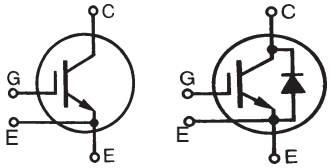
IXYS

HiPerFAST™ IGBTs with Diode

IXGN60N60C2
IXGN60N60C2D1

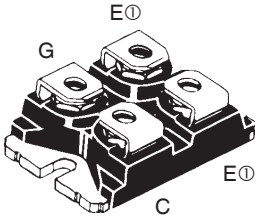
V_{CES} = 600V
I_{C110} = 60A
$V_{CE(sat)} \leq$ 2.5V
t_{rr} = 35ns

C2-Class High Speed IGBTs



60C2 60C2D1

SOT-227B, miniBLOC
E153432



G = Gate, C = Collector, E = Emitter
① Either Emitter Terminal can be used as Main or Kelvin Emitter

Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1 MΩ		600	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C (Limited by Leads)		75	A
I_{C110}	T_C = 110°C		60	A
I_{CM}	T_C = 25°C, 1 ms		300	A
SSOA	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 10 Ω		I_{CM} = 100	A
(RBSOA)	Clamped Inductive Load		@ $V_{CE} \leq$ 600	V
P_C	T_C = 25°C		480	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60 Hz	t = 1 min	2500	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in.
	Terminal Connection Torque (M4)		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.	
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}			650	μA
	V_{GE} = 0V, T_J = 125°C			5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 50A, V_{GE} = 15V, Note 1		2.1	2.5	V
	T_J = 125°C		1.8		V

Features

- International Standard Package miniBLOC
- Aluminium Nitride Isolation
  - High Power Dissipation
- Anti-Parallel Ultra Fast Diode
- Isolation Voltage 3000 V~
- Low $V_{CE(sat)}$ for Minimum On-State Conduction Losses
- MOS Gate Turn-on
  - Drive Simplicity
- Low Collector-to-Case Capacitance (< 50 pF)
- Low Package Inductance (< 5 nH)
  - Easy to Drive and to Protect

Applications

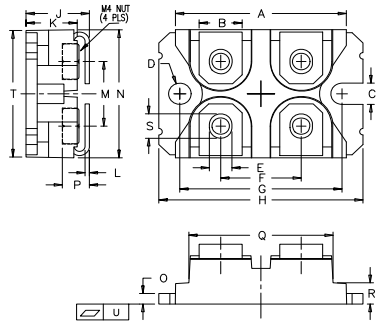
- AC Motor Speed Control
- DC Servo and Robot Drives
- DC Choppers
- Uninterruptible Power Supplies (UPS)
- Switch-Mode and Resonant-Mode Power Supplies

Advantages

- Easy to Mount with 2 Screws
- Space Savings
- High Power Density

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 50A, V_{CE} = 10V, Note 1	40	58		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4750		pF
C_{oes}			530		pF
C_{res}			65		pF
Q_g	I_C = 50A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		146		nC
Q_{ge}			28		nC
Q_{gc}			50		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		18		ns
t_{ri}	I_C = 50A, V_{GE} = 15 V		25		ns
$t_{d(off)}$	V_{CE} = 400V, R_G = 2Ω		95	150	ns
t_{fi}			35		ns
E_{off}			0.48	0.80	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		18		ns
t_{ri}	I_C = 50A, V_{GE} = 15V		25		ns
E_{on}	V_{CE} = 400V, R_G = 2Ω		0.90		mJ
$t_{d(off)}$			130		ns
t_{fi}			80		ns
E_{off}			1.20		mJ
R_{thJC}				0.26	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC



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

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Oherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 60A, V_{GE} = 0V, Note 1			2.1	V
	T_J = 150°C		1.4		V
I_{RM}	I_F = 60A, -di/dt = 100A/μs, T_J = 100°C			8.3	A
	V_R = 100V, V_{GE} = 0V,				
t_{rr}	I_F = 1A, -di/dt = 200A/μs, V_R = 30V, V_{GE} = 0V		35		ns
R_{thJC}				0.85	°C/W

Note 1: PulseTest, t ≤ 300μs, Duty Cycle, d ≤ 2%.

Fig. 1. Output Characteristics
@ 25 Deg. C

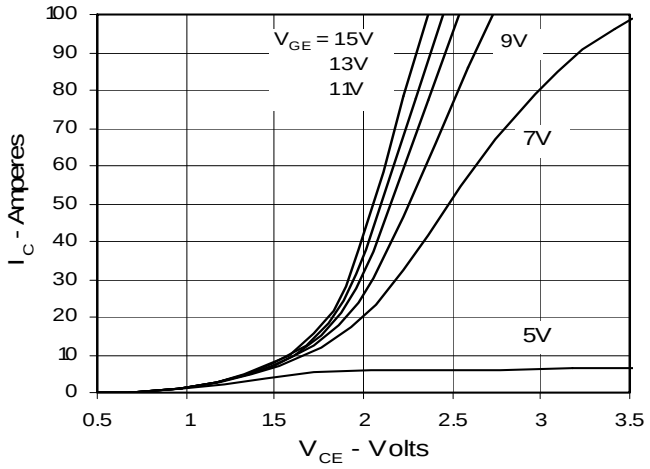


Fig. 2. Extended Output Characteristics
@ 25 deg. C

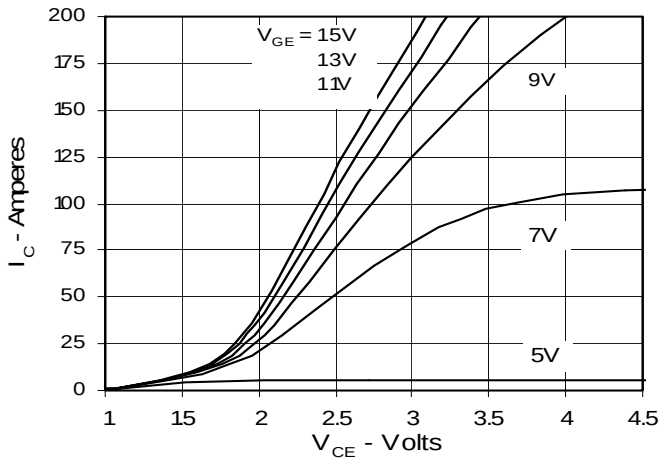


Fig. 3. Output Characteristics
@ 125 Deg. C

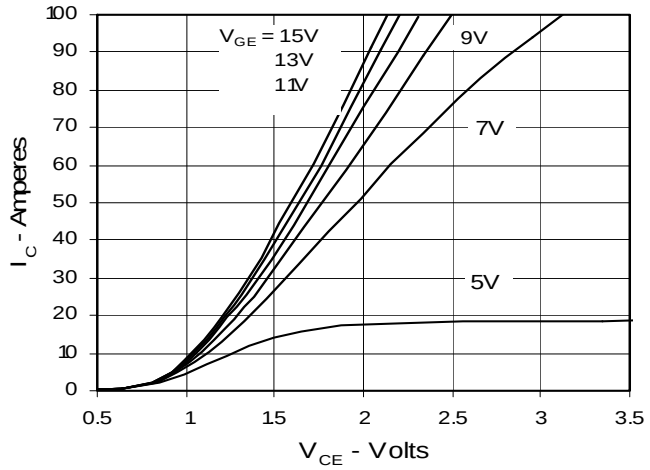


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

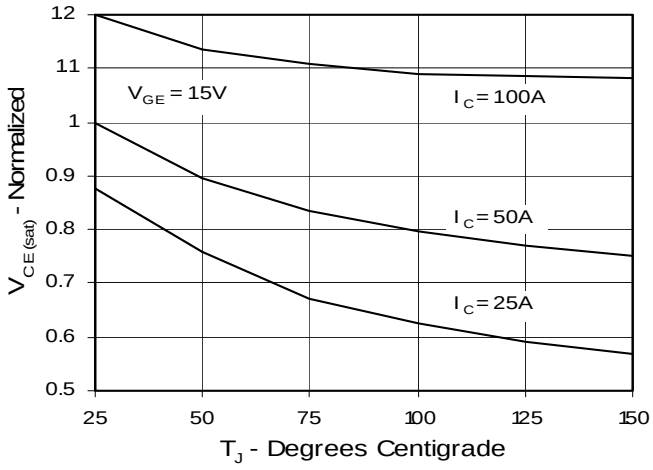


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter voltage

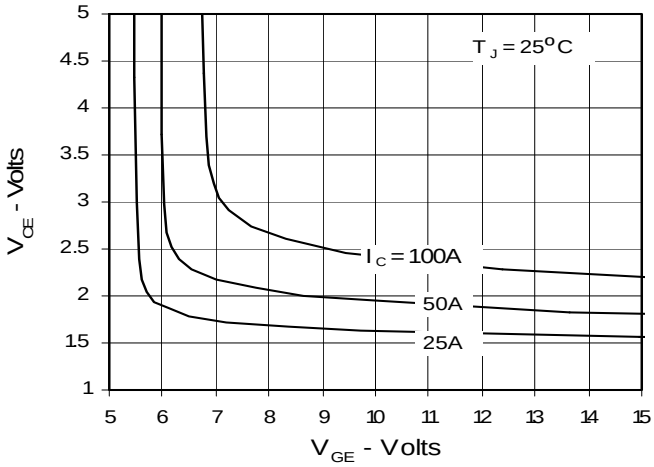


Fig. 6. Input Admittance

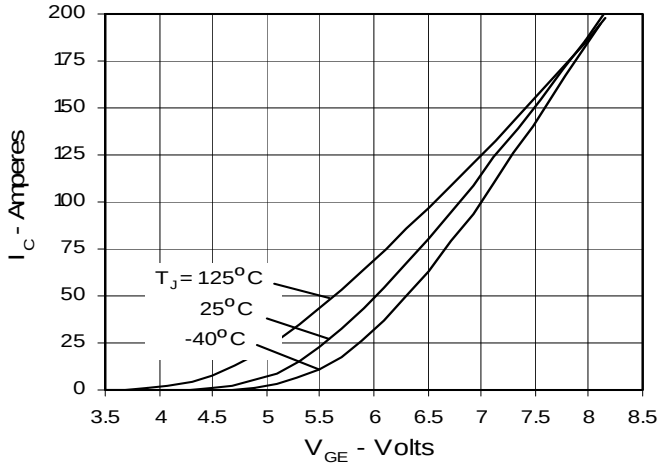


Fig. 7. Transconductance

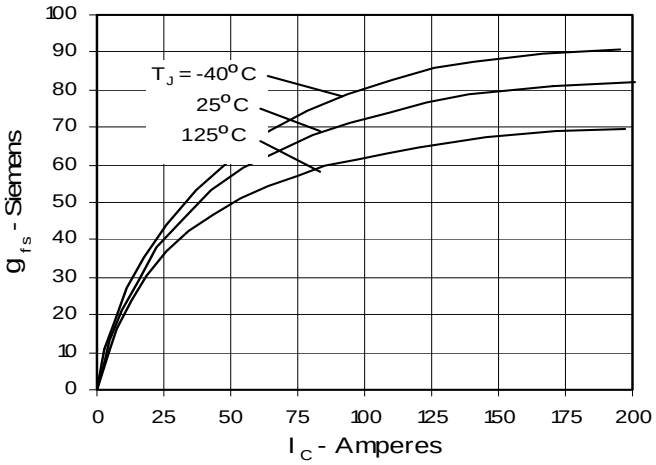


Fig. 8. Dependence of E_{off} on R_G

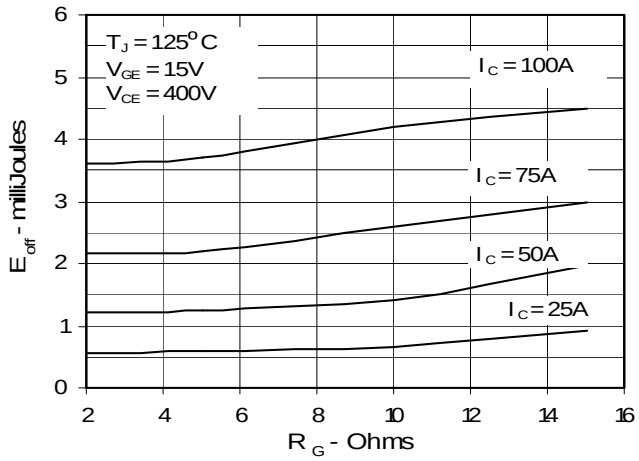


Fig. 9. Dependence of E_{off} on I_C

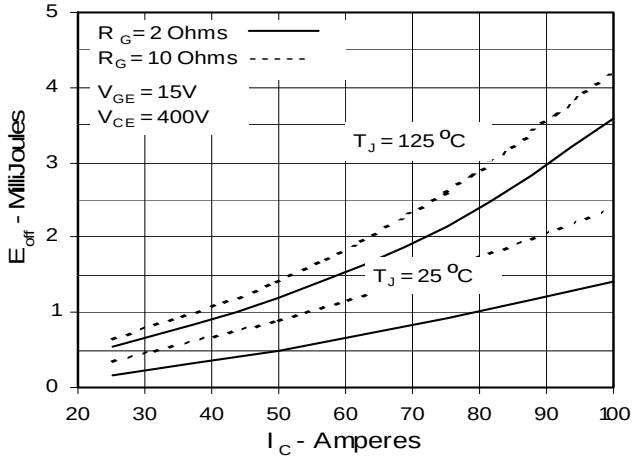


Fig. 10. Dependence of E_{off} on Temperature

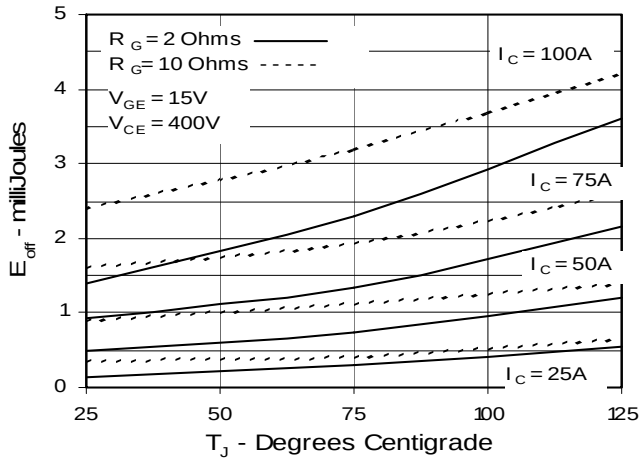


Fig. 11. Gate Charge

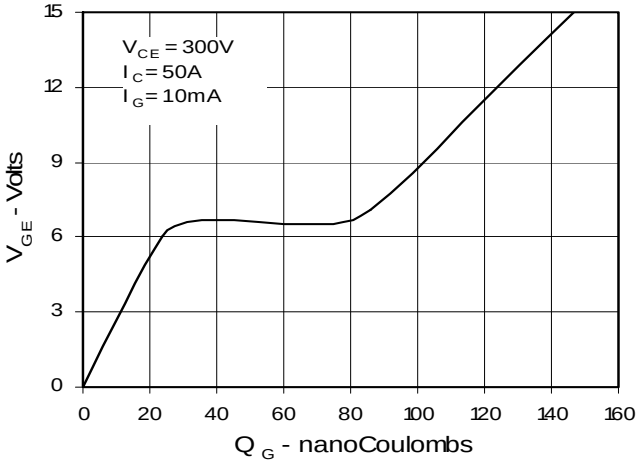
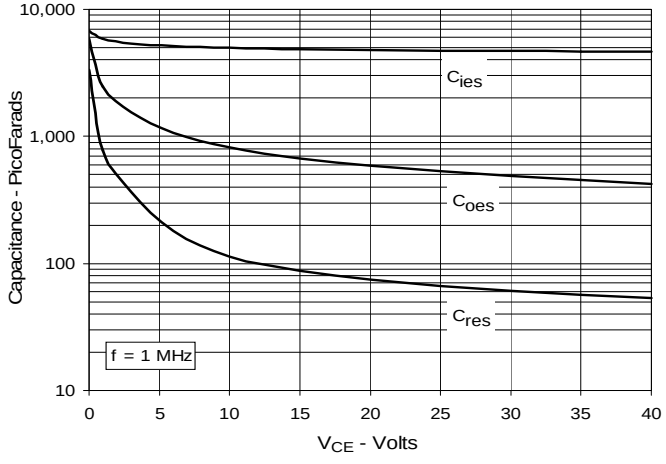


Fig. 12. Capacitance



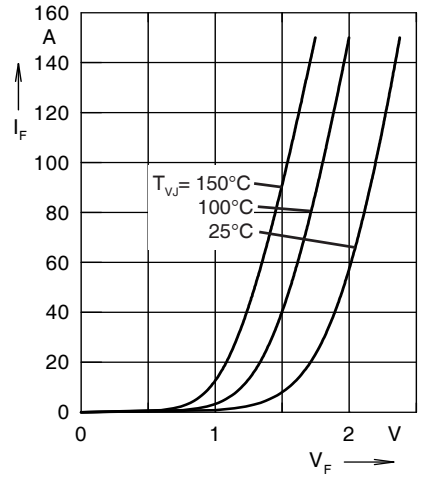


Fig. 13. Forward Current I_F Versus V_F

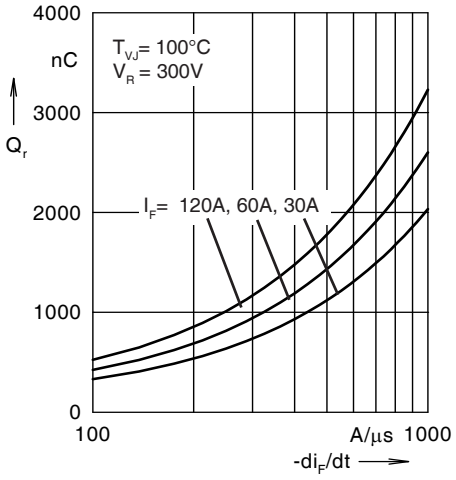


Fig. 14. Reverse Recorvery Charge Q_r Versus $-di_F/dt$

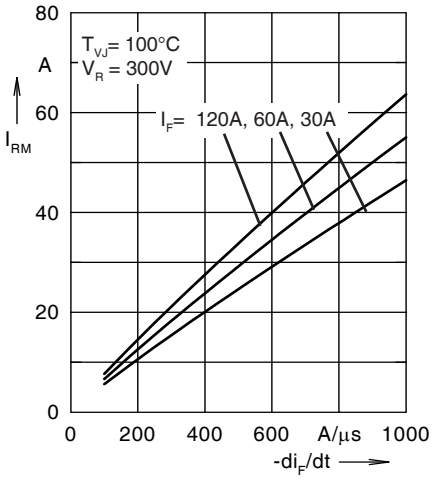


Fig. 15. Peak Reverse Current I_{RM} Versus $-di_F/dt$

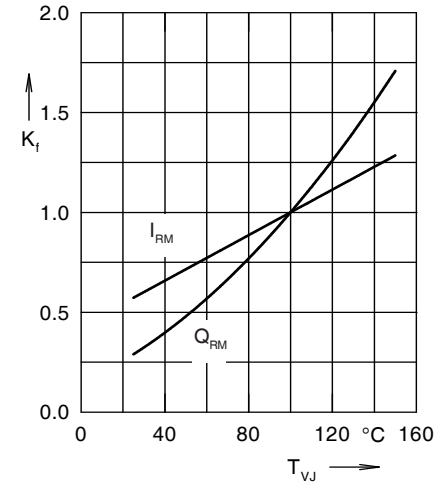


Fig. 16. Dynamic Paraments Q_r, I_{RM} Versus T_{VJ}

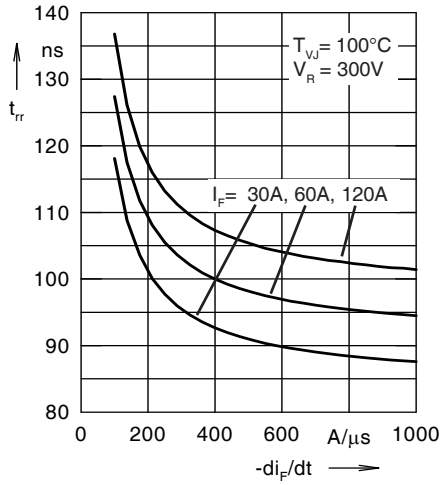


Fig. 17. Recorvery Time t_{rr} Versus $-di_F/dt$

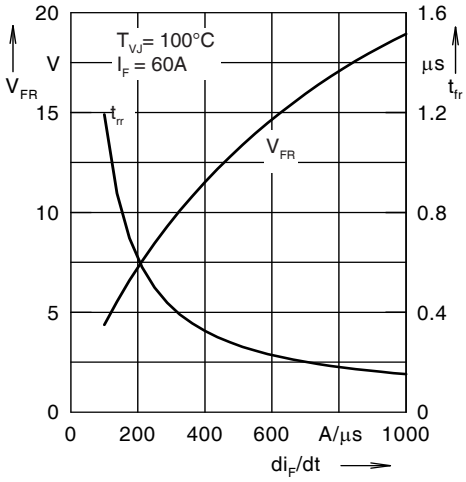


Fig. 18. Peak Forward Voltage V_{RM} and t_{rr} Versus $-di_F/dt$

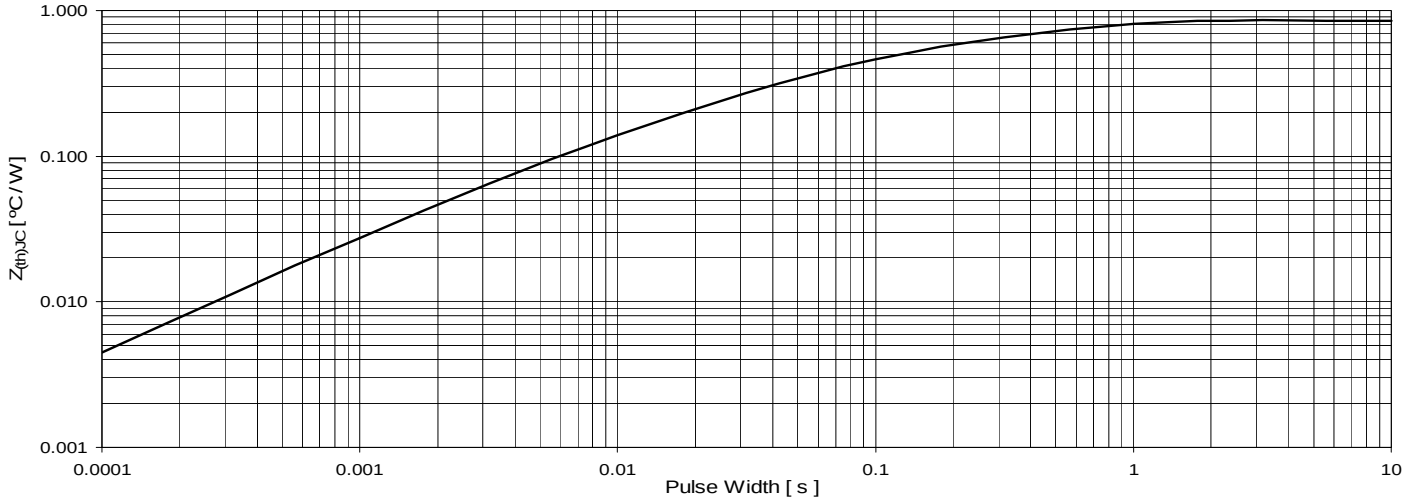


Fig. 27. Maximum Transient Thermal Impedance (for diode)