

International

IR

OR

Rectifier

IRKDL450..S20 SERIES

FAST DIODES

SUPER MAGN-A-pak™ Power Modules

Features

- High power FAST recovery diode series
- High current capability
- 3000 V_{RMS} isolating voltage with non-toxic substrate
- High surge capability
- High voltage ratings up to 2500V
- Industrial standard package
- UL recognition pending

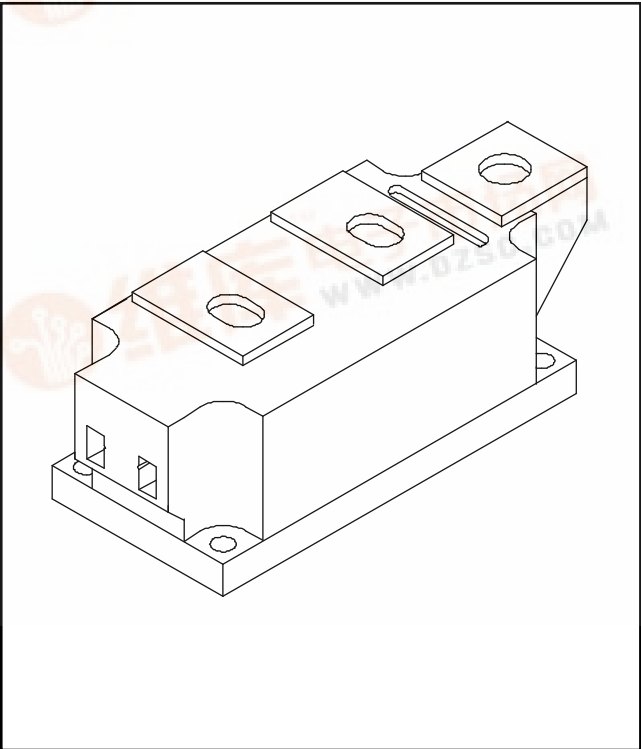
460 A

Typical Applications

- Snubber for large GTO
- Snubber for large IGBT

Major Ratings and Characteristics

Parameters	IRKDL450..S20	Units
I _{F(AV)}	460	A
@ T _C	82	°C
I _{F(RMS)}	720	A
@ T _C	82	°C
I _{FSM}	@ 50Hz 13.0	KA
	@ 60Hz 13.8	KA
I ² t	@ 50Hz 845	KA ² s
	@ 60Hz 790	KA ² s
I ² √t	8450	KA ² √s
V _{RRM} range	1600 to 2500	V
t _{rr}	4.0	μs
T _{STG} range	-40 to 150	°C
T _J range	-40 to 150	°C



IRKDL450..S20 Series

ELECTRICAL SPECIFICATIONS

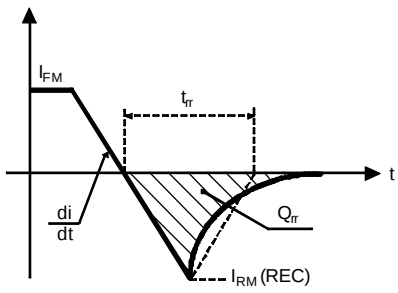
Voltage Ratings

Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ T_J max. mA
IRKDL450..S20	16	1600	1700	50
	20	2000	2100	
	25	2500	2600	

Forward Conduction

Parameter	IRKDL450..	Units	Conditions
$I_{F(AV)}$ Maximum average forward current @ Case temperature	460	A	180° conduction, half sine wave
	82	°C	
$I_{F(RMS)}$ Maximum RMS forward current	720	A	180° conduction, half sine wave @ $T_C = 82^\circ\text{C}$
I_{FSM} Maximum peak, one-cycle forward, non-repetitive surge current	13.0	KA	t = 10ms No voltage
	13.8		t = 8.3ms reappplied
	11.1		t = 10ms 100% V_{RRM}
	11.8		t = 8.3ms reappplied
I^2t Maximum I^2t for fusing	845	KA ² s	t = 10ms No voltage
	790		t = 8.3ms reappplied
	616		t = 10ms 100% V_{RRM}
	578		t = 8.3ms reappplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	8450	KA ² √s	t = 0.1 to 10ms, no voltage reappplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.16	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
$V_{F(TO)2}$ High level value of threshold voltage	1.62		$(I > \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
r_{f1} Low level value of forward slope resistance	0.68	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
r_{f2} High level value of forward slope resistance	0.41		$(I > \pi \times I_{F(AV)})$, $T_J = T_J \text{ max.}$
V_{FM} Maximum forward voltage drop	2.20	V	$I_{pk} = 1800\text{A}$, $T_J = 25^\circ\text{C}$, $t_p = 10\text{ms}$ sine pulse

Recovery Characteristics

Code	$T_J = 25^\circ\text{C}$ typical t_{rr} @ 25% I_{RRM} (μs)	Test conditions			Max. values @ $T_J = 150^\circ\text{C}$			
		I_{pk} Square Pulse (A)	di/dt (A/μs)	V_r (V)	t_{rr} @ 25% I_{RRM} (μs)	Q_{rr} (μC)	I_{rr} (A)	
S20	2.0	1000	100	-50	4.0	400	180	

Blocking

Parameter	IRKDL450..	Units	Conditions
V_{INS} RMS isolation voltage	3000	V	t = 1 s
I_{RRM} Maximum peak reverse and off-state leakage current	50	mA	$T_J = T_J \text{ max.}$, rated V_{RRM} applied

IRKDL450..S20 Series

Outline Table

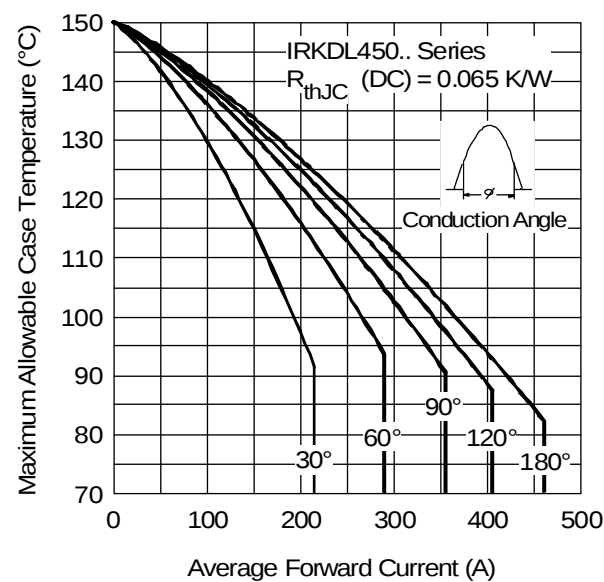
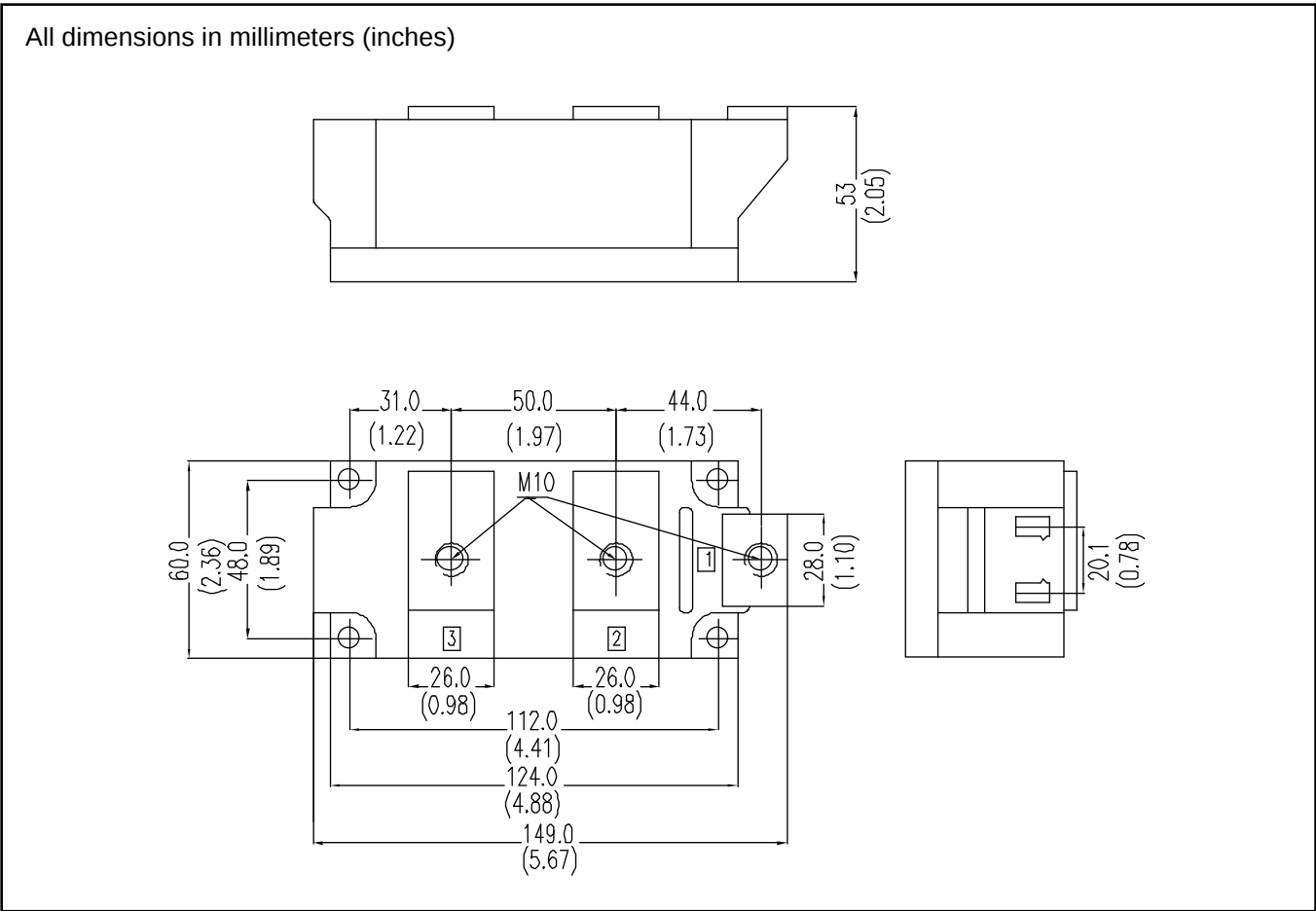


Fig. 1 - Current Ratings Characteristics

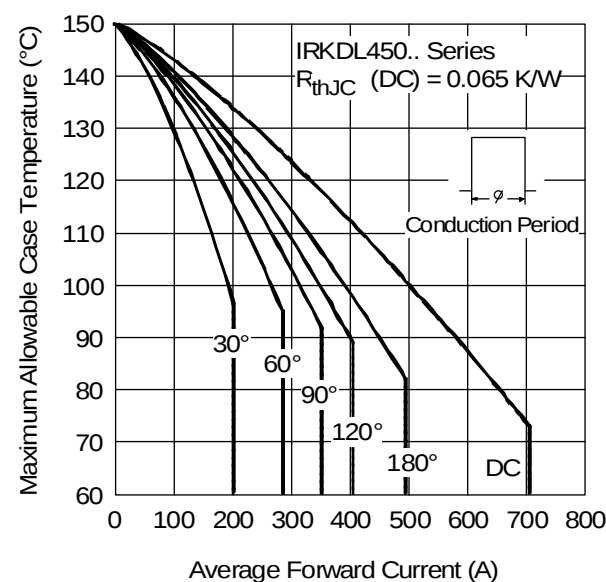


Fig. 2 - Current Ratings Characteristics

IRKDL450..S20 Series

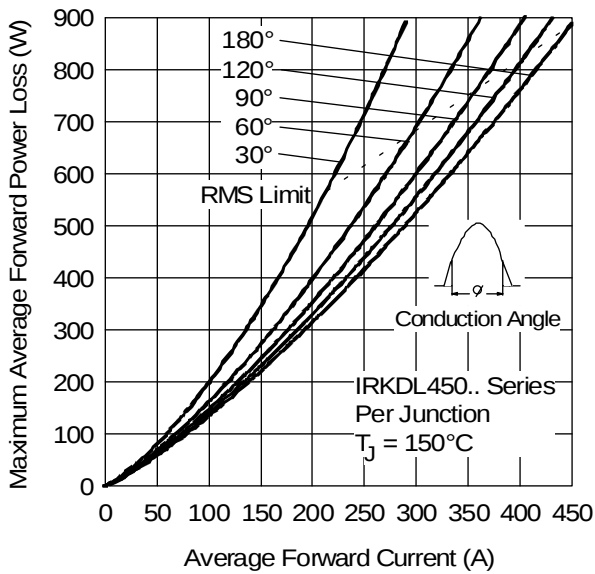


Fig. 3 - Forward Power Loss Characteristics

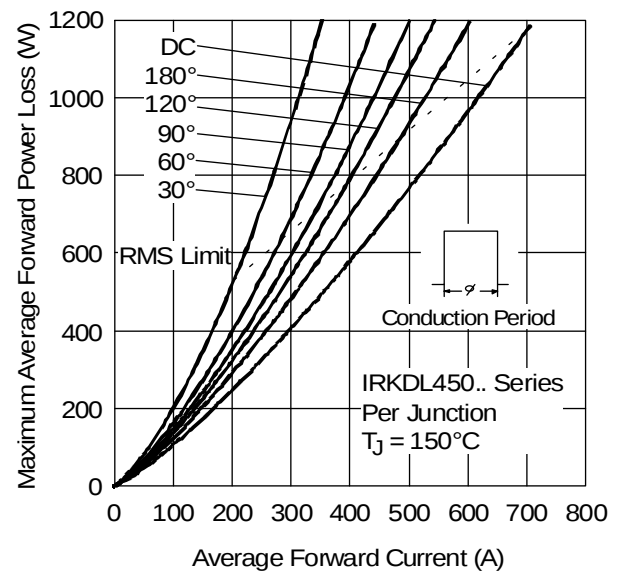


Fig. 4 - Forward Power Loss Characteristics

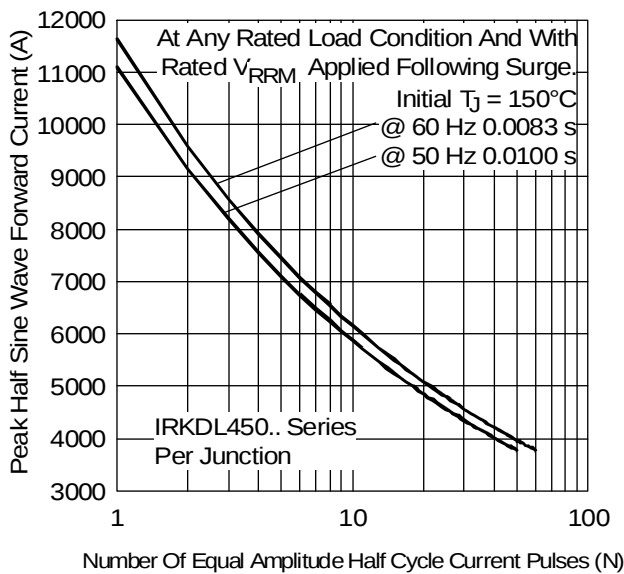


Fig. 5 - Maximum Non-Repetitive Surge Current

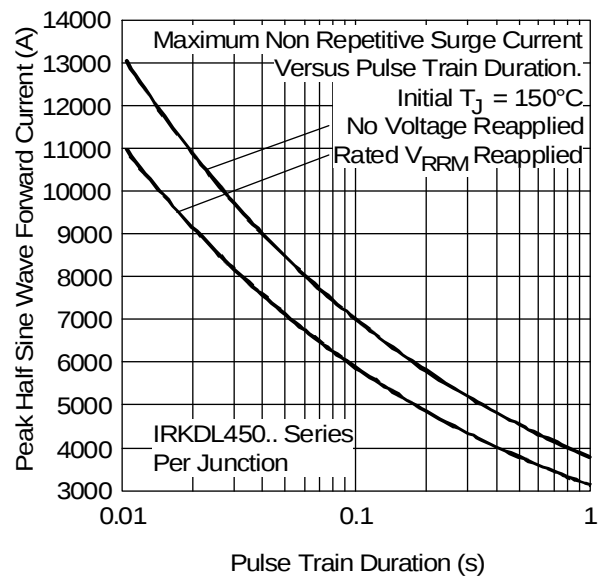


Fig. 6 - Maximum Non-Repetitive Surge Current

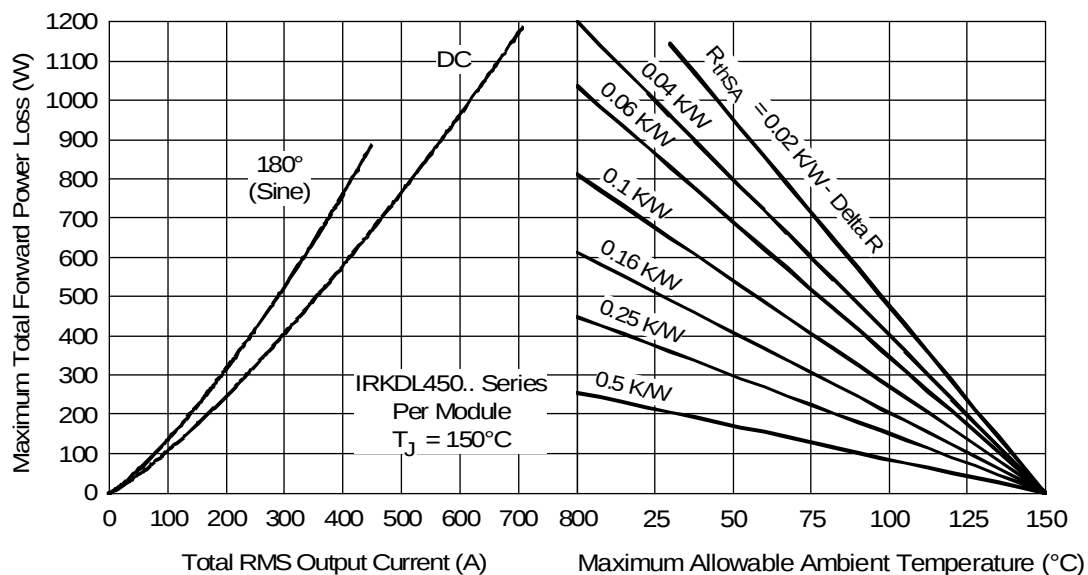


Fig. 7 - Forward Power Loss Characteristics

IRKDL450..S20 Series

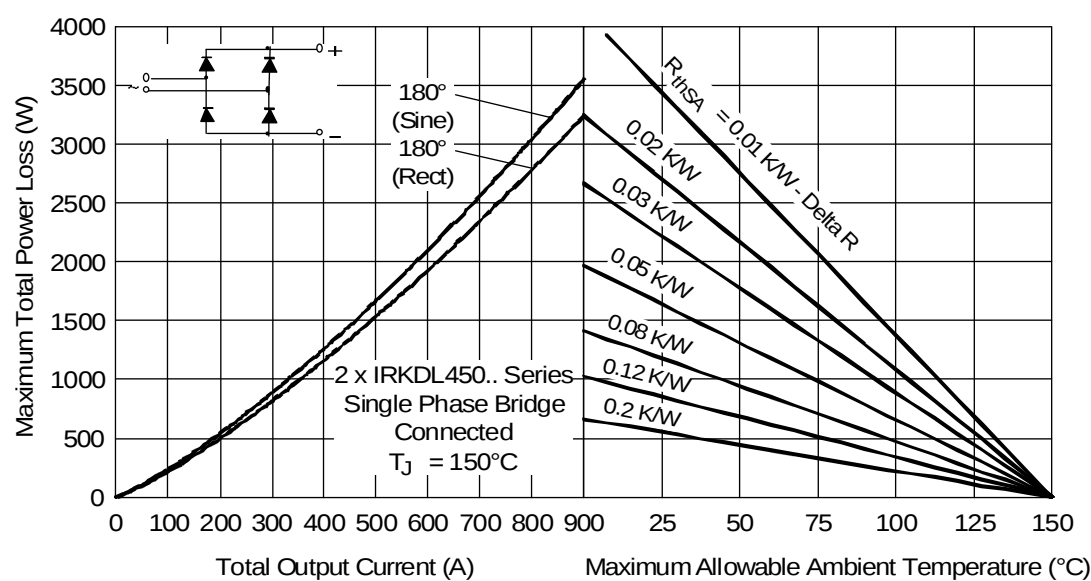


Fig. 8 - Forward Power Loss Characteristics

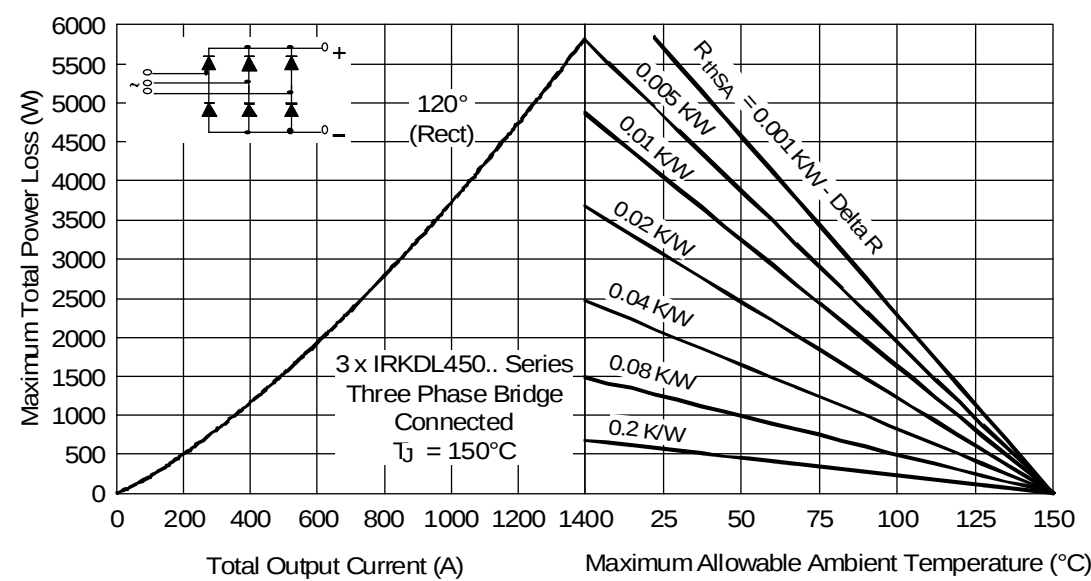


Fig. 9 - Forward Power Loss Characteristics

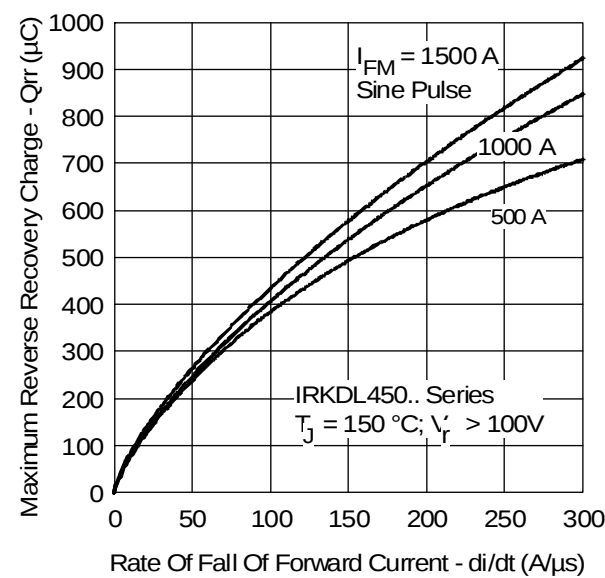


Fig. 10 - Forward Voltage Drop Characteristics

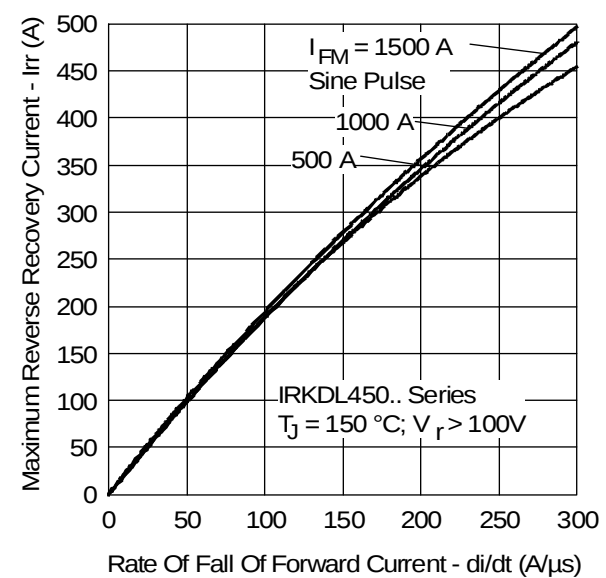


Fig. 11 - Thermal Impedance Z_{thJC} Characteristic

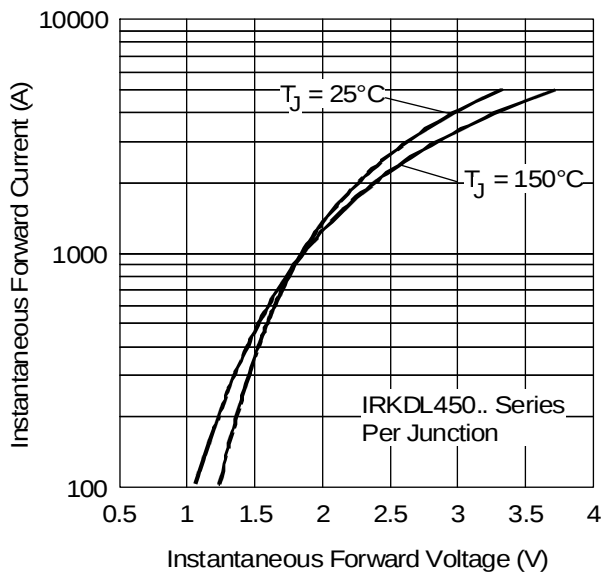


Fig. 12 - Forward Voltage Drop Characteristics

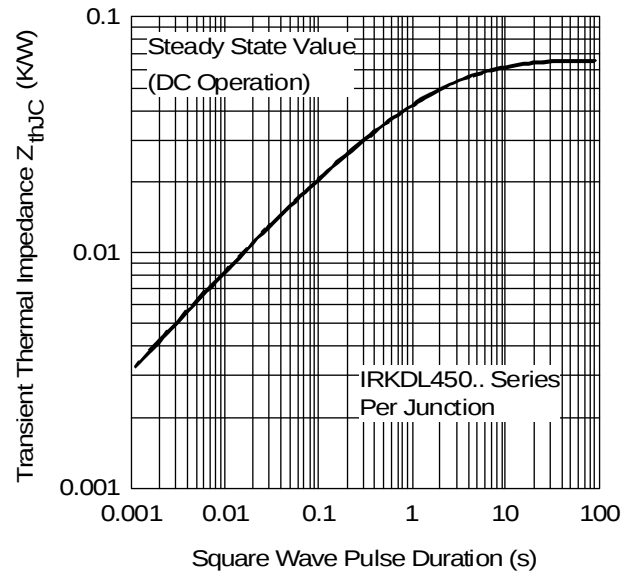


Fig. 13 - Thermal Impedance Z_{thJC} Characteristic