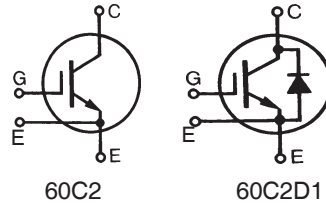


HiPerFAST™ IGBTs with Diode

IXGN60N60C2 IXGN60N60C2D1

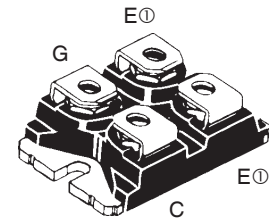
$V_{CES} = 600V$
 $I_{C110} = 60A$
 $V_{CE(sat)} \leq 2.5V$
 $t_{rr} = 35ns$

C2-Class High Speed IGBTs



SOT-227B, miniBLOC

E153432



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	600	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1 M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$ (Limited by Leads)	75	A
I_{C110}	$T_C = 110^\circ C$	60	A
I_{CM}	$T_C = 25^\circ C$, 1 ms	300	A
SSOA	$V_{GE} = 15 V$, $T_{VJ} = 125^\circ C$, $R_G = 10 \Omega$	$I_{CM} = 100$	A
(RBSOA)	Clamped Inductive Load	@ $V_{CE} \leq 600$	V
P_C	$T_C = 25^\circ C$	480	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
V_{ISOL}	50/60 Hz	$t = 1 \text{ min}$	2500 V~
	$I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ s}$	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

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

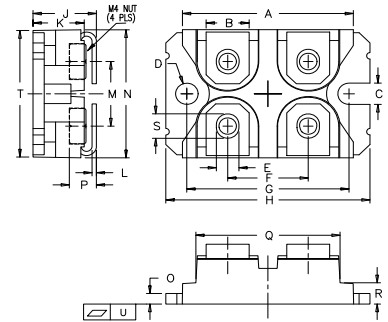
Advantages

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

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$			650 μA 5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 50A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		2.1	2.5 V
			1.8	V

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

SOT-227B miniBLOC



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C}$, Unless Otherwise Specified)				
V_F	$I_F = 60\text{A}, V_{GE} = 0\text{V}$, Note 1 $T_J = 150^\circ\text{C}$		1.4	2.1 V
I_{RM}	$I_F = 60\text{A}, -di/dt = 100\text{A}/\mu\text{s}$, $V_R = 100\text{V}, V_{GE} = 0\text{V}$, $T_J = 100^\circ\text{C}$			8.3 A
t_{rr}	$I_F = 1\text{A}, -di/dt = 200\text{A}/\mu\text{s}, V_R = 30\text{V}, V_{GE} = 0\text{V}$		35	ns
R_{thJC}				0.85 $^\circ\text{C/W}$

Note 1: PulseTest, $t \leq 300\mu\text{s}$, Duty Cycle, $d \leq 2\%$.

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

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

Fig. 1. Output Characteristics
@ 25 Deg. C

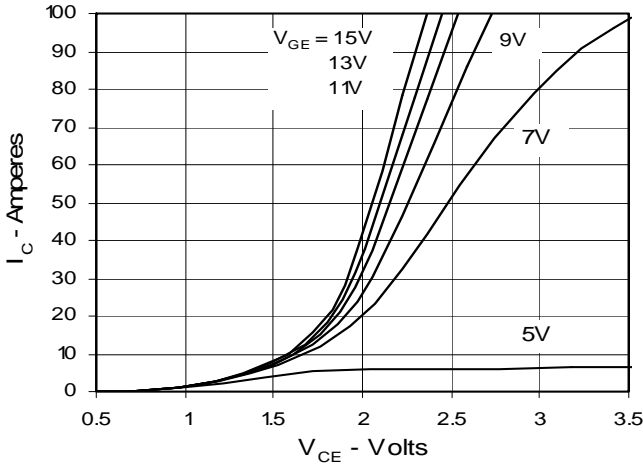


Fig. 2. Extended Output Characteristics
@ 25 deg. C

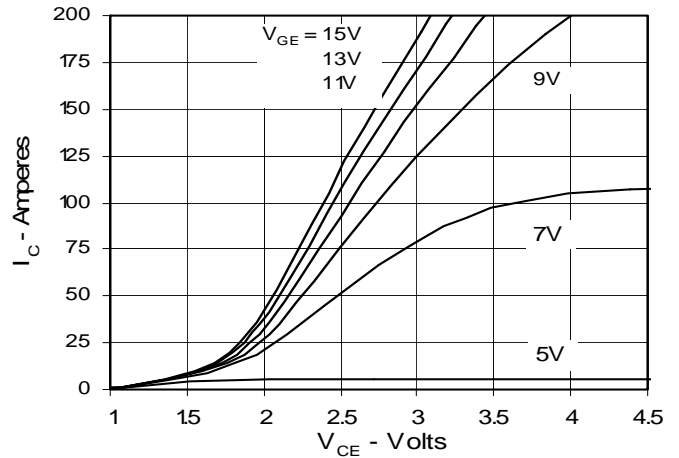


Fig. 3. Output Characteristics
@ 125 Deg. C

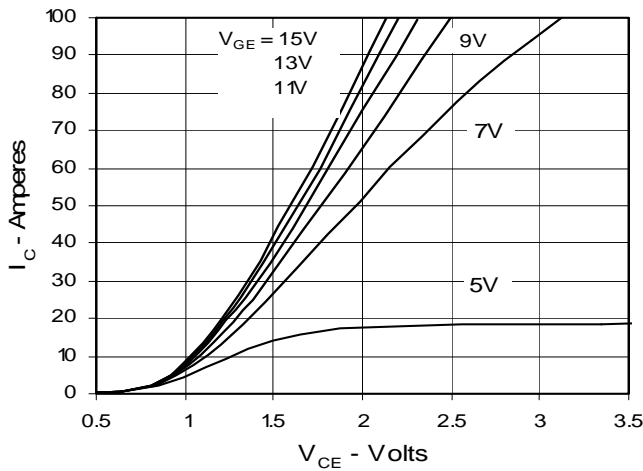


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

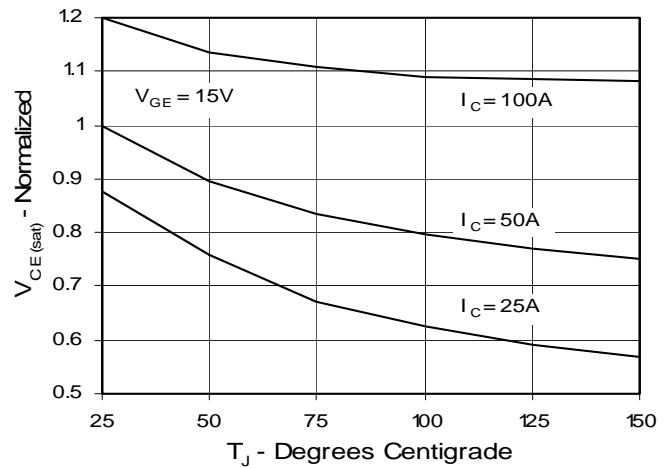


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

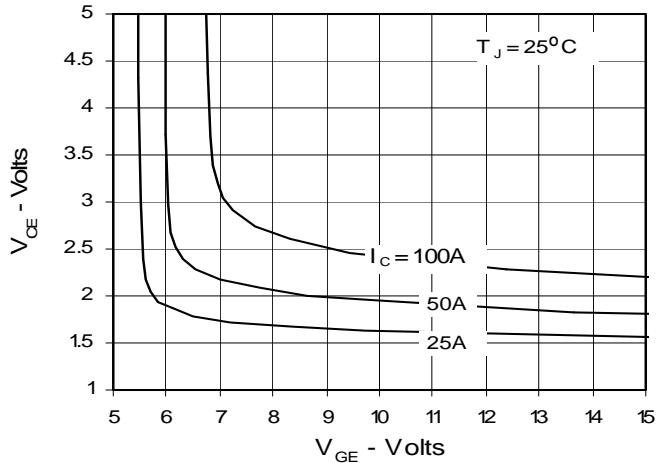


Fig. 6. Input Admittance

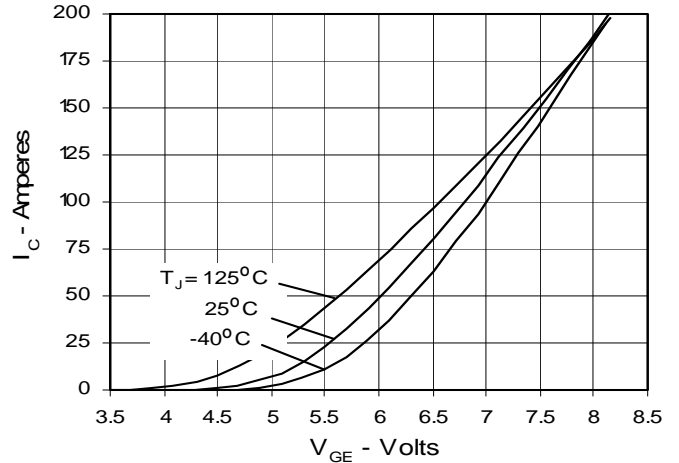


Fig. 7. Transconductance

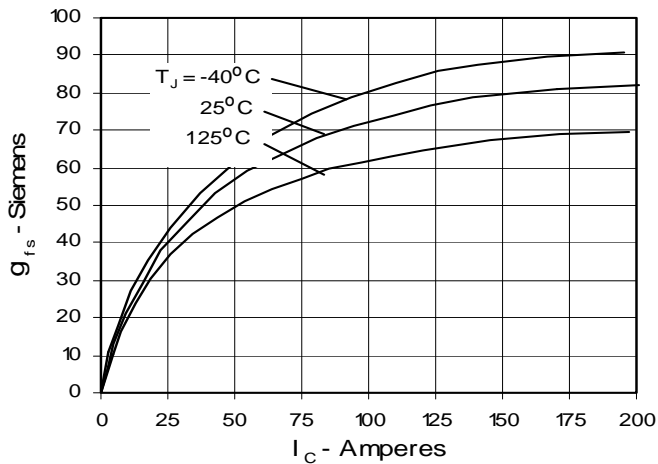


Fig. 8. Dependence of E_{off} on R_G

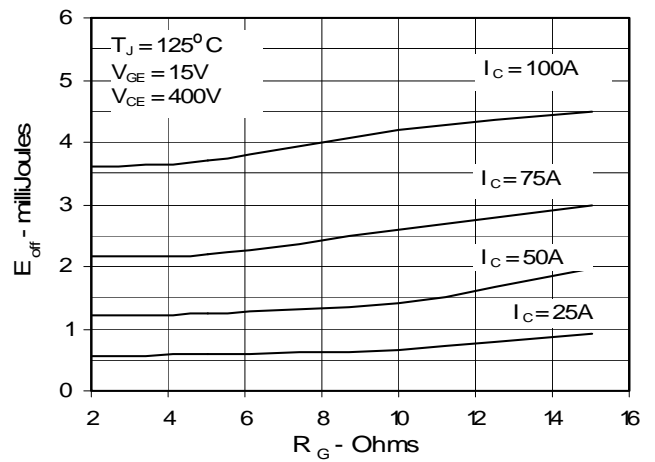


Fig. 9. Dependence of E_{off} on I_C

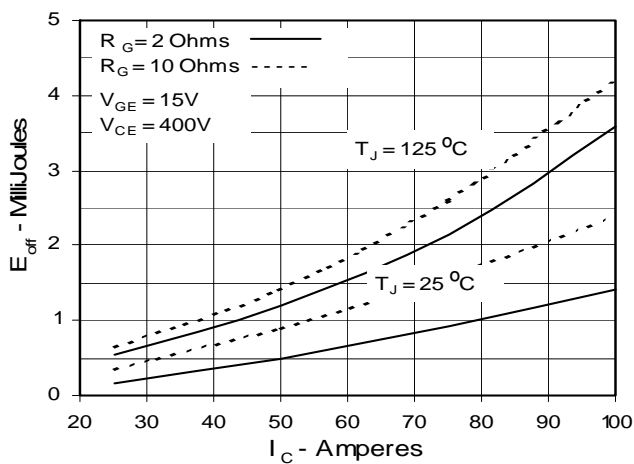


Fig. 10. Dependence of E_{off} on Temperature

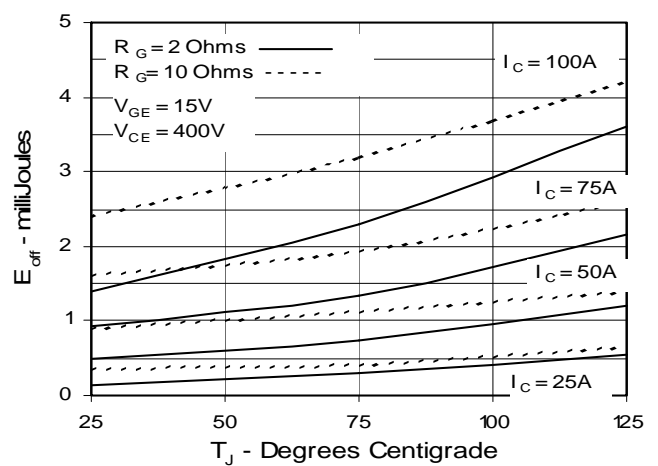


Fig. 11. Gate Charge

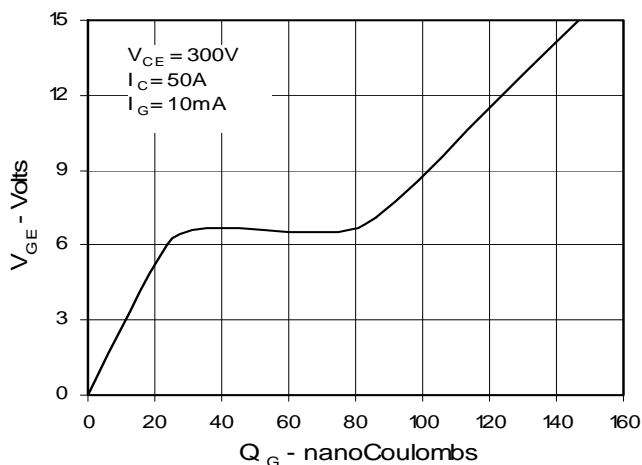
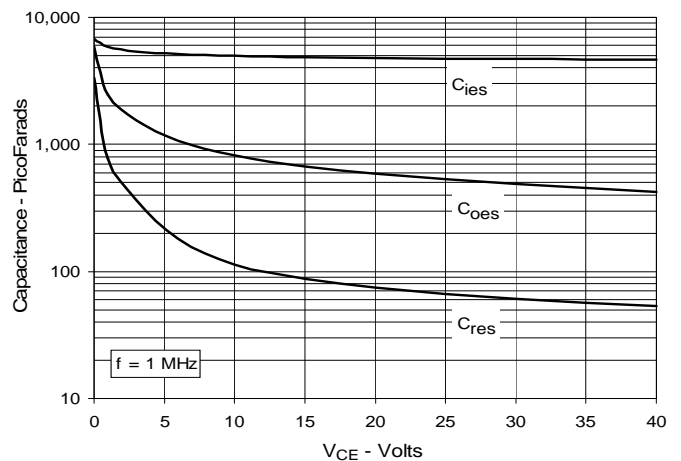


Fig. 12. Capacitance



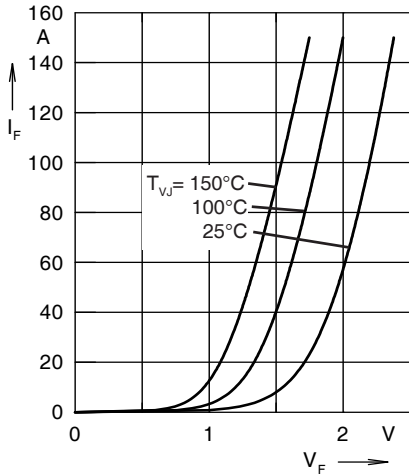


Fig. 13. Forward Current I_F Versus V_F

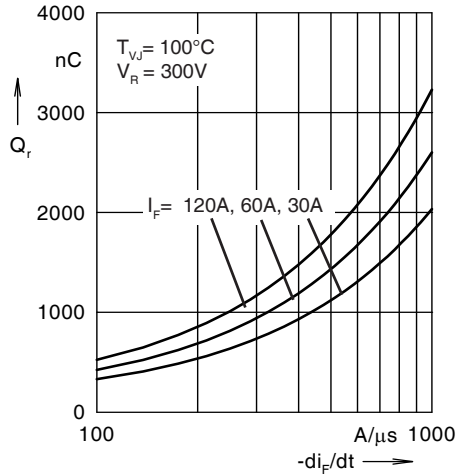


Fig. 14. Reverse Recovery Charge Q_r Versus $-di_F/dt$

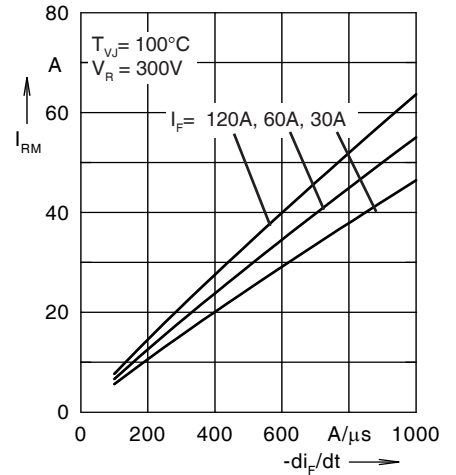


Fig. 15. Peak Reverse Current I_{RM} Versus $-di_F/dt$

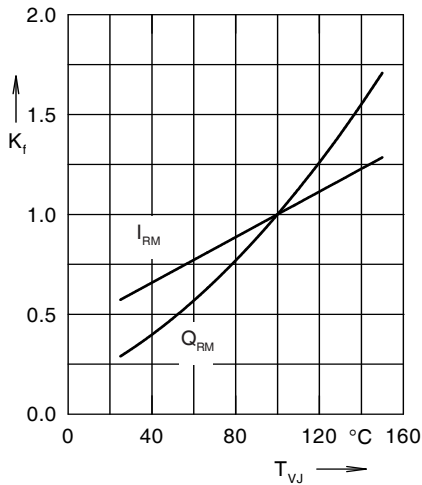


Fig. 16. Dynamic Parameters Q_r, I_{RM} Versus T_{VJ}

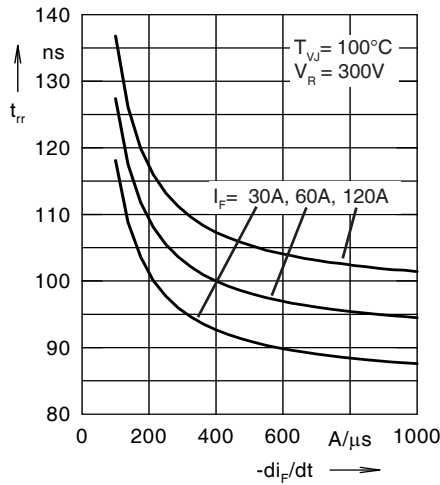


Fig. 17. Recovery Time t_{rr} Versus $-di_F/dt$

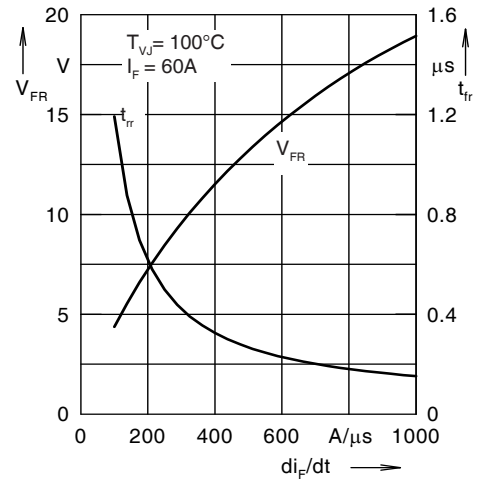


Fig. 18. Peak Forward Voltage V_{FR} and t_{rr} Versus $-di_F/dt$

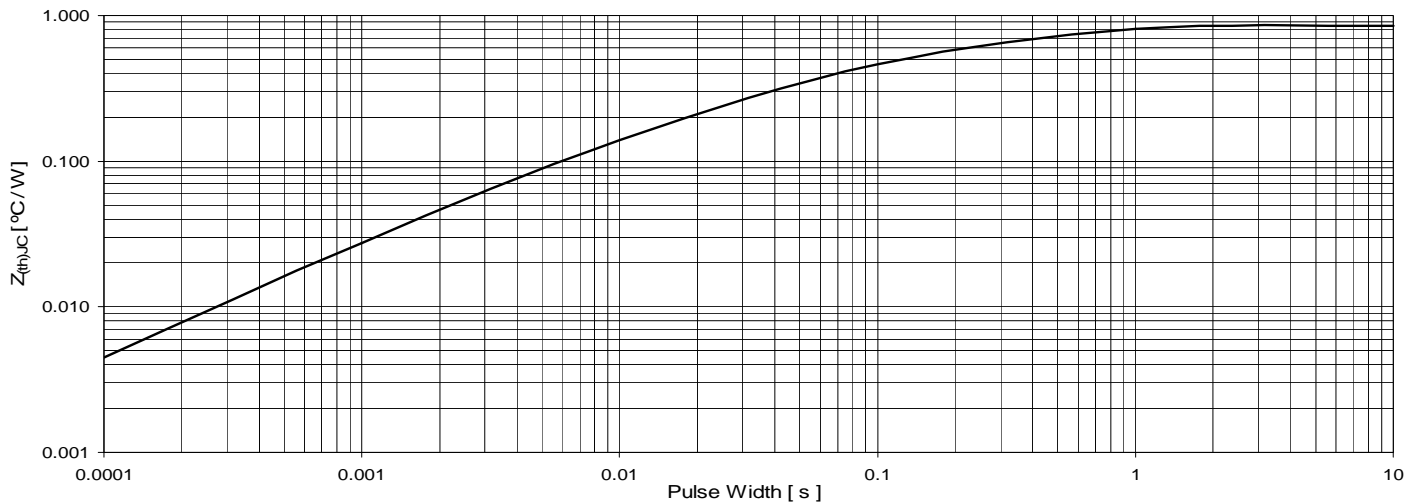


Fig. 27. Maximum Transient Thermal Impedance (for diode)