DC/DC Power Modules 1.65 – 3 W
PKV 3000 I – PKV 5000 I

- *Wide input voltage range, 9–36 V, 18–72 V*
- *High efficiency 74–83% typical*
- *Low idling power*
- *Full output power up to +75 °C ambient temperature*
- *Input/Output isolation 1,500 V dc*
- *MTBF > 650,000 hours at +25 °C ambient*

The PKV series of DC/DC power modules is intended for general use in 12/24 V and 48/60 V DC systems. Designed with MOSFET transistors and 200 kHz switching frequency, they are characterized by high efficiency over a wide load range, very low quiescent power and an excellent line and load regulation.
The DC/DC power modules are encapsulated in an epoxy filled plastic box. The flammability ratings of the encapsulating materials are in conformance with UL 94V-0 and have an adequate thermal conductivity. The materials withstand all normal PBA cleaning methods.
Ericsson Microelectronics AB has been an ISO 9001 certified supplier since 1991.
For a complete product program please reference the back cover.

ERICSSON

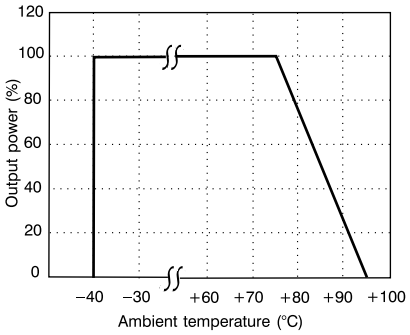
General

Absolute Maximum Ratings

Characteristics			min	max	Units
T_C	Case temperature[1)]		–40	+95	°C
T_S	Storage temperature		–40	+125	°C
V_I	Input voltage, 0.1 s max	PKV 3000 PKV 5000		40 80	Vdc
V_{ISO}	Isolation voltage (input to output test voltage)		1,500		Vdc

Stress in excess of Absolute Maximum Ratings may cause permanent damage. Absolute Maximum Ratings, sometimes referred to as no destruction limits, are normally tested with one parameter at a time exceeding the limits of Output data or Electrical Characteristics. If exposed to stress above these limits, function and performance may degrade in an unspecified manner.

Power Derating



Input $T_A = +25\,°C$, unless otherwise specified

Characteristics		Conditions		min	typ	max	Units
V_I	Input voltage range	T_A= –40 to +75 °C	PKV 3000 PKV 5000	9 18		36 72	V
V_{Ioff}	Turn-off input voltage		PKV 3000 PKV 5000			8 16	V
	Inrush current Peak I^2t	Low loss, low inductive capacitive source	PKV 3000 PKV 5000		35 0.005 0.005		A A^2s A^2s
	Idling power	$I_O = 0$			0.3		W
V_{Iac}	Ripple voltage	$I_O = I_{Omax}$, BW=20 MHz			100		mV_{p-p}

These DC/DC power modules operate without any external components. However, in low noise applications it is recommended to use a filter. Please see EMC information included in this data sheet.

It is recommended to protect the input source by fuses or other protection devices. Fuses are not supplied internally. A slow fuse with rating of 2× the I_{Imax} is recommended.

Miscellaneous

Characteristics		Conditions	min	typ	max	Unit
	Input/Output coupling capacitor	RH = 48%, T_C = +25 °C f = 100 Hz		1000		pF
	Switching frequency	$V_I = V_{Inom}$, $I_O = I_{Omax}$		200		kHz

Environmental Characteristics

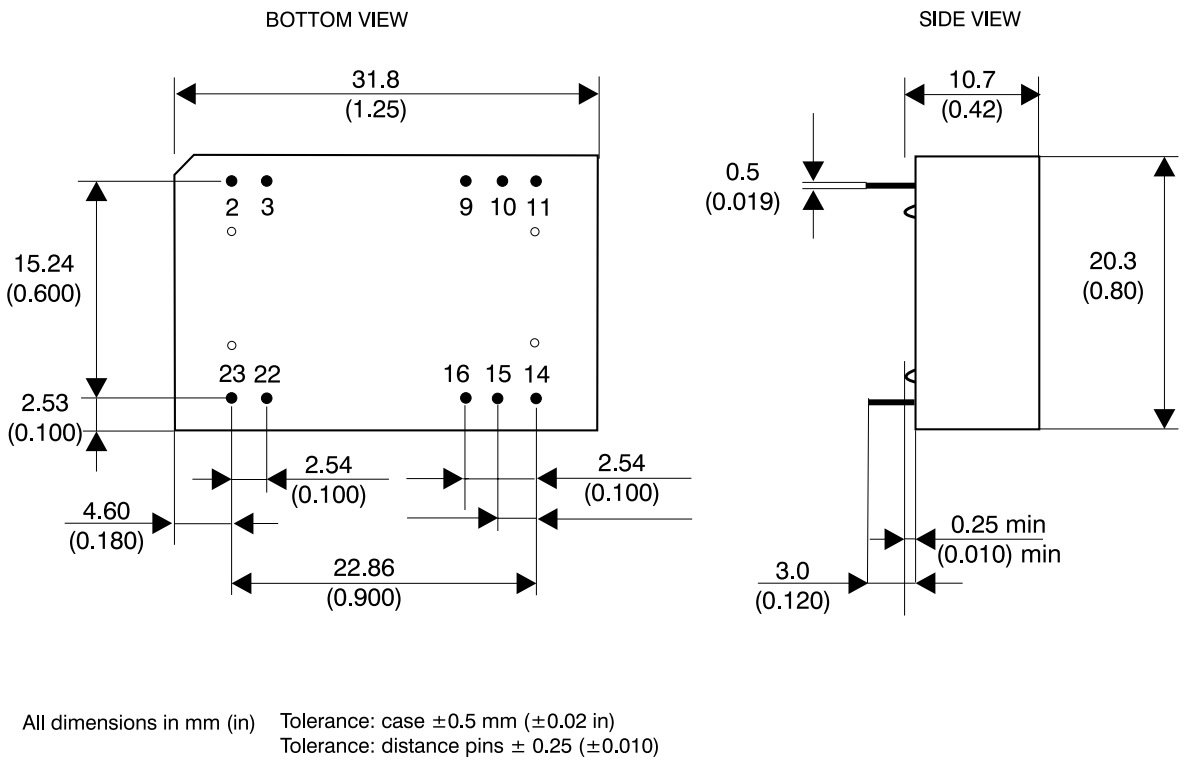
Test method	Reference	Test procedure & conditons	
Vibration (Sinusoidial)	IEC 68-2-6 F_C	Frequency Amplitude Accelaration Number of cycles Test duration	10...500Hz 0.75 mm 10 g 10 in each axis 1 h per axis
Shock (Half-sinus)	IEC 68-2-27 E_a	Peak acceleration Shock duration	2000 m/s^2 3 ms
Temperature change	IEC 68-2-14 N_a	Temperature Number of cycles	–40 °C to +125 °C 100

Note:

[1)] Corresponding typical ambient temperature range (T_A) at full output power is –40 to + 75 °C.

EN/LZT 146 37 R1A (Replaces EN/LZT 137 33 R2)

Mechanical Data



All dimensions in mm (in) Tolerance: case ±0.5 mm (±0.02 in)
Tolerance: distance pins ± 0.25 (±0.010)

Connections

Pin	Designation	Function	
		Single output	Dual output
2	–In	Negative input	Negative input
3	–In	Negative input	Negative input
9	NC/Rtn	Not connected	Output return
10	NC	Not connected	Not connected
11	NC/–Out	Not connected	Negative output
14	+Out	Positive output	Positive output
15	NC	Not connected	Not connected
16	Rtn	Output return	Output return
22	+In	Positive input	Positive input
23	+In	Positive input	Positive input

Weight

Maximum 15 g
(0.53 oz).

Case

Non conductive plastic, UL 94V-0.

PKV 3110 PI

Output

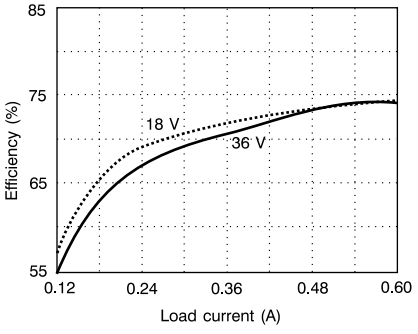
T_A =+25°C, V_I = 9...36 V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$ and long term drift		3.20		3.40	V
	Line regulation	$I_O = I_{O\,max}$			6.6	16.5	mV
	Load regulation	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$, V_I = 26 V			6.6	33	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+100		mV
					–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		0.5		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		800	1300	ms
I_O	Output current					0.5	A
$P_{O\,max}$	Max output power			1.65			W
I_{lim}	Current limiting threshold[1)]	$T_C < T_{C\,max}$		0.50		1.62	A
I_{sc}	Short circuit current	V_I = 26 V			0.20		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC… 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			60		dB

[1)] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 26 V	66	73		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 26 V		0.61	0.85	W

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PKV 3211 PI

Output

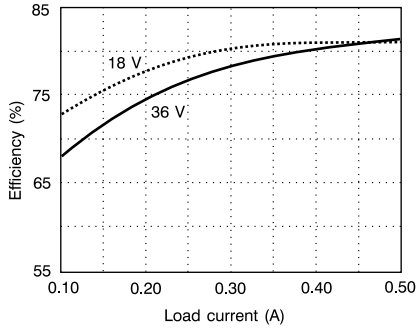
T_A =+25°C, V_I = 9...36 V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		4.90		5.10	V
	Line regulation	I_O=$I_{O\,max}$			10	25	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 26 V			10	50	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+100		mV
					–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		0.5		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		800	1300	ms
I_O	Output current					0.5	A
$P_{O\,max}$	Max output power			2.5			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.5		1.62	A
I_{sc}	Short circuit current	V_I =26 V			0.25		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/$V_{O\,p-p}$))			60		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 26 V	76	82		%
P_d	Power dissipation	I_O=$I_{O\,max}$, V_I = 26 V		0.55	0.79	W

PKV 3313 PI

Output

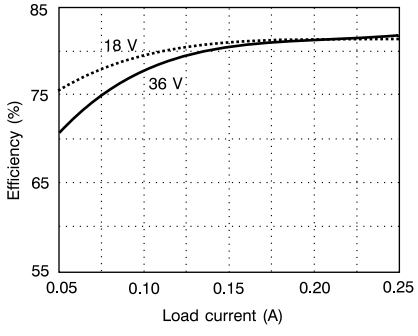
T_A = +25°C, V_I = 9...36 V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	I_O = 0.1 ... 1.0 × $I_{O\,max}$ and long term drift		11.76		12.24	V
	Line regulation	$I_O = I_{O\,max}$			24	60	mV
	Load regulation	I_O = 0.1 ... 1.0 × $I_{O\,max}$, V_I = 26 V			24	120	mV
t_{tr}	Load transient recovery time	I_O = 0.1 ... 1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+150		mV
					–150		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O = 0.1...1.0 × $I_{O\,max}$, V_I = 26 V	0.1 ... 0.9 × V_O		1.2		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		800	1300	ms
I_O	Output current					0.25	A
$P_{O\,max}$	Max output power			3			W
I_{lim}	Current limiting threshold[1)]	$T_C < T_{C\,max}$		0.25		0.81	A
I_{sc}	Short circuit current	V_I = 26 V			0.35		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC ... 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			60		dB

[1)] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 26 V	76	82		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 26 V		0.66	0.95	W

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PKV 3315 PI

Output

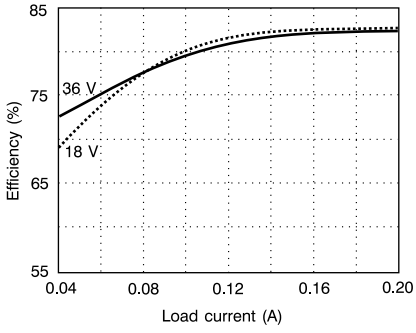
T_A = +25°C, V_I = 9...36 V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		14.7		15.3	V
	Line regulation	I_O=$I_{O\,max}$			30	75	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 26 V			30	150	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+200		mV
					–200		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		800	1300	ms
I_O	Output current					0.2	A
$P_{O\,max}$	Max output power			3			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.2		0.65	A
I_{sc}	Short circuit current	V_I =26 V			0.35		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC… 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/$V_{O\,p-p}$))			60		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 26 V	76	82		%
P_d	Power dissipation	I_O=$I_{O\,max}$, V_I = 26 V		0.66	0.95	W

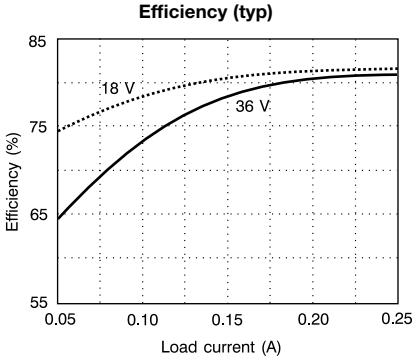
Output

T_A =+25°C, V_I = 9...36V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		+4.9		+5.1	–4.9		–5.1	V
	Line regulation	I_O=$I_{O\,max}$			10	25		10	25	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 26 V			10	50		10	50	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+100			+100		mV
					–100			–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		800	1300		800	1300	ms
I_O	Output current					0.25			0.25	A
$P_{O\,max}$	Max output power			1.25			1.25			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.25		0.81	0.25		0.81	A
I_{sc}	Short circuit current	V_I =26 V			0.25			0.25		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC…20 MHz		60			60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			45			45		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 26 V	75	82		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 26 V		0.55	0.83	W

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PKV 3321 PI

Output

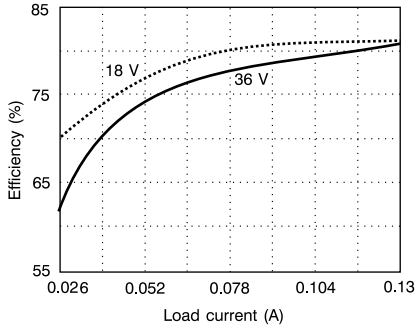
T_A = +25°C, V_I = 9...36V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		+11.76		+12.24	–11.76		–12.24	V
	Line regulation	I_O=$I_{O\,max}$			24	60		24	60	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 26 V			24	120		24	120	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+150			+150		mV
					–150			–150		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		800	1300		800	1300	ms
I_O	Output current					0.125			0.125	A
$P_{O\,max}$	Max output power			1.5			1.5			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.125		0.400	0.125		0.400	A
I_{sc}	Short circuit current	V_I =26 V			0.35			0.35		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC…20 MHz		60			60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			45			45		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 26 V	73	82		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 26 V		0.66	1.11	W

Output

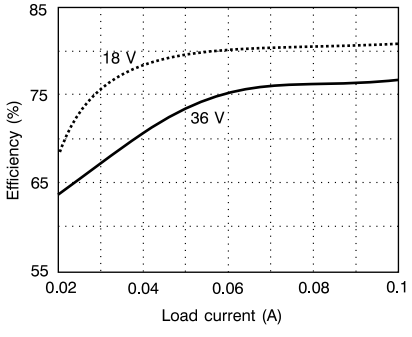
T_A = +25°C, V_I = 9...36V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O= 0.1…1.0 × $I_{O\,max}$ and long term drift		+14.7		+15.3	–14.7		–15.3	V
	Line regulation	$I_O = I_{O\,max}$			30	75		30	75	mV
	Load regulation	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V			30	150		30	150	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+200			+200		mV
					–200			–200		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 26 V	0.1…0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		800	1300		800	1300	ms
I_O	Output current					0.1			0.1	A
$P_{O\,max}$	Max output power			1.5			1.5			W
I_{lim}	Current limiting threshold[1)]	$T_C < T_{C\,max}$		0.10		0.32	0.10		0.32	A
I_{sc}	Short circuit current	V_I = 26 V			0.35			0.35		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC…20 MHz		50			50		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			45			45		dB

[1)] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 26 V	76	80		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 26 V		0.75	0.95	W

EN/LZT 146 37 R1A (Replaces EN/LZT 137 33 R2)

PKV 5110 PI

Output

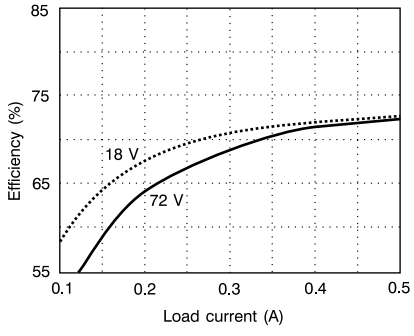
T_A = +25°C, V_I = 18...72V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		3.20		3.40	V
	Line regulation	I_O=$I_{O\,max}$			6.6	16.5	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 53 V			6.6	33.0	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+100		mV
					–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		0.5		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		900	1300	ms
I_O	Output current					0.5	A
$P_{O\,max}$	Max output power			1.65			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.50		1.62	A
I_{sc}	Short circuit current	V_I = 53 V			0.1		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC… 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			60		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 53 V	66	73		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 53 V		0.61	0.85	W

Output

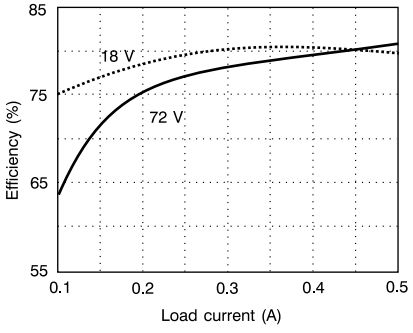
T_A = +25°C, V_I = 18...72V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$ and long term drift		4.90		5.10	V
	Line regulation	$I_O = I_{O\,max}$			10	25	mV
	Load regulation	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$, V_I = 53 V			10	50	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+100		mV
					–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		0.5		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		900	1300	ms
I_O	Output current					0.5	A
$P_{O\,max}$	Max output power			2.5			W
I_{lim}	Current limiting threshold[1)]	$T_C < T_{C\,max}$		0.5		1.62	A
I_{sc}	Short circuit current	V_I = 53 V			0.12		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC … 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			60		dB

[1)] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 53 V	75	82		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 53 V		0.55	0.84	W

EN/LZT 146 37 R1A (Replaces EN/LZT 137 33 R2)

PKV 5313 PI

Output

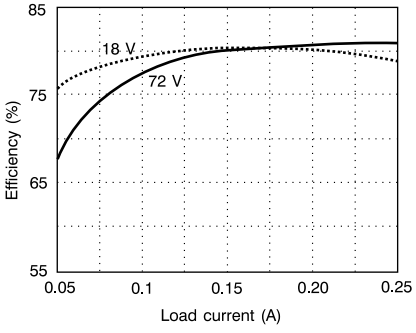
T_A = +25°C, V_I = 18...72V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		11.76		12.24	V
	Line regulation	I_O=$I_{O\,max}$			24	60	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 53 V			24	120	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+150		mV
					–150		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		900	1300	ms
I_O	Output current					0.25	A
$P_{O\,max}$	Max output power			3			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.25		0.81	A
I_{sc}	Short circuit current	V_I = 53 V			0.17		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC… 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/$V_{O\,p-p}$))			60		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 53 V	76	82		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 53 V		0.66	0.95	W

Output

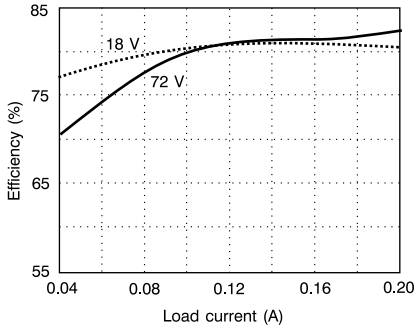
T_A = +25°C, V_I = 18...72V unless otherwise specified.

Characteristics		Conditions		Output 1 min	Output 1 typ	Output 1 max	Unit
V_O	Output voltage tolerance band	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$ and long term drift		14.7		15.3	V
	Line regulation	$I_O = I_{O\,max}$			30	75	mV
	Load regulation	$I_O = 0.1 \ldots 1.0 \times I_{O\,max}$, V_I = 53 V			30	150	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300		µs
V_{tr}	Load transient voltage				+200		mV
					–200		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		1.2		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		900	1300	ms
I_O	Output current					0.2	A
$P_{O\,max}$	Max output power			3			W
I_{lim}	Current limiting threshold[1]	$T_C < T_{C\,max}$		0.20		0.65	A
I_{sc}	Short circuit current	V_I = 53 V			0.17		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC … 20 MHz		60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			60		dB

[1] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 53 V	76	82		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 53 V		0.66	0.95	W

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PKV 5222 PI

Output

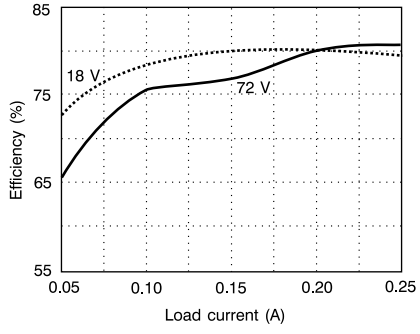
T_A = +25°C, V_I = 18...72V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		+4.9		+5.1	–4.9		–5.1	V
	Line regulation	I_O=$I_{O\,max}$			10	25		10	25	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 53 V			10	50		10	50	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+100			+100		mV
					–100			–100		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		900	1300		900	1300	ms
I_O	Output current					0.25			0.25	A
$P_{O\,max}$	Max output power			1.25			1.25			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.25		0.81	0.25		0.81	A
I_{sc}	Short circuit current	V_I =53 V			0.12			0.12		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC…20 MHz		60			60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			45			45		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 53 V	75	82		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 53 V		0.55	0.83	W

PKV 5321 PI

Output

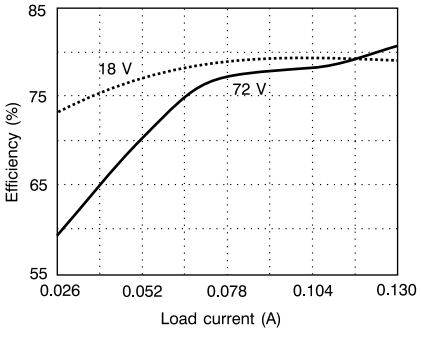
T_A = +25°C, V_I = 9...36V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O= 0.1 ...1.0 × $I_{O\,max}$ and long term drift		+11.76		+12.24	–11.76		–12.24	V
	Line regulation	$I_O = I_{O\,max}$			24	60		24	60	mV
	Load regulation	I_O= 0.1 ...1.0 × $I_{O\,max}$, V_I = 53 V			24	120		24	120	mV
t_{tr}	Load transient recovery time	I_O= 0.1 ...1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+150			+150		mV
					–150			–150		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1...1.0 × $I_{O\,max}$, V_I = 53 V	0.1 ...0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O = 0.9 × V_{Oi}		900	1300		900	1300	ms
I_O	Output current					0.125			0.125	A
$P_{O\,max}$	Max output power			1.5			1.5			W
I_{lim}	Current limiting threshold[1)]	$T_C < T_{C\,max}$		0.125		0.400	0.125		0.400	A
I_{sc}	Short circuit current	V_I = 53 V			0.17			0.17		A
$V_{O\,ac}$	Output ripple & noise	$I_O = I_{O\,max}$, T_A = 25 °C	DC ...20 MHz		60			60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/V_{Op-p}))			45			45		dB

[1)] At $V_{out} \leq$ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	$I_O = I_{O\,max}$, V_I = 53 V	73	82		%
P_d	Power dissipation	$I_O = I_{O\,max}$, V_I = 53 V		0.66	1.11	W

EN/LZT 146 37 R1A (Replaces EN/LZT 137 33 R2)

PKV 5325 PI

Output

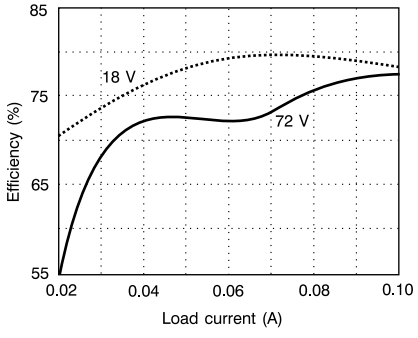
T_A = +25°C, V_I = 9...36V unless otherwise specified.

Characteristics		Conditions		Output 1			Output 2			Unit
				min	typ	max	min	typ	max	
V_O	Output voltage tolerance band	I_O=0.1…1.0 × $I_{O\,max}$ and long term drift		+14.7		+15.3	–14.7		–15.3	V
	Line regulation	I_O=$I_{O\,max}$			30	75		30	75	mV
	Load regulation	I_O=0.1…1.0 × $I_{O\,max}$, V_I = 53 V			30	150		30	150	mV
t_{tr}	Load transient recovery time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V load step = 0.5 × $I_{O\,max}$			300			300		µs
V_{tr}	Load transient voltage				+200			+200		mV
					–200			–200		mV
T_{coeff}	Temperature coefficient	Measured after stabilization				±0.02			±0.02	%/°C
t_r	Ramp-up time	I_O= 0.1…1.0 × $I_{O\,max}$, V_I = 53 V	0.1…0.9 × V_O		1.2			1.2		ms
t_s	Start-up time		From V_I connection to V_O= 0.9 × V_{Oi}		900	1300		900	1300	ms
I_O	Output current					0.1			0.1	A
$P_{O\,max}$	Max output power			1.5			1.5			W
I_{lim}	Current limiting threshold[1)]	T_C < $T_{C\,max}$		0.10		0.32	0.10		0.32	A
I_{sc}	Short circuit current	V_I =53 V			0.17			0.17		A
$V_{O\,ac}$	Output ripple & noise	I_O=$I_{O\,max}$, T_A = 25 °C	DC…20 MHz		60			60		mV_{p-p}
SVR	Supply voltage rejection (ac)	f = 100/120 Hz sine wave, 1 V_{p-p}, (SVR = 20 log (1 V_{p-p}/$V_{O\,p-p}$))			45			45		dB

[1)] At V_{out} ≤ 80% of nominal the power module goes into hick up mode.

Miscellaneous

Efficiency (typ)



Characteristics		Conditions	min	typ	max	Unit
η	Efficiency	I_O= $I_{O\,max}$, V_I = 53 V	76	82		%
P_d	Power dissipation	I_O= $I_{O\,max}$, V_I = 53 V		0.66	0.95	W

EMC Specifications

The PKV DC/DC power module is mounted on a double sided printed circuit board (PB) with groundplane during EMC measurements. The fundamental switching frequency is approx. 200 kHz.

The PKV series has a good input filter and will only need a simple filter to meet conducted noise according to EN 55022 level B. Fig. 1 shows an example of filter and the results for this filter is shown below.

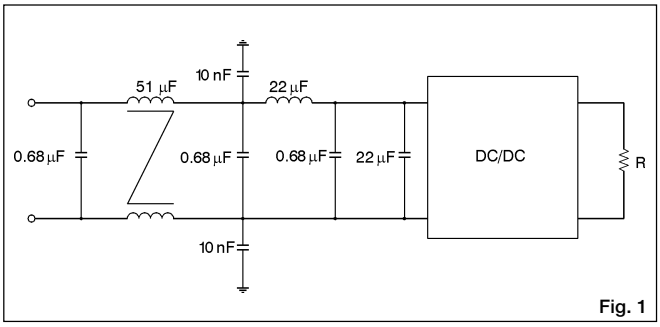
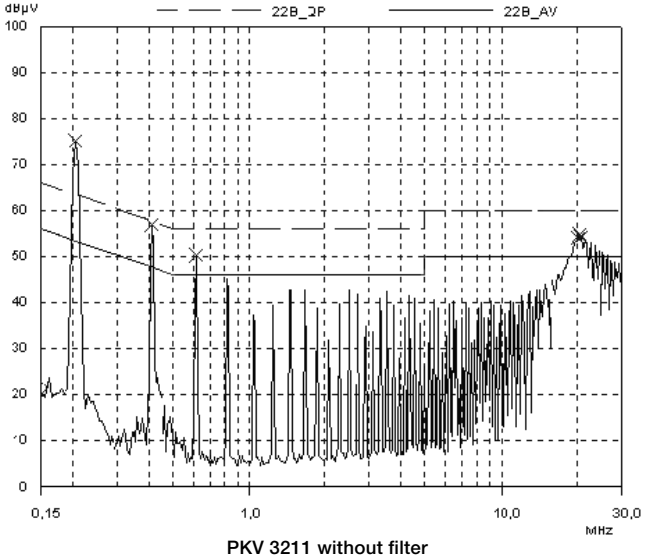
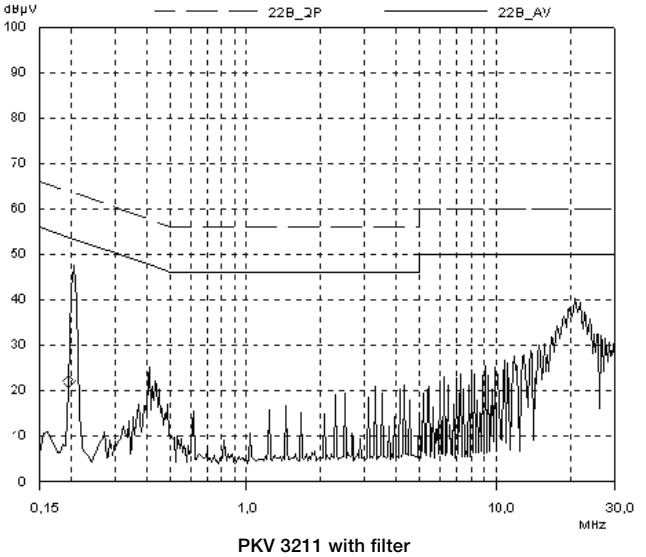


Fig. 1

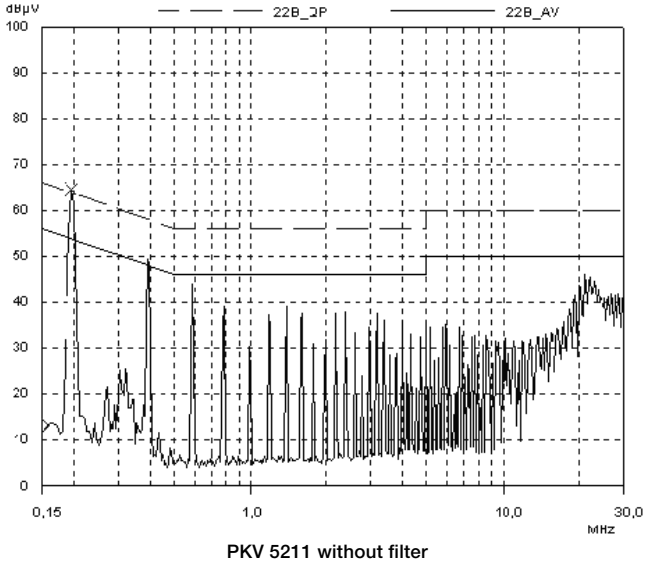
Conducted noise



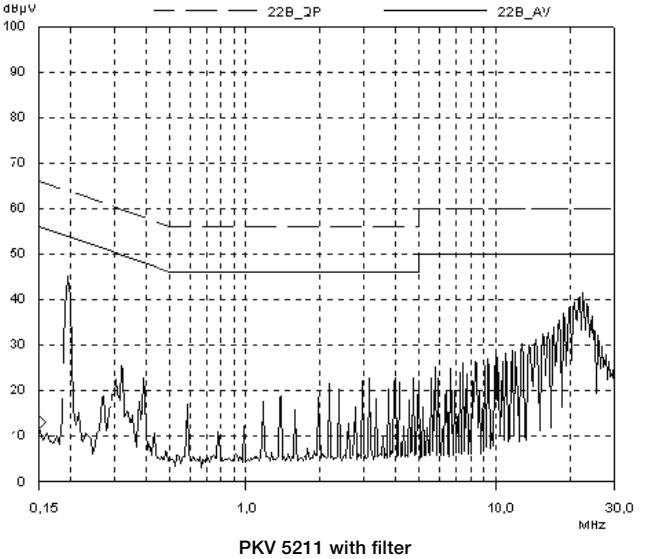
PKV 3211 without filter



PKV 3211 with filter



PKV 5211 without filter



PKV 5211 with filter

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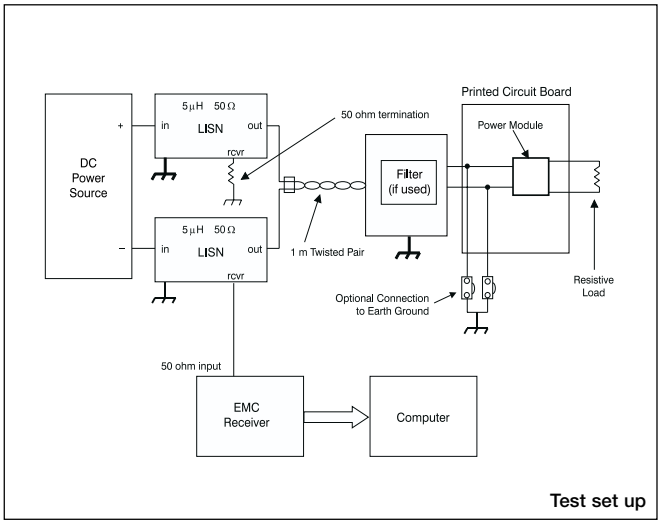

Test set up

Limitation of liability

Ericsson Microelectronics does not make any other warranties, expressed or implied including any warranty of merchantability or fitness for a particular purpose (including, but not limited to, use in life support applications, where malfunctions of product can cause injury to a person's health or life).

Quality

Reliability

According to MIL-HDBK-217F the calculated MTBF value at 100% load (from PKV 5211 PI) at the following ambient temperatures will be approx.:

T_{amb}	Hours
0 °C	2.7 million
10 °C	1.5 million
25 °C	650 000
40 °C	276 000
60 °C	88 000
75 °C	37 000

At 80–100% load the case temperature will be approx. 15–20 °C higher than the ambient temperature.

Quality Statement

The products are designed and manufactured in an industrial environment where quality systems and methods like ISO 9000 and SPC are intensively in use to boost the continuous improvements strategy. Infant mortality or early failures in the products are screened out by a burn-in procedure.

Warranty

Ericsson Microelectronics warrants to the original purchaser or end user that the product conform to this Data Sheet and are free from material and workmanship defects for a period of five (5) years from the date of manufacture, if the product is used within specified conditions and not opened. In case the product is discontinued, claims will be accepted up to three (3) years from the date of the discontinuation. For additional details on this limited warranty we refer to Ericsson Microelectronics AB's "General Terms and Conditions of Sales", or individual contract documents.

Product Program

V_I	V_O/I_O max	P_O max	Ordering No.
12/24 V	3.3 V/500 mA	1.65 W	PKV 3110 PI
	5 V/500 mA	2.50 W	PKV 3211 PI
	12 V/250 mA	3.00 W	PKV 3313 PI
	15 V/200 mA	3.00 W	PKV 3315 PI
	± 5V/250 mA	2.50 W	PKV 3222 PI
	±12V/125 mA	3.00 W	PKV 3321 PI
	±15V/100 mA	3.00 W	PKV 3325 PI
48/60 V	3.3 V/500 mA	1.65 W	PKV 5110 PI
	5 V/500 mA	2.50 W	PKV 5211 PI
	12 V/250 mA	3.00 W	PKV 5313 PI
	15 V/200 mA	3.00 W	PKV 5315 PI
	± 5 V/250 mA	2.50 W	PKV 5222 PI
	±12 V/125 mA	3.00 W	PKV 5321 PI
	±15 V/100 mA	3.00 W	PKV 5325 PI

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Data Sheet

EN/LZT 146 37 R1A (Replaces EN/LZT 137 33 R1A)