IXYS

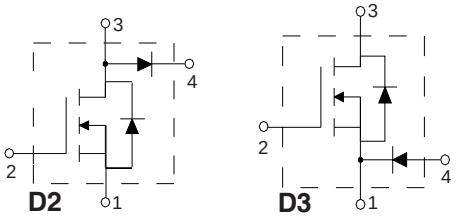
PolarHV™ HiPerFET Power MOSFET

IXFN64N50PD2
IXFN64N50PD3

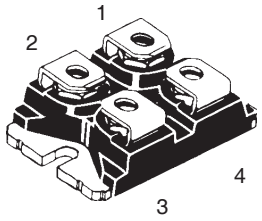
V_{DSS} = 500V
I_{D25} = 50A
$R_{DS(on)}$ ≤ 85mΩ
t_{rr} ≤ 200ns

Boost & Buck Configurations (Ultra-fast FRED Diode)

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



miniBLOC, SOT-227 B
E153432



D2 Pin Out:
1 = Source 3 = Drain / Diode anode
2 = Gate 4 = Diode cathode

D3 Pin Out:
1 = Source / Diode Cathode 2 = Gate
3 = Drain 4 = Diode cathode

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	50	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	200	A
I_A	T_C = 25°C	64	A
E_{AS}	T_C = 25°C	2.5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le$150°C	10	V/ns
P_D	T_C = 25°C	625	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting Torque	1.5/13	Nm/lb.in.
	Terminal Connection Torque	1.3/11.5	Nm/lb.in.
Weight		30	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 500μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	3.0		5.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS}= 0V			50	μA
	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 32A, Note 1			85	mΩ

Features

- Fast Intrinsic Diode in Boost Configuration
- International Standard Package
- Encapsulating Epoxy Meets UL 94 V-0, Flammability Classification
- miniBLOC with Aluminium Nitride Isolation
- Avalanche Rated
- Low Package Inductance

Advantages

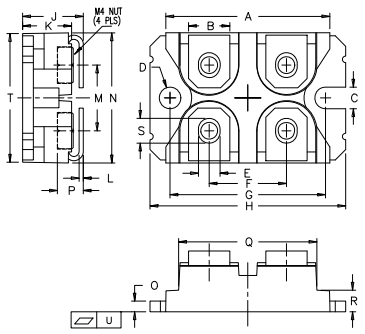
- Easy To Mount
- Space Savings
- Tightly Coupled FRED Diode
- High Power Density

Applications

- PFC Circuits
- Uninterruptible Power Supplies (UPS)
- Switched-Mode and Resonant-Mode Power Supplies
- AC and DC Motor Drives
- High Speed Power Switching Applications
- Robotics and Servo Controls

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20V, I_D = 32A, Note 1	30	50		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		9700		pF
C_{oss}			970		pF
C_{rss}			30		pF
$t_{d(on)}$	**Resistive Switching Times**		30		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 32A		25		ns
$t_{d(off)}$	R_G = 2Ω (External)		85		ns
t_f			22		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 32A		150		nC
Q_{gs}			50		nC
Q_{gd}			50		nC
R_{thJC}				0.20	°C/W
R_{thCS}			0.05		°C/W

SOT-227B (IXFN) Outline



(M4 screws (4x) supplied)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			64	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			250	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/µs			200	ns
Q_{RM}	V_R = 100V,V_{GS} = 0V		0.6		µC
I_{RM}			6.0		A

FRED Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_{F25}	T_C = 115°C			30	A
V_F	I_F = 30A, Note 1		2.5	2.75	V
	T_{VJ} = 150°C		1.8		V
I_{RM}	I_F = 10A, di_F/dt = -100A/µs, T_{VJ} = 100°C		5.5	11.5	A
t_{rr}	V_R = 100V, V_{GE} = 0V		200		ns
R_{thJC}				0.9	°C/W
R_{thCS}	with Heat Transfer Paste		0.25		°C/W

Note 1: Pulse Test, t ≤ 300µs; Duty Cycle, d ≤ 2%.

Fig. 1. Output Characteristics @ 25ºC

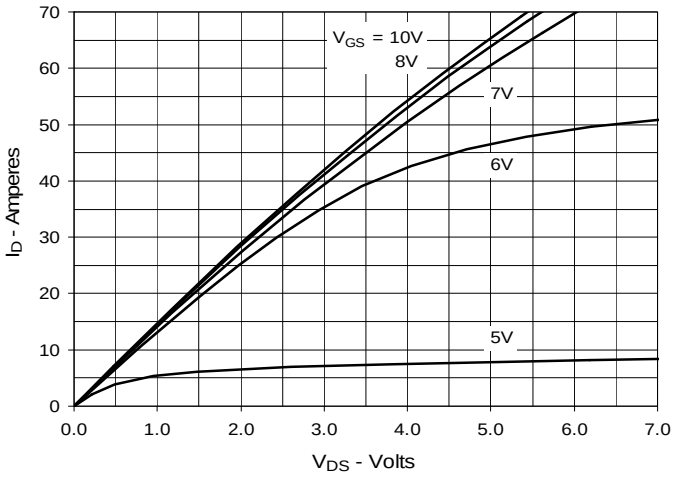


Fig. 2. Extended Output Characteristics @ 25ºC

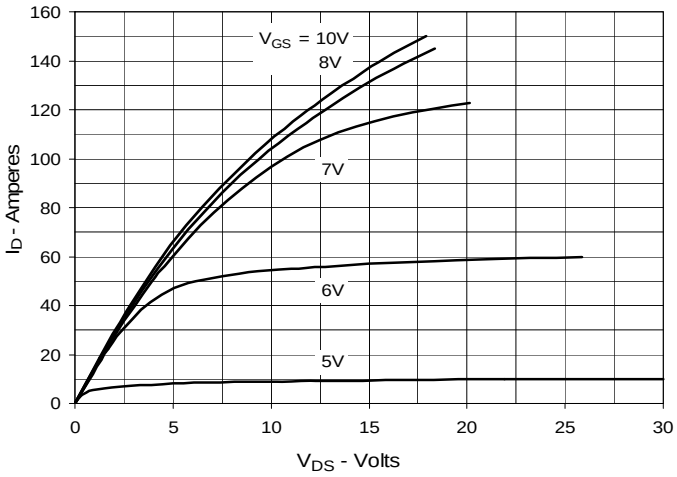


Fig. 3. Output Characteristics @ 125ºC

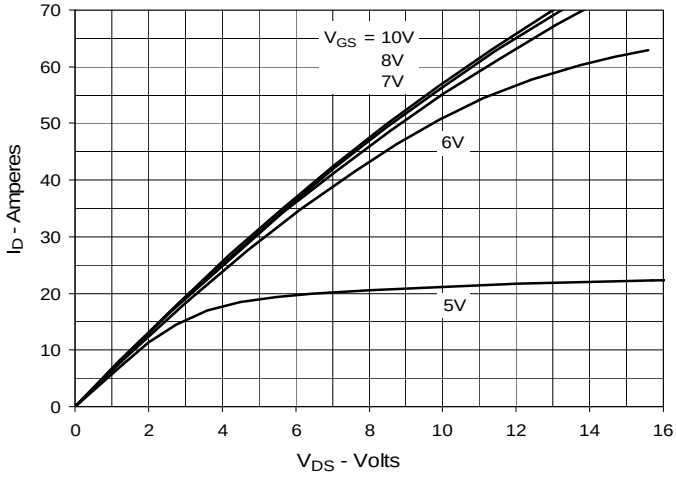


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 32A Value vs. Junction Temperature

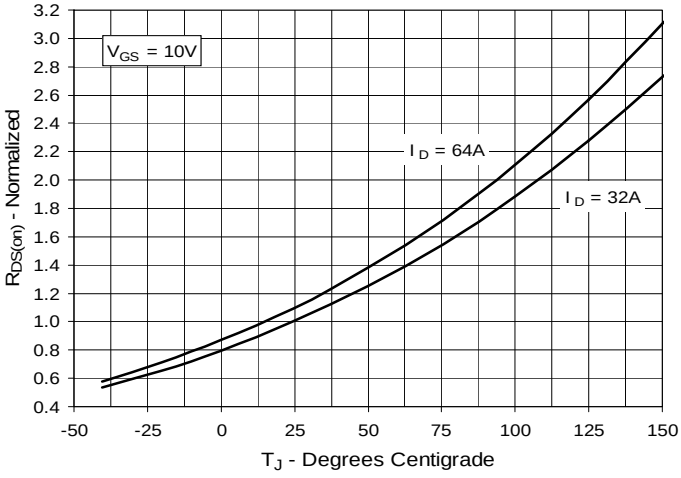


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 32A Value vs. Drain Current

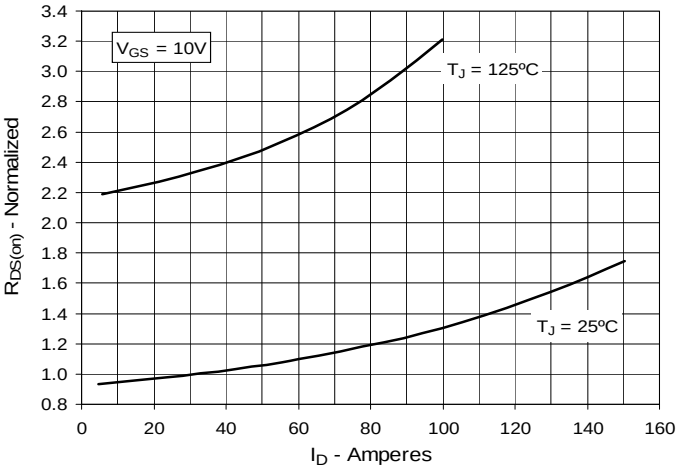


Fig. 6. Maximum Drain Current vs. Case Temperature

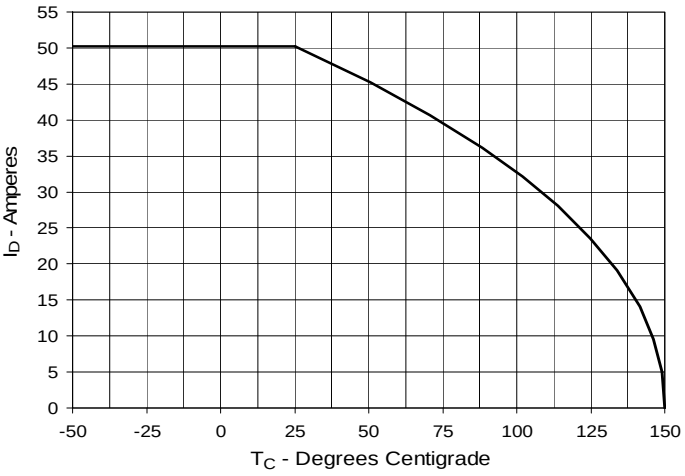


Fig. 7. Input Admittance

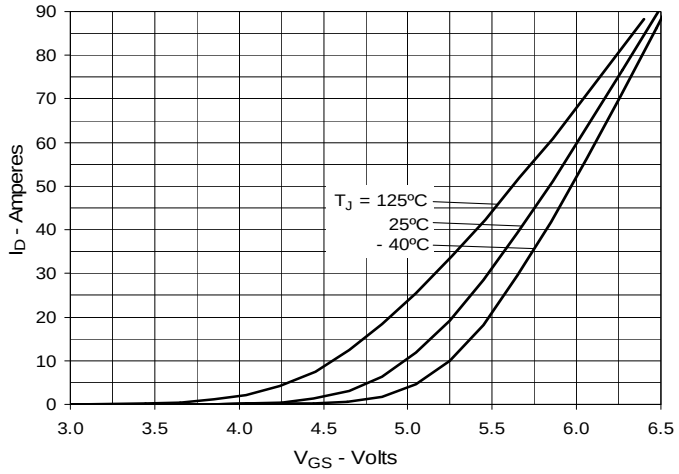


Fig. 8. Transconductance

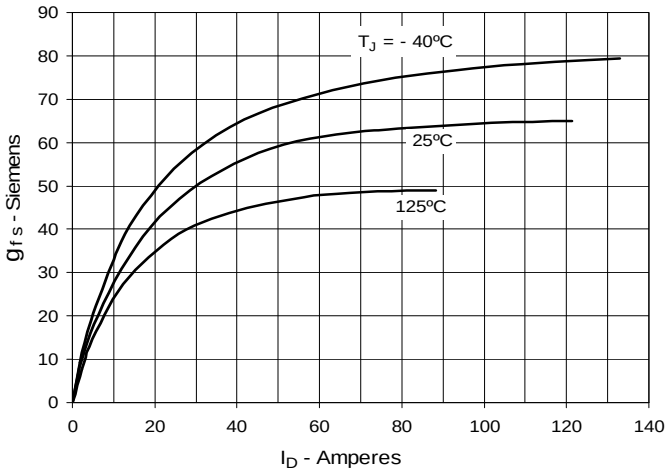


Fig. 9. Forward Voltage Drop of Intrinsic Diode

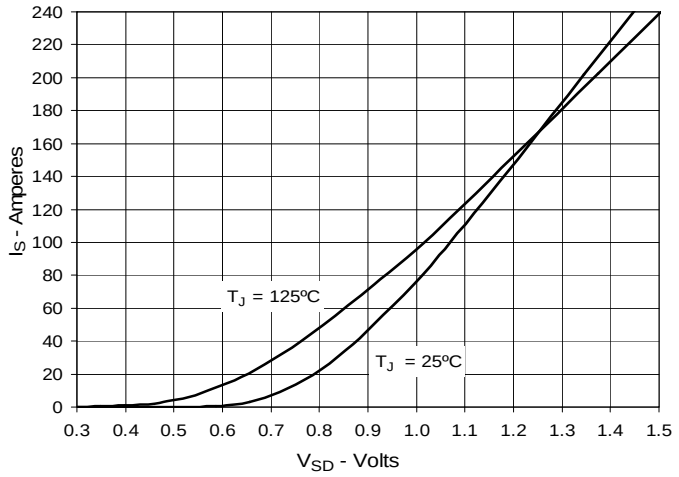


Fig. 10. Gate Charge

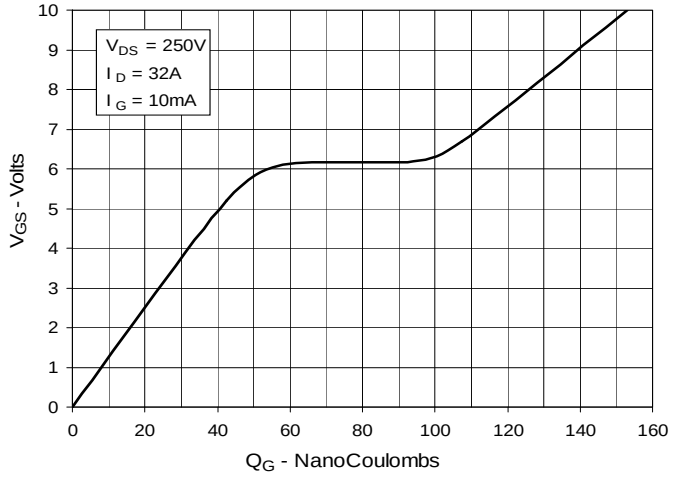


Fig. 11. Capacitance

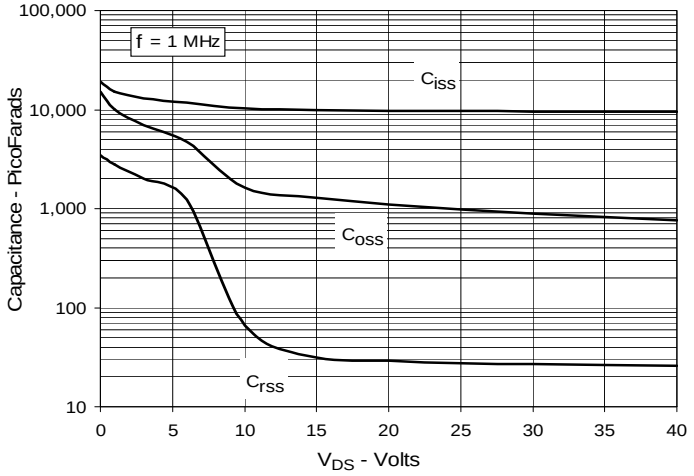
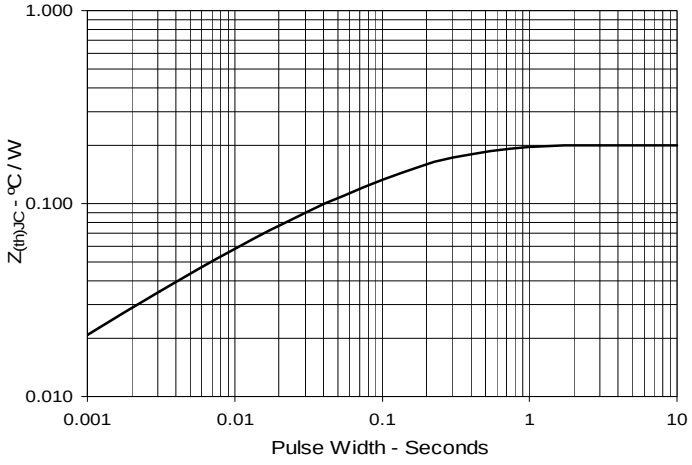


Fig. 12. Maximum Transient Thermal Impedance



IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

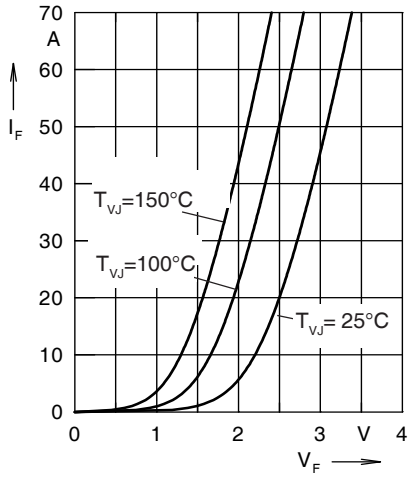


Fig. 13. Forward current I_F versus V_F

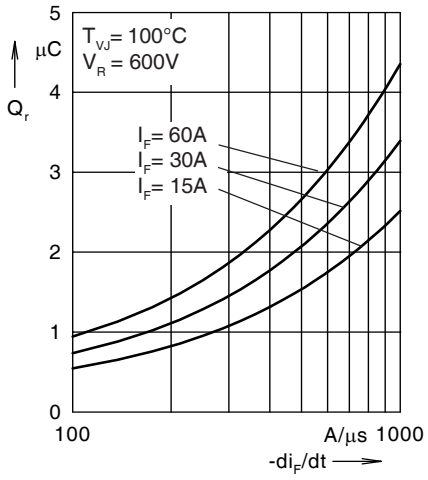


Fig. 14. Reverse recovery charge Q_r versus $-di_F/dt$

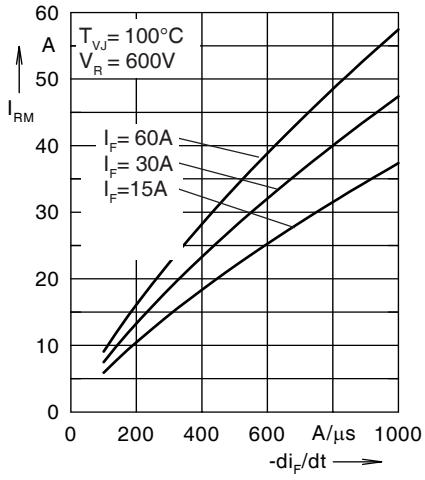


Fig. 15. Peak reverse current I_{RM} versus $-di_F/dt$

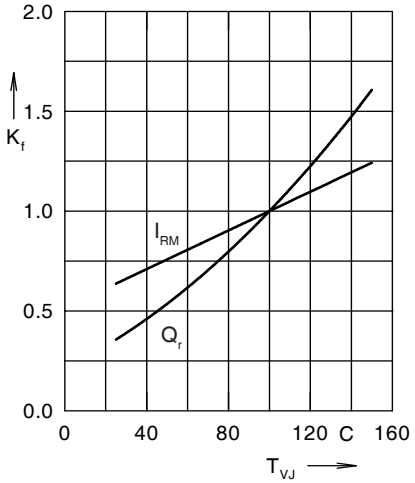


Fig. 16. Dynamic parameters Q_r, I_{RM} versus T_{VJ}

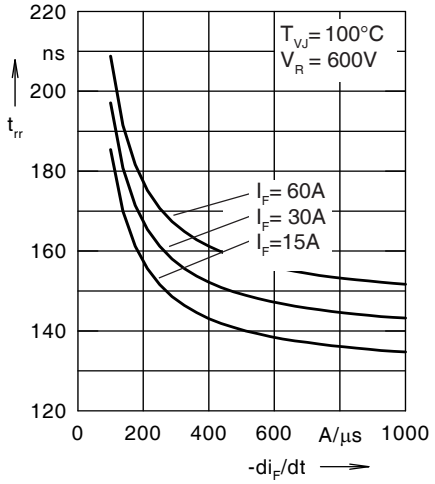


Fig. 17. Recovery time t_{rr} versus $-di_F/dt$

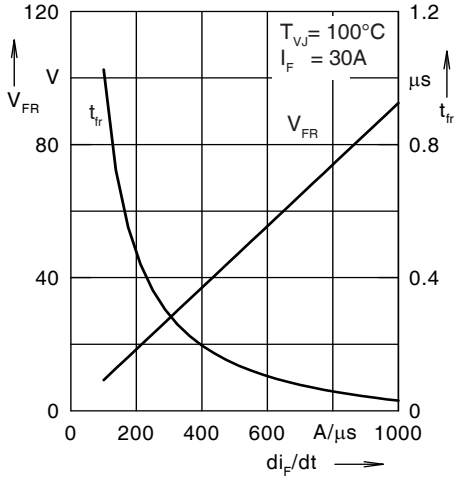


Fig. 18. Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

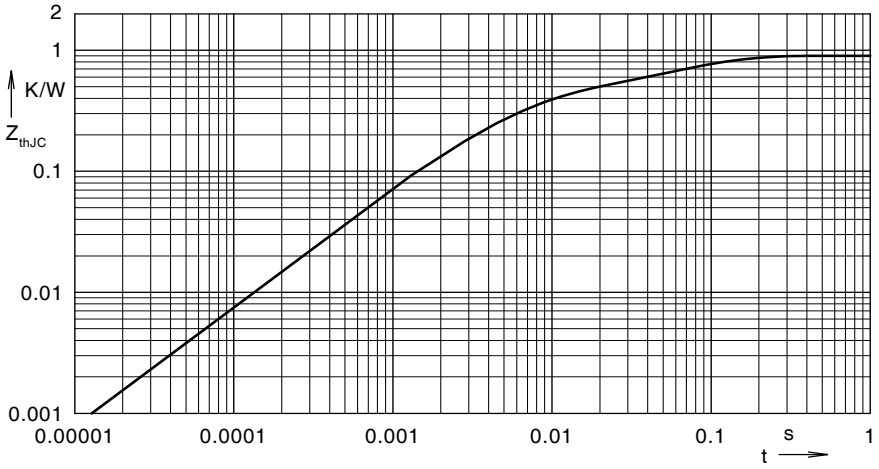


Fig. 19 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.465	0.0052
2	0.179	0.0003
3	0.256	0.0397