

IRK.L132.. SERIES

FAST RECOVERY DIODES

INT-A-pak™ Power Modules

Features

- Fast recovery time characteristics
- Electrically isolated base plate
- Industrial standard package
- Simplified mechanical designs, rapid assembly
- High surge capability
- Large creepage distances
- 3000 V_{RMS} isolating voltage
- UL E78996 approved 

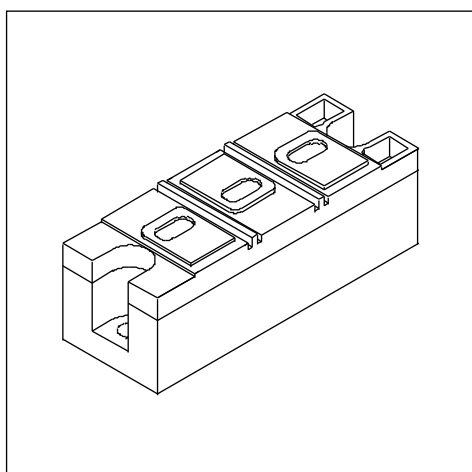
140 A

Description

The IRK.L132 series of INT-A-pak uses fast recovery power diodes in four basic configurations. The semiconductors are electrically isolated from the metal base, allowing common heatsinks and compact assemblies to be built. Application includes power supplies, battery chargers, welders, motor controls and general industrial current rectification. These modules are intended for those applications where fast recovery characteristics are required.

Major Ratings and Characteristics

Parameters	IRK.L132..	Units
$I_{F(AV)}$	140(130)	A
@ T_C	100(105)	°C
$I_{F(RMS)}$	220	A
I_{FSM} @ 50Hz	3000	A
@ 60Hz	3100	A
I^2t @ 50Hz	44.2	KA ² s
@ 60Hz	40.3	KA ² s
$I^2\sqrt{t}$	442	KA ² √s
V_{RRM}	upto 1400	V
T_J	-40 to 150	°C



IRK.L132.. Series

Bulletin I27095 rev. A 08/97

International
IOR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

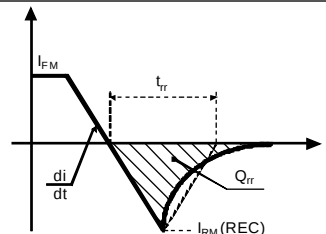
Type number	Voltage Code	t_{rr} Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak reverse voltage V	I_{RRM} max. @ 150°C mA
IRK.L132..	06	S10	600	700	40
	10	S10	1000	1100	
	12	S20	1200	1300	
	14	S20	1400	1500	

Forward Conduction

Parameter	IRK.L132..	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Case temperature	140 (130) 100 (105)	A °C	180° conduction, half sine wave
$I_{F(RMS)}$ Max. RMS forward current	220	A	as AC switch
I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current	3000 3100 2500 2600	A	t = 10ms t = 8.3ms No voltage reappplied 100% V_{RRM} reappplied Sinusoidal half wave, Initial $T_J = T_J$ max.
I^2t Maximum I^2t for fusing	44.2 40.3 31.2 28.5	KA ² s	t = 10ms t = 8.3ms No voltage reappplied 100% V_{RRM} reappplied Initial $T_J = T_J$ max.
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	442	KA ² √s	t = 0.1 to 10ms, no voltage reappplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.12	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}), T_J = T_J$ max.
$V_{F(TO)2}$ High level value of threshold voltage	1.51	V	$(I > \pi \times I_{F(AV)}), T_J = T_J$ max.
r_{f1} Low level value of forward slope resistance	1.52	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}), T_J = T_J$ max.
r_{f2} High level value of forward slope resistance	0.71	mΩ	$(I > \pi \times I_{F(AV)}), T_J = T_J$ max.
V_{FM} Max. forward voltage drop	1.68	V	$I_{FM} = \pi \times I_{F(AV)}, T_J = 25^\circ\text{C}$ Av. power = $V_{F(TO)} \times I_{F(AV)} + r_f \times (I_{F(RMS)})^2$

Recovery Characteristics

Code	Test conditions			Typ. values @ $T_J = 150^\circ\text{C}$	
	I_{pk} (A)	di/dt (A/μs)	V_r (V)	Q_{rr} (μC)	I_{rr} (A)
S10	500	100	50	38	70
S20	500	100	50	68	95



Blocking

Parameter	IRK.L132..	Units	Conditions
I_{RRM} Max. peak reverse leakage current	40	mA	$T_J = 150^\circ\text{C}$
V_{INS} RMS isolation voltage	3000	V	50 Hz, circuit to base, all terminals shorted, $t = 1$ sec

Thermal and Mechanical Specifications

Parameter	IRK.L132..	Units	Conditions
T_J Max. junction operating temperature range	-40 to 150	$^\circ\text{C}$	
T_{stg} Max. storage temperature range	-40 to 150	$^\circ\text{C}$	
R_{thJC} Max. thermal resistance, junction to case	0.20	K/W	Per junction, DC operation
R_{thCS} Max. thermal resistance, case to heatsink	0.035	K/W	Mounting surface flat, smooth and greased Per module
T Mounting torque $\pm 10\%$ IAP to heatsink busbar to IAP	4 to 6	Nm	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound
	4 to 6		
wt Approximate weight	500 (17.8)	g (oz)	

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.011	0.012	K/W	$T_J = T_{J \text{ max.}}$
120°	0.016	0.019		
90°	0.021	0.023		
60°	0.029	0.030		
30°	0.041	0.041		

Ordering Information Table

Device Code

The diagram illustrates the Device Code structure with 8 positions, each represented by a black box with white text. Below each box is a circled number from 1 to 8. The positions are: 1 (IRK), 2 (D), 3 (L), 4 (13), 5 (2), 6 (-), 7 (14), 8 (S20), and 9 (N). A horizontal line connects the circled number 8 to the text 'S10 = 1000ns' and 'S20 = 2000ns' in a box on the right.

- 1** - Module type
- 2** - Circuit configuration (see Outline Table)
- 3** - L = Fast recovery diode
- 4** - Current rating: $I_{F(AV)} \times 10$ rounded
- 5** - 1 = option with spacers and longer terminal screws
2 = option with standard terminal screws
- 6** - Voltage code: Code $\times 100 = V_{RRM}$ (see Voltage Rating Table)
- 7** - t_{rr} code (see Recovery Characteristics Table)
- 8** - None = Standard devices
N = Aluminum nitride substrate

S10 = 1000ns
S20 = 2000ns

S10 = 1000ns
S20 = 2000ns

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Bulletin I27095 rev. A 08/97

Outline Table

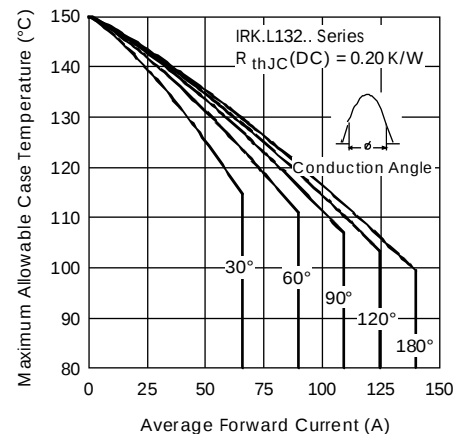
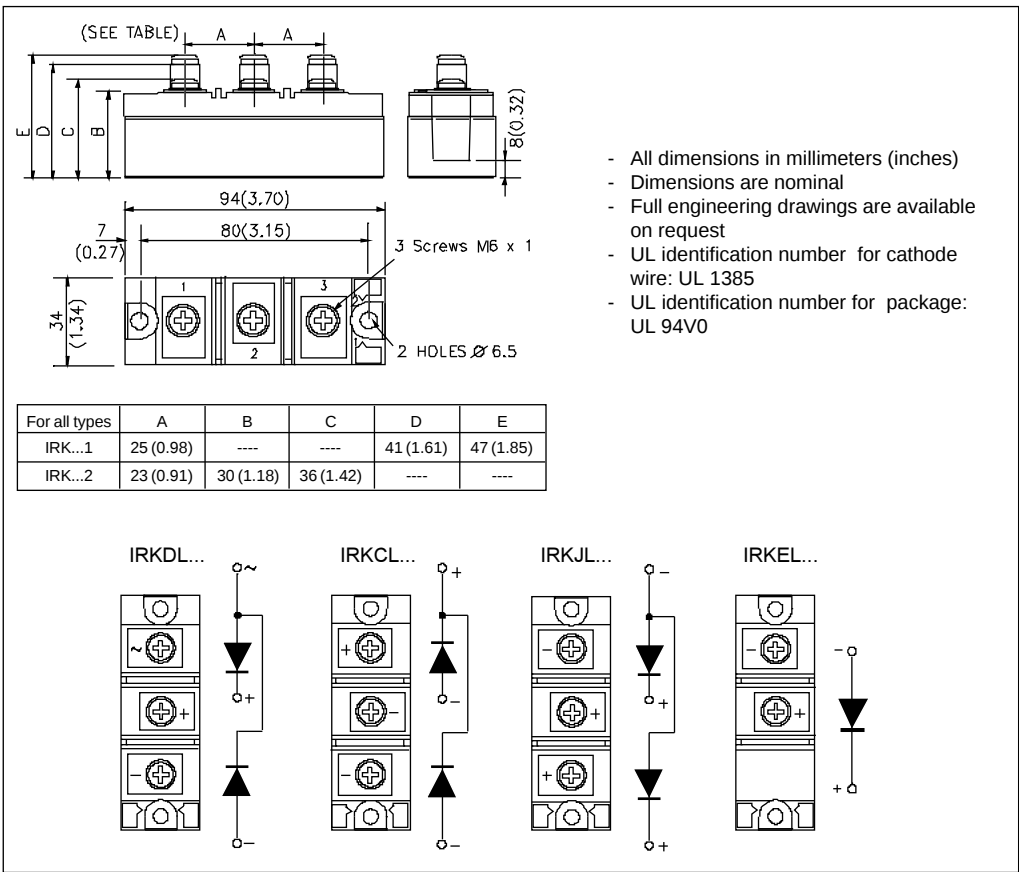


Fig. 1 - Current Ratings Characteristics

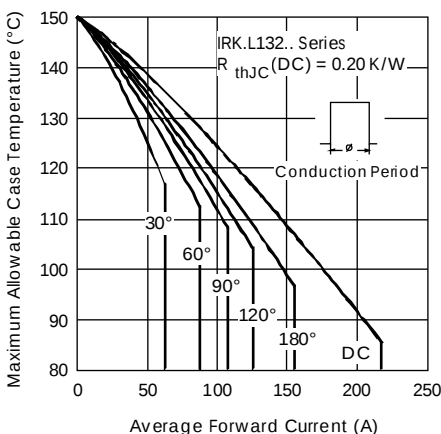


Fig. 2 - Current Ratings Characteristics

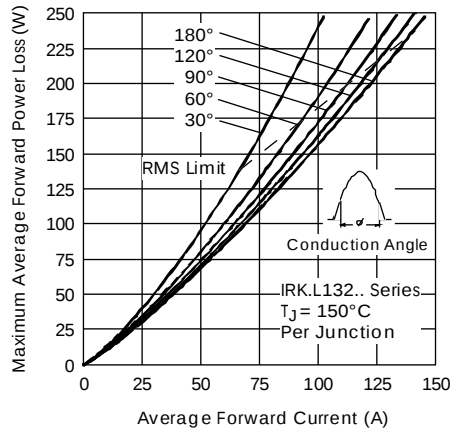


Fig. 3 - Forward Power Loss Characteristics

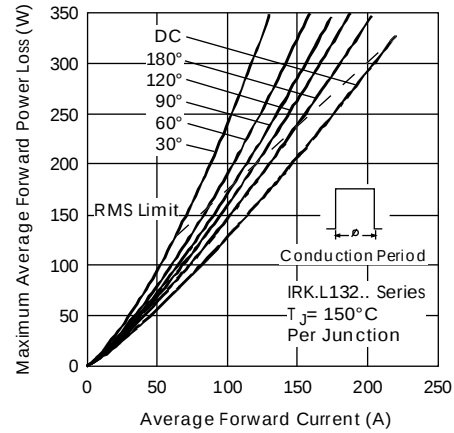


Fig. 4 - Forward Power Loss Characteristics

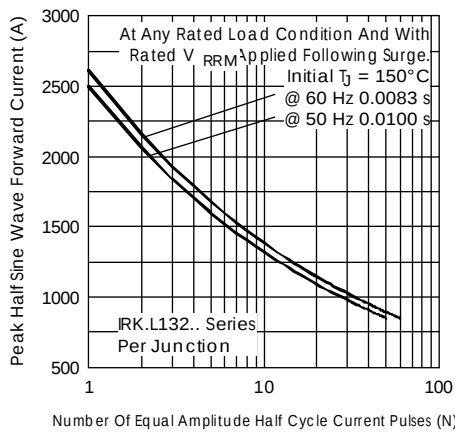


Fig. 5 - Maximum Non-Repetitive Surge Current

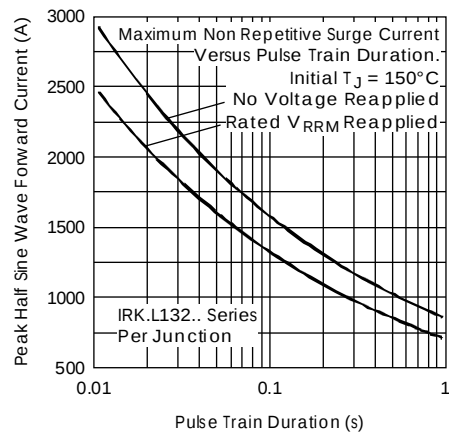


Fig. 6 - Maximum Non-Repetitive Surge Current

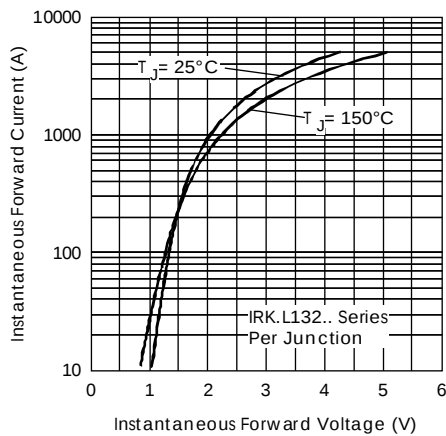


Fig. 7 - Forward Voltage Drop Characteristics

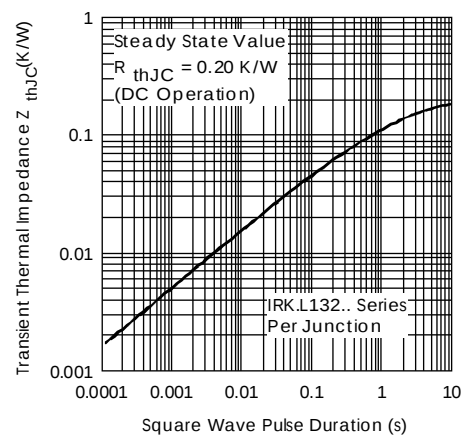


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

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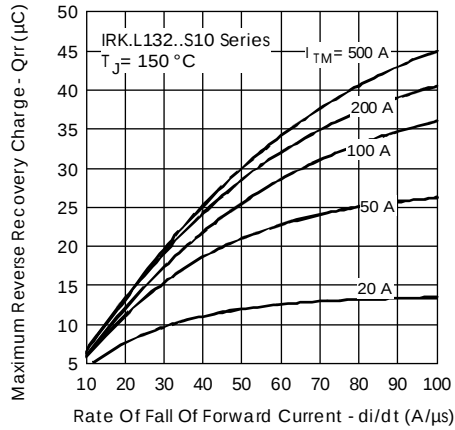


Fig. 9 - Reverse Recovery Charge Characteristics

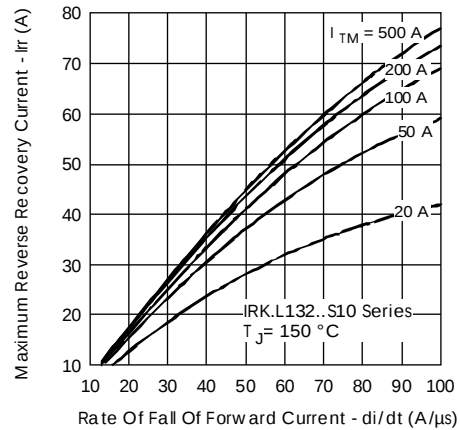


Fig. 10 - Reverse Recovery Current Characteristics

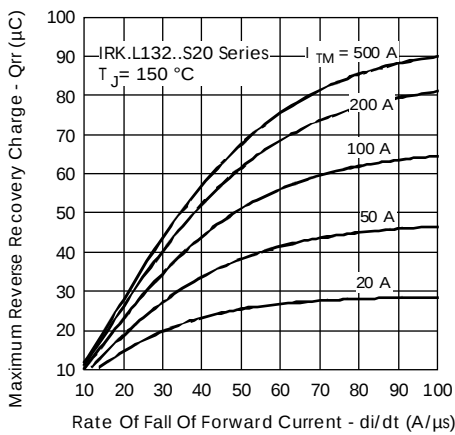


Fig. 11 - Reverse Recovery Charge Characteristics

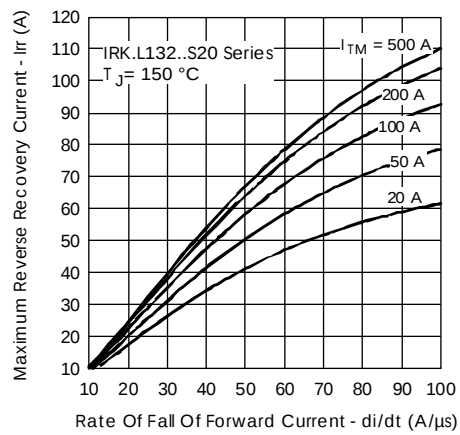


Fig. 12 - Reverse Recovery Current Characteristics

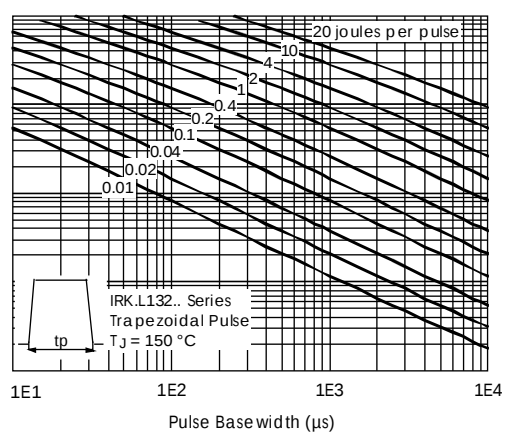
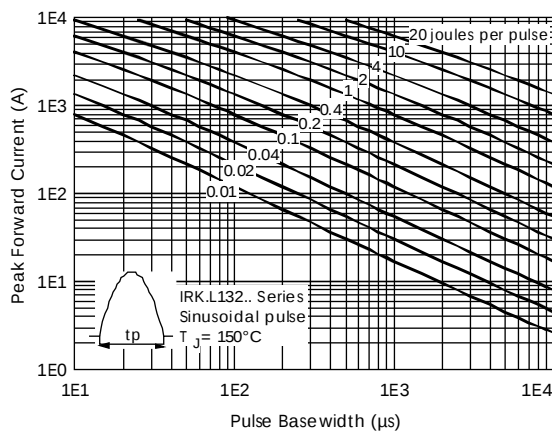


Fig. 13 - Maximum Forward Energy Power Loss Characteristics

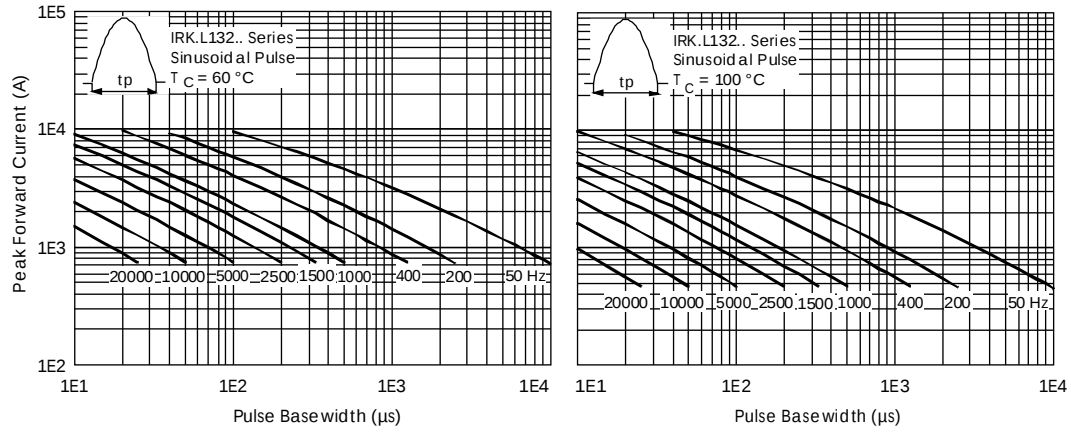


Fig. 14 - Frequency Characteristics

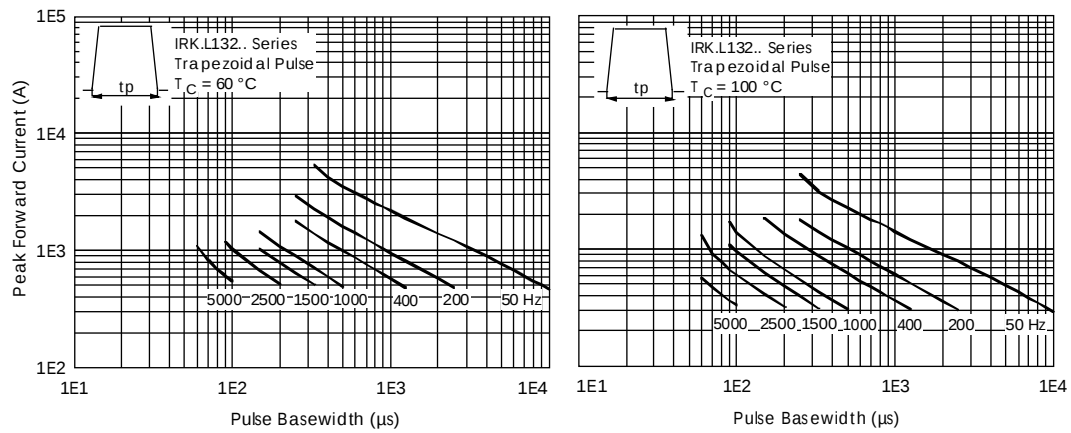


Fig. 15 - Frequency Characteristics