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PKC-136

Application Specific Discretes
ASD™

PEAK CLAMP

MAIN PRODUCT CHARACTERISTICS

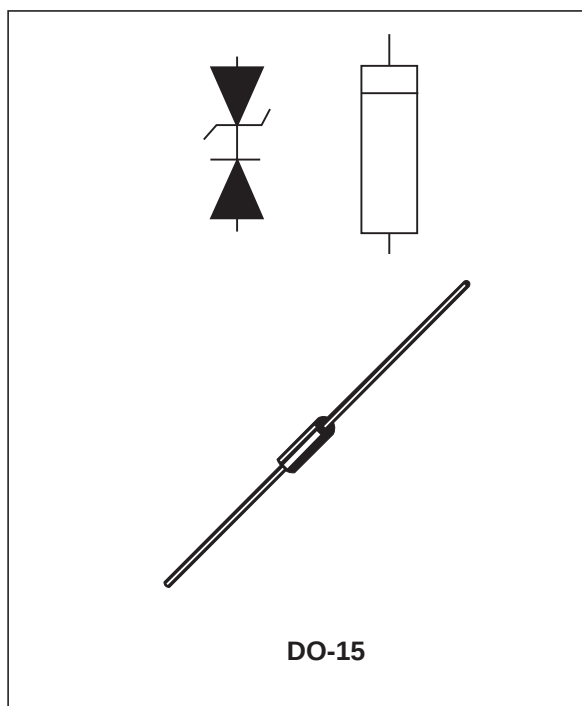
V_{BR}	160Vdc
V_{DRM}	700Vdc
P	1.5W

FEATURES

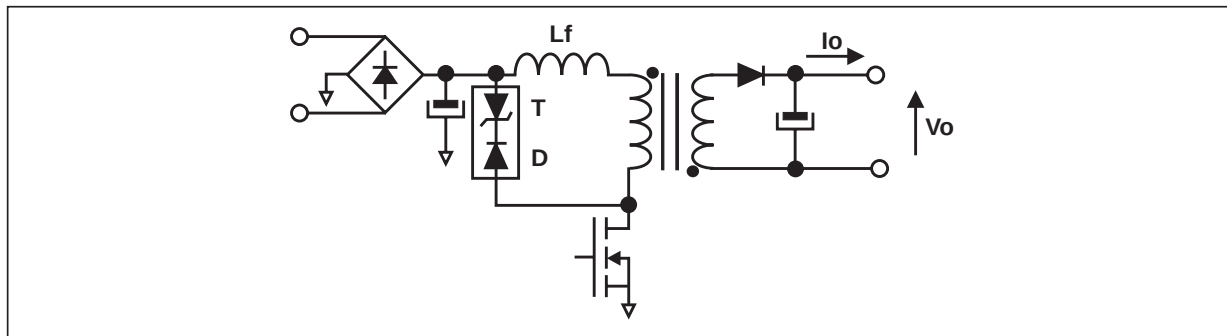
- Protection of the Mosfet in flyback power supply
- TRANSIL™ and blocking diode in a single package

BENEFITS

- Accurate voltage clamping regardless load
- Reduced current loop
- Reduced EMI emission
- High integration
- Fast assembly
- Reduced losses in stand by mode



BASIC CONNECTION



ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter	Value	Unit
T_{stg}	Storage temperature	- 40 to + 150	°C
T_j	Junction temperature	150	°C
P	Maximum power dissipation $T^{\circ}lead = 90^{\circ}C$	1.5	W

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ELECTRICAL CHARACTERISTICS TRANSIL

Symbol	Parameter	Test conditions		Value			Unit
				Min.	Typ.	Max.	
I_{RM}	Leakage current	$V_R = 136V$	$T_j = 25^{\circ}C$			1	μA
			$T_j = 125^{\circ}C$			10	
V_{BR}	Breakdown voltage	$I_R = 1mA$ pulse test < 50ms	$T_j = 25^{\circ}C$	150	160	170	V
R_d	Dynamical Resistance	tp < 500ns between $I = 0.5A$ mps and $I = 1.5A$ mps	$T_j = 125^{\circ}C$			4	Ω
αT	Temperature Coefficient					10.8	$10^{-4}/^{\circ}C$
V_{SCL}	Surge Clamping voltage	$I_{pp} = 2.7A$ mps 10/1000 μs				219	V

CALCULATION OF THE CLAMPING VOLTAGE:

In repetitive mode and for low current rating, use the equation (1) and (2) to calculate the breakdown voltage V_{BR} of the transil versus the operating junction temperature and use the equation (3) to calculate the clamping voltage versus the transil current I_{pp} and the temperature.

$$\Delta V_{BR} = \alpha T (T_j - 25^{\circ}C) V_{BR}(25^{\circ}C) \quad (1)$$

$$V_{BR}(T_j) = V_{BR}(25^{\circ}C) + \Delta V_{BR} \quad (2)$$

$$V_{CL}(T_j) = V_{BR}(T_j) + R_d \cdot I_{pp} \quad (3)$$

ELECTRICAL CHARACTERISTICS DIODE ($T_j = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Tests conditions		Value			Unit
				Min.	Typ.	Max.	
I_R	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25^{\circ}C$			3	μA
			$T_j = 125^{\circ}C$		3	20	
V_{RRM}	Repetitive Peak Reverse Voltage	$T_j = 25^{\circ}C$		700			V
t_{rr}	Reverse Recovery Time	$I_F = 1A$ $di_F / dt = -50A/\mu s$ $V_R = 30V$				45	ns
V_{FP}	Peak Forward Voltage	$I_F = 3A$ $di_F / dt = 100A/\mu s$	$T_j = 25^{\circ}C$			12	V
			$T_j = 125^{\circ}C$			18	

CAPACITANCE

Symbol	Parameter	Typical Value	Unit
C	Total Parasitic capacitance 1MHz 30mV	35	pF

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to leads L = 10mm	40	°C/W
$R_{th(j-a)}$	Junction to ambient condition see note 1	105	°C/W

Note 1: Device mounted on a epoxy FR4 board of 35μm thickness

Lead Length: 10mm

Pad diameter: 4mm

Track width: 1mm

Track length: 25mm

The $R_{th(j-a)}$ can be reduced by replacing the Cu track by plan:

$S(Cu) = 1.5cm^2/lead$ $R_{th(j-a)} = 65°C/W$

$S(Cu) = 3.5cm^2/lead$ $R_{th(j-a)} = 60°C/W$

Fig. 1: Peak pulse power versus exponential pulse duration.

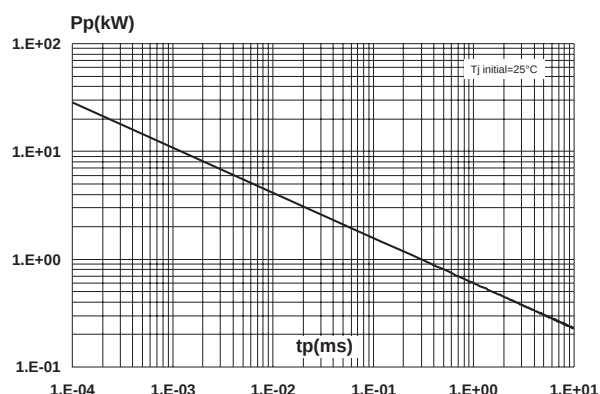


Fig. 2: Relative variation of peak pulse power versus initial junction temperature.

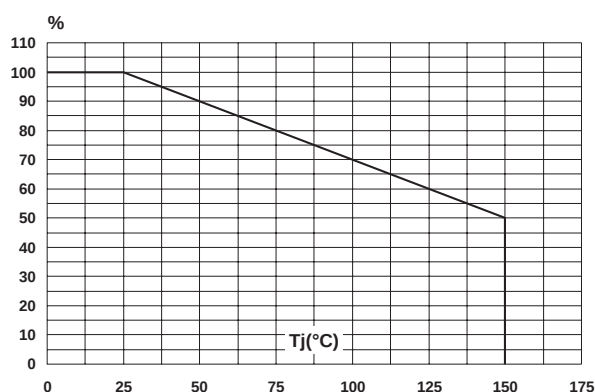


Fig. 3: Average power dissipation versus ambient temperature.

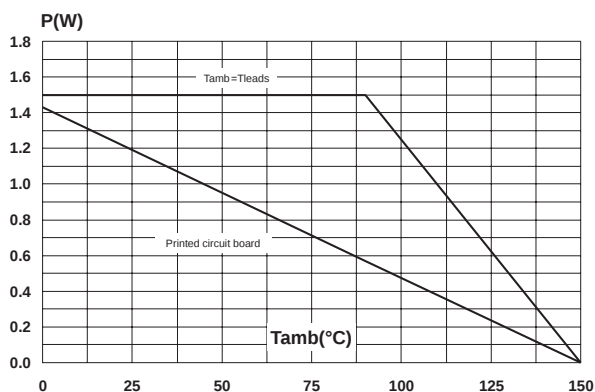
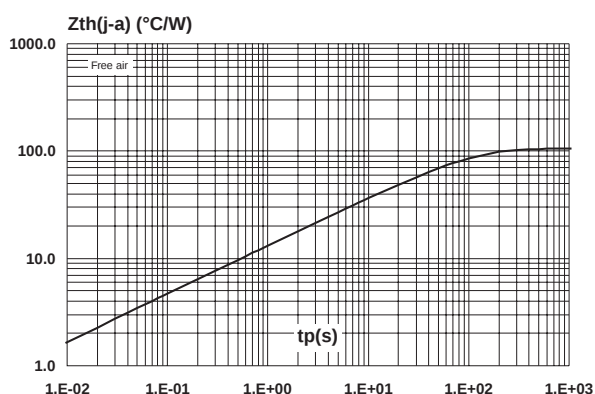


Fig. 4: Variation of thermal impedance junction to ambient versus pulse duration (printed circuit board epoxy FR4)



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Fig. 5: Thermal resistance junction to ambient versus copper surface under each lead.

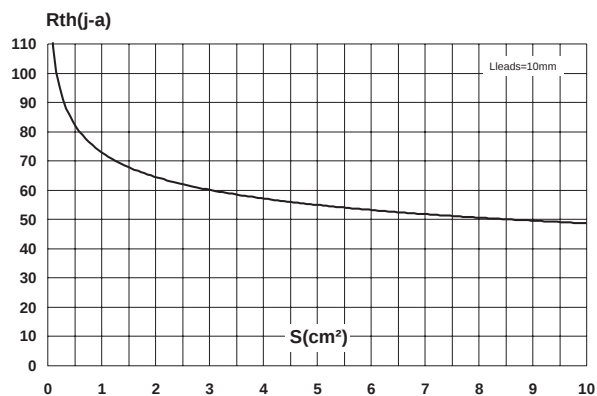


Fig. 6-1: Reverse leakage current versus reverse voltage applied (typical values, for Transil).

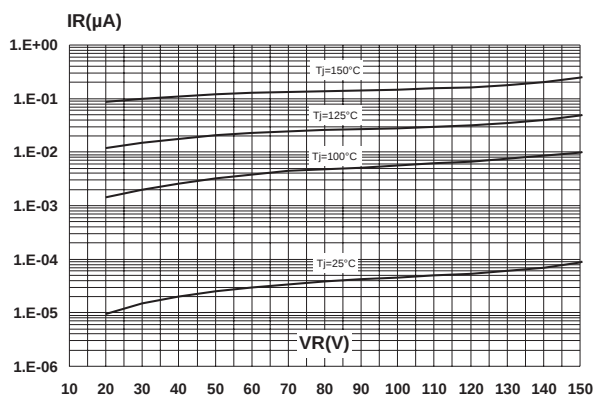


Fig. 6-2: Reverse leakage current versus reverse voltage applied (typical values, for diode).

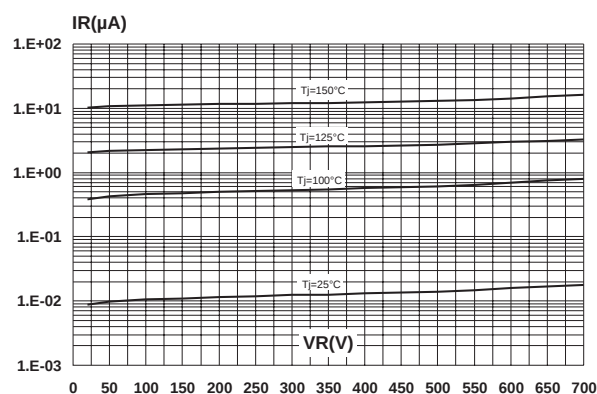


Fig. 7: Transient peak forward voltage versus dI_F/dt (90% confidence).

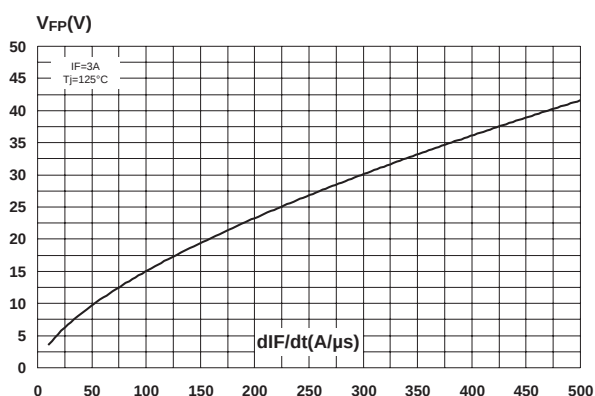


Fig. 8: Clamping voltage versus peak pulse current (maximum values).

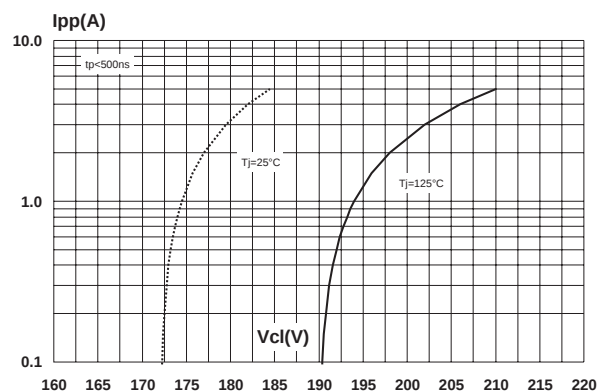
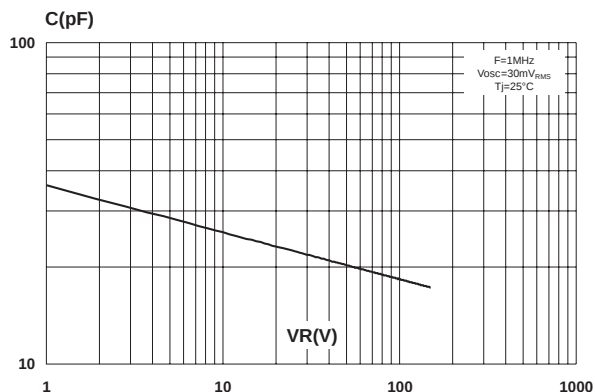


Fig. 9: Junction capacitance versus reverse voltage applied on clamping characteristic (typical values).



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PACKAGE MECHANICAL DATA

DO-15

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.05	6.75	0.238	0.266
B	2.95	3.53	0.116	0.139
C	26	31	1.024	1.220
D	0.71	0.88	0.028	0.035

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
PKC136	Partnumber Diode cathode ring	DO-15	0.4g	1000	Ammopack
PKC136-RL	Partnumber Diode cathode ring	DO-15	0.4g	6000	Tape and reel

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