC conversion. While auxiliary power supply can be arranged as an alternative/additional external source in parallel to the power supply.
- 2) Controls and gate drive: In order to control motion of the motor, the proper signals must be generated, by using the feedback from the motor. This function is done by controls and gate drive circuit.



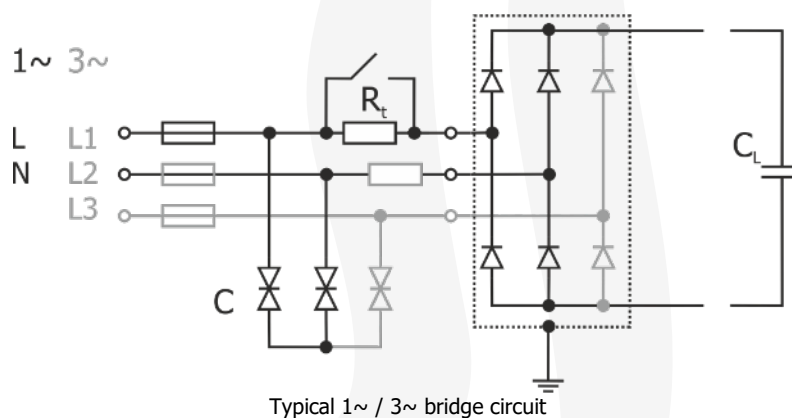
AC – DC Rectification

Single Phase Bridge Rectifiers

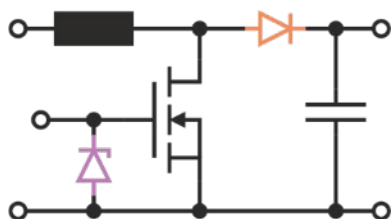
Part No	Package	I _{FAV}	V _{RRM}
GBI Series	30 x 20 x 3.6	10 ... 40 A	50 ... 1600 V
GBU Series	21.5 x 18.2 x 3.4	4 ... 12 A	50 ... 1000 V
KBPC10/15/25xx Series	28.6 x 28.6 x 7.3	10/15/25 A	100 ... 1600 V
KBPC250xxI Series	28.6 x 28.6 x 7.3	25A	100 ... 100 V
KBPC35xxFP/WP Series	28.6 x 28.6 x 7.3	35 A	100 ... 1600 V
KBPC35xxI Series	28.6 x 28.6 x 7.3	35A	100 ... 1000 V
KBPC50xxFP/WP Series	28.6 x 28.6 x 7.3	50 A	100 ... 1600 V

Three Phase Bridge Rectifiers

Part No	Package	I _{FAV}	V _{RRM}
DBI20 Series	35 x 25 x 4	20 A	800 ... 1600 V
DBI25 Series	35 x 25 x 4	25 A	800 ... 1800 V
DB15/25 Series	28.5 x 28.5 x 10	15/25 A	100 ... 1600 V
DB35 Series	28.5 x 28.5 x 10	35 A	100 ... 1600 V



Power Factor Correction (PFC)



Superfast Efficient Rectifiers

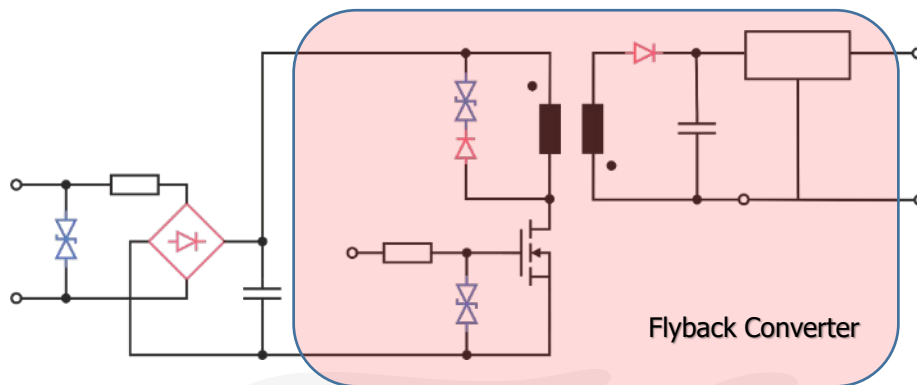
Operation frequencies are rather high. For reduction of power losses in the switch (affected highly by reverse recovery behaviour of the diode!), the boost diode must have very low reverse recovery but also low forward voltage drop. Superfast Efficient rectifiers fulfil this requirement.

Part No	Package	I_{FAV}	V_{RRM}	t_{rr}
MUR460	DO-201	4 A	600 V	50 ns
UGB8JT	D2PAK	8 A	600 V	35 ns
UFT800J	TO-220AC	8 A	600 V	35 ns
MUR860	TO-220AC	8 A	600 V	50 ns
MURF2060CT	ITO-220AB	20 A	600 V	25 ns

Power MOSFETs*

Part No	Package	I_D	V_{DS}	$R_{DS(on)}$
DI002N66D1	D-PAK	2 A	600 V	3.3 Ω
DIJ004N65	ITO-220AB	4 A	650 V	2.3 Ω
DIJ013N65	ITO-220AB	13 A	650 V	0.28 Ω
DIJ020N60	ITO-220AB	20 A	600 V	0.13 Ω

Auxiliary Power Supply



Power MOSFETs*

Part no	Package	I _D	V _{DS}	R _{DS(on)}
DIJ004N80	ITO-220AB	4 A	800 V	2.8 Ω
DIJ006N80	ITO-220AB	6 A	800 V	1.4 Ω
DIJ010N80	ITO-220AB	10 A	800 V	0.9 Ω

Ultrafast Diodes (Snubber)

Part no	Package	I _{FAV}	V _{RRM}
EGL1J... M	DO-213AA/MiniMelf	1 A	600 ... 1000 V
USL1J ... M	SOD-123F	1 A	600 ... 1000 V
SUF4006 ... 4007	DO-213AB/Melf	1 A	600 ... 1000 V
US1J ... M	DO-214AC/SMA	1 A	600 ... 1000 V
US3J ... M	DO-214AB/SMC	3 A	600 ... 1000 V

TVS Diodes (Snubber/Gate protection)

Part no	Package	P _{PPM}	V _{WM}	V _{BR}
TGL34-...	DO-213AA/MiniMelf	150 W	5.5 ... 171 V	6.8 ... 200 V
SMF...	SOD-123F	200 W	5.0 ... 220 V	6.8 ... 260 V
TGL41-...	DO-213AB/Melf	400 W	5.5 ... 423 V	6.8 ... 520 V
P4SMA...	DO-214AC/SMA	400 W	5.0 ... 495 V	6.8 ... 550 V
P6SMB...	DO-214AA/SMB	600 W	5.0 ... 495 V	6.8 ... 550 V
1.5SMC...	DO-214AB/SMC	1500 W	5.0 ... 495 V	6.8 ... 550 V

TVS and Ultrafast (Snubber) in *a single package!*

Part no	Package	P _{PPM}	V _R	V _{BR}
TGL200CU06	DO-213AB/Melf	300 W	600 V	200 V
PKC-136	DO-15/ DO-204AC	600 W	700 V	160 V

Schottky Output Rectifiers

Part no	Package	I _{FAV}	V _{RRM}
SKL34 ... 36	SOD-123F	3 A	40 ... 60 V
SK34SMA-3G ... 315SMA (-3G)	DO-214AC/SMA	3 A	40 ... 150 V
SK420	DO-214AB/SMC	4 A	200 V
SK54 ... 515 (-3G)	DO-214AA/SMB	5 A	40 ... 150 V
SK84 ... 815 (-3G)	DO-214AB/SMC	8 A	40 ... 150 V

-3G: Available in 3rd Generation Schottky Technology with low V_F and low I_R

Voltage Regulators*

Part no	Package	I _{out}	V _{out}
LDI1117 Series	SOT-89, SOT-223	0.8 A	Adj, 1.2 ... 5 V
DI78L05 Series	SO-8, SOT-89	0.1 A	3.3 ... 24 V
DI79L Series	TO-92	0.1 A	5 ... 24 V
DI78M Series	SO8, SOT-89	0.5 A	5 ... 24 V
DI6206	SOT-23	0.2 A	1.2 ... 5.0V

DC – DC Converter

Schottky Output Rectifiers

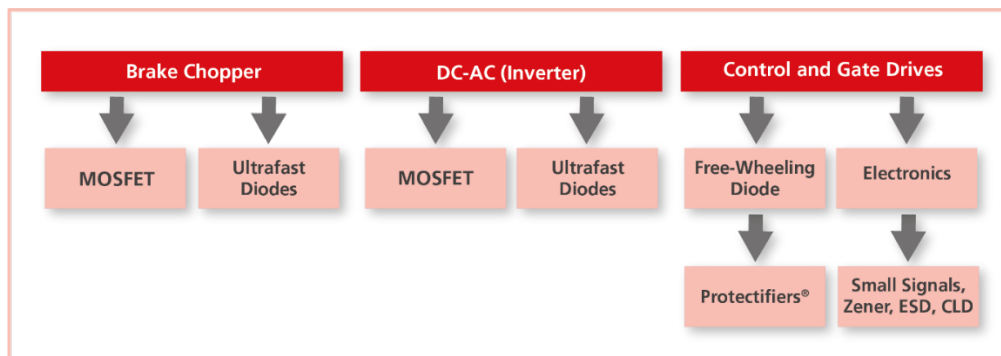
Part no	Package	I _{FAV}	V _{RRM}
PPS1040 ... 60 (-3G)	Power SMD	10 A	40 ... 60 V
PPS1540 ... 60 (-3G)	Power SMD	15 A	40 ... 60 V
SK1040...100D1)(-3G)	D-PAK	10A	40... 100 V
SK1040...100D2 (-3G)	D2-PAK single	10A	40... 100 V
SK2040...100CD2 (-3G)	D2-PAK dual	2x 10A	40... 100 V
SK3040...100CD2 (-3G)	D2-PAK dual	2x 15A	40... 100 V
SK4040...45CD2 (-3G)	D2-PAK dual	2x 20A	40... 45 V
SBT1040...100 (-3G)	TO-220AC	10A	40 ... 100 V
SBCT1040...100 (-3G)	TO-220AB dual	2x 5A	40 ... 100 V
SBCT2040...100 (-3G)	TO-220AB dual	2x 10A	40 ... 100 V
SBCT30100...150	TO-220AB dual	2x 15A	100 ... 150 V

-3G: Available in 3rd Generation Schottky Technology with low V_F and low I_R

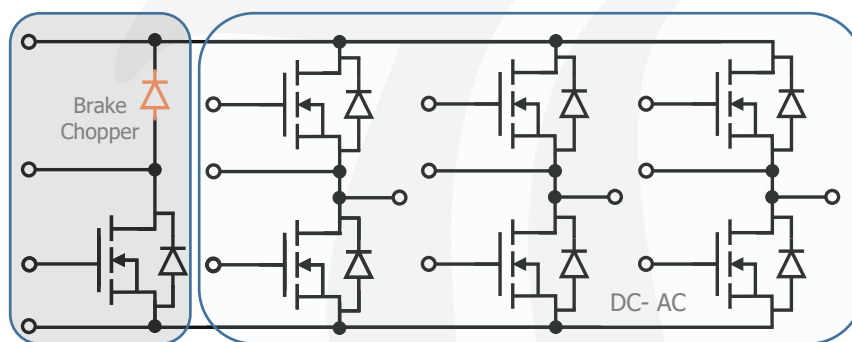
Power MOSFETs*

Part no	Package	I _D	V _{DS}	R _{DS(on)}
DI015N25D1	D-PAK	15 A	250 V	165 mΩ
DI030N03D1	D-PAK	30 A	30 V	21 mΩ
DIT050N06	TO-220AB	50 A	60 V	16 mΩ
DIT090N06	TO-220AB	90 A	60 V	7 mΩ
DIT095N08	TO-220AB	95 A	80 V	11 mΩ
DIT100N10	TO-220AB	100 A	100 V	2.8 mΩ
DIT120N08	TO-220AB	120 A	80 V	6.5 mΩ
DIT120N08	TO-220AB	150 A	30 V	2.5 mΩ
DIT195N08	TO-220AB	195 A	80 V	3.5 mΩ

Output Stage



Brake Chopper and DC – AC Inverter



Typical DC-AC inverter circuit

Superfast Efficient Rectifier

Part no	Package	I _{FAV}	V _{RRM}	T _{rr}
UGB8AD...J	D2PAK	8 A	200 ... 600 V	25...35 ns
UFT800D...J	TO-220AC	8 A	200 ... 600 V	25...35 ns
MUR860	TO-220AC	8 A	600 V	50 ns
MURF2060CT	ITO-220AB	20 A	600 V	25 ns

Power MOSFETs*

Part no	Package	I _D	V _{DS}	R _{DS(on)}
DIJ004N80	ITO-220AB	4 A	800 V	2.8 Ω
DIJ006N80	ITO-220AB	6 A	800 V	1.4 Ω
DIJ010N80	ITO-220AB	10 A	800 V	0.9 Ω
DI015N25D1	D-PAK	15 A	250 V	165 mΩ
DI030N03D1	D-PAK	30 A	30 V	21 mΩ
DIT050N06	TO-220AB	50 A	60 V	16 mΩ
DIT090N06	TO-220AB	90 A	60 V	7 mΩ
DIT095N08	TO-220AB	95 A	80 V	11 mΩ
DIT100N10	TO-220AB	100 A	100 V	2.8 mΩ
DIT120N08	TO-220AB	120 A	80 V	6.5 mΩ
DIT120N08	TO-220AB	150 A	30 V	2.5 mΩ
DIT195N08	TO-220AB	195 A	80 V	3.5 mΩ

Controls and Gate Drive

Small Signal Diodes

Part no	Package	I _{FAV}	V _{RRM}
1N4148WS	SOD-323	150 mA	100 V
BAT54A	SOT-23	200 mA	30 V
BAV99	SOT-23	215 mA	85 V

Zener Diodes

Part no	Package	P _{tot}	V _Z
MM3Z	SOD-323	300 mW	2.4 ... 47 V
BZT52	SOD-123	500 mW	2.4 ... 75 V
ZMC	Micro Melf	500 mW	2.4 ... 75 V

Schottky Diodes

Part no	Package	I _{FAV}	V _{RRM}
BAT54A	SOT-23	200 mA	30 V
BAS40-05	SOT-23	200 mA	40 V

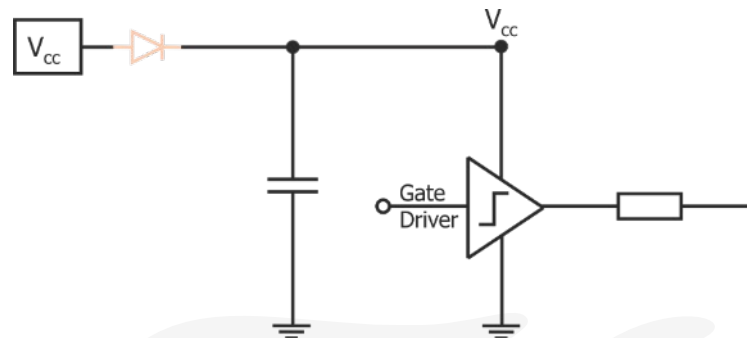
ESD Protection

Part no	Package	P _{PPM}	V _{Br Min}	C _j
ESD3Z5V0 ... 12	SOD-323	350 W	6, 13.3 V	350, 150 pF
ESD5Z	SOD-523	158 ... 240 W	3.3 ... 12 V	55 ... 105 pF
ESD3B5V0 ... 24WS	SOD-323	350 W	6.0 ... 26.7 V	50 ... 200 pF
ESD3V3... 36CA	SOT-23	200 W	3.3 ... 36 V	60 ... 600 pF
ESDB3V3 ... 24C	SOT-23	200 ... 350 W	3.3 ... 24 V	11 ... 101 pF

CLD (Constant Current Regulator)

Part no	Package	I _{Pnom}	V _{AK}
CL15 ... 40MD	DO-213AA/MiniMelf	15 ... 40 mA	90 V
CL15 ... 40M35	DO-214AC/SMA	15 ... 40 mA	90 V

Bootstrap Diodes



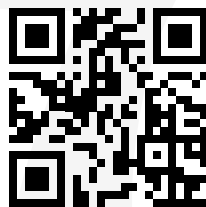
Part no	Package	I _{FAV}	V _{RRM}
FR2TSMA...FR2YSMA (Fast)	DO-214AC/SMA	1 A	1300 ... 2000 V
BYG23T (Superfast / Avalanche)	DO-214AC/SMA	1A	1300V

TVS Diodes (Gate Protection/Active Clamping)

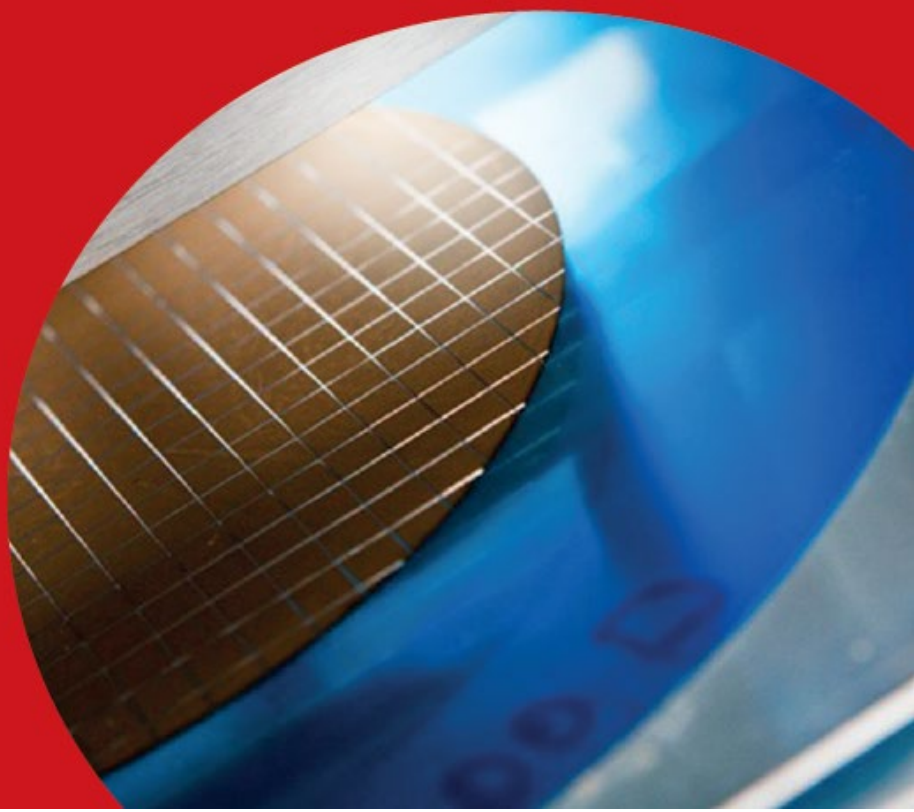
Part no	Package	P _{PPM}	V _{WM}	V _{BR}
TGL34-...	DO-213AA/MiniMelf	150 W	5.5 ... 171 V	6.8 ... 200 V
SMF...	SOD-123F	200 W	5.0 ... 220 V	6.8 ... 260 V
TGL41-...	DO-213AB/Melf	400 W	5.5 ... 423 V	6.8 ... 520 V
P4SMA...	DO-214AC/SMA	400 W	5.0 ... 495 V	6.8 ... 550 V
P6SMB...	DO-214AA/SMB	600 W	5.0 ... 495 V	6.8 ... 550 V
1.5SMC...	DO-214AB/SMC	1500 W	5.0 ... 495 V	6.8 ... 550 V



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