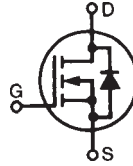




**THE DATASHEET OF  
IXFA80N25X3**



**X3-Class HiPerFET™  
Power MOSFET**
**IXFA80N25X3  
IXFP80N25X3  
IXFQ80N25X3  
IXFH80N25X3**

 N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	250	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1\text{M}\Omega$	250	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	80	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	220	A
$I_A$	$T_C = 25^\circ\text{C}$	40	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.2	J
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$	20	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	390	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
$F_C$	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb
$M_d$	Mounting Torque (TO-220, TO-247 & TO-3P)	1.13 / 10	Nm/lb.in
<b>Weight</b>	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g
	TO-247	6.0	g

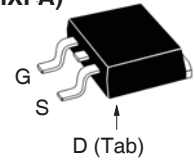
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0\text{V}$ , $I_D = 250\mu\text{A}$	250		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1.5\text{mA}$	2.5		V
$I_{GSS}$	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0\text{V}$ $T_J = 125^\circ\text{C}$			5 $\mu\text{A}$
				350 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	13	16	m $\Omega$

$$V_{DSS} = 250\text{V}$$

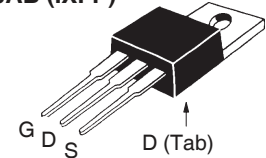
$$I_{D25} = 80\text{A}$$

$$R_{DS(on)} \leq 16\text{m}\Omega$$

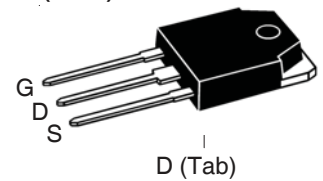
TO-263 AA (IXFA)



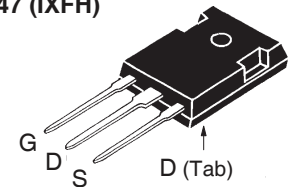
TO-220AB (IXFP)



TO-3P (IXFQ)



TO-247 (IXFH)


 G = Gate      D = Drain  
S = Source    Tab = Drain

**Features**

- International Standard Packages
- Low  $R_{DS(ON)}$  and  $Q_G$
- Avalanche Rated
- Low Package Inductance

**Advantages**

- High Power Density
- Easy to Mount
- Space Savings

**Applications**

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$g_{fs}$	$V_{DS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	38	64	S
$R_{Gi}$	Gate Input Resistance		1.6	$\Omega$
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		5430	pF
$C_{oss}$			890	pF
$C_{rss}$			1.6	pF
<b>Effective Output Capacitance</b>				
$C_{o(er)}$	Energy related	$V_{GS} = 0\text{V}$ $V_{DS} = 0.8 \cdot V_{DSS}$	320	pF
$C_{o(tr)}$	Time related		1410	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 5\Omega$ (External)		30	ns
$t_r$			17	ns
$t_{d(off)}$			65	ns
$t_f$			8	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		83	nC
$Q_{gs}$			27	nC
$Q_{gd}$			24	nC
$R_{thJC}$	TO-220 TO-247& TO-3P			0.32 $^\circ\text{C/W}$
$R_{thCS}$			0.50 0.25	$^\circ\text{C/W}$ $^\circ\text{C/W}$

#### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$I_S$	$V_{GS} = 0\text{V}$			80 A
$I_{SM}$	Repetitive, pulse Width Limited by $T_{JM}$			320 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	$I_F = 40\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		105	ns
$Q_{RM}$			760	nC
$I_{RM}$			14.5	A

Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

#### PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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	6,404,065B1	6,683,344	6,727,585	7,005,734B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343	6,710,405B2	6,759,692	7,063,975B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	

Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

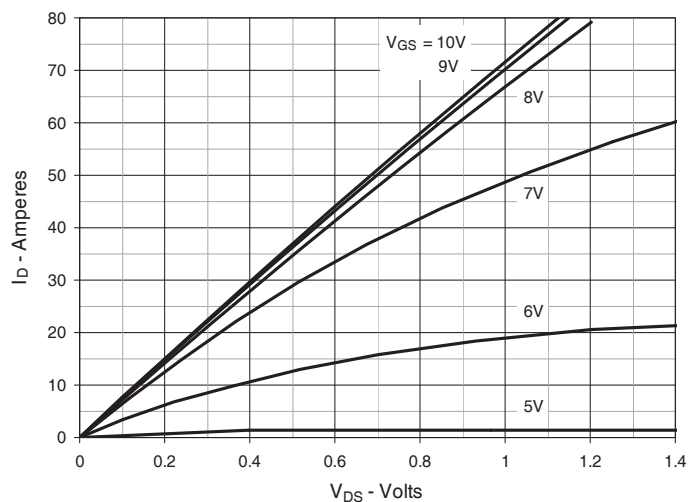


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

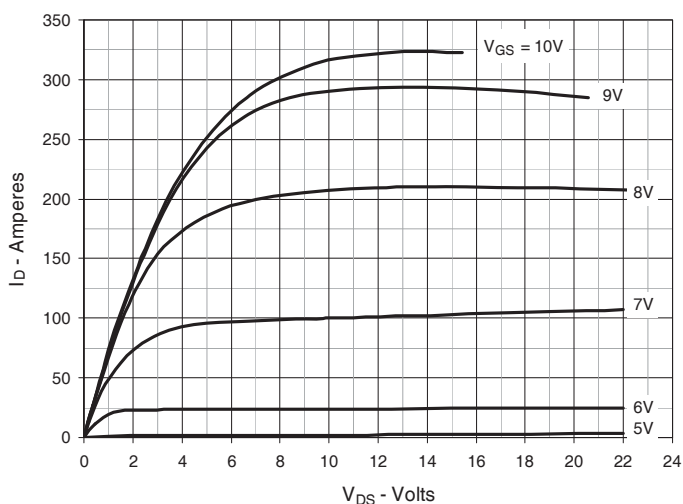


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

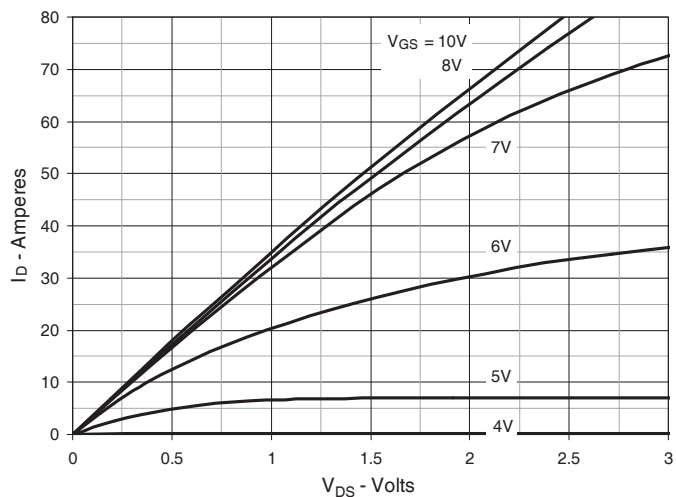


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Junction Temperature

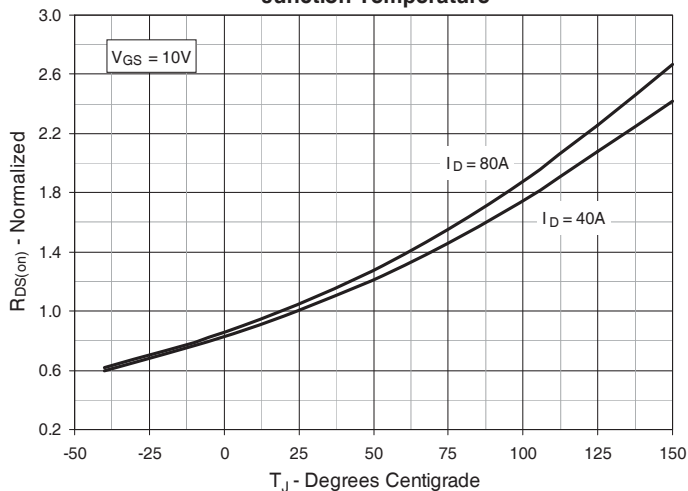


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Drain Current

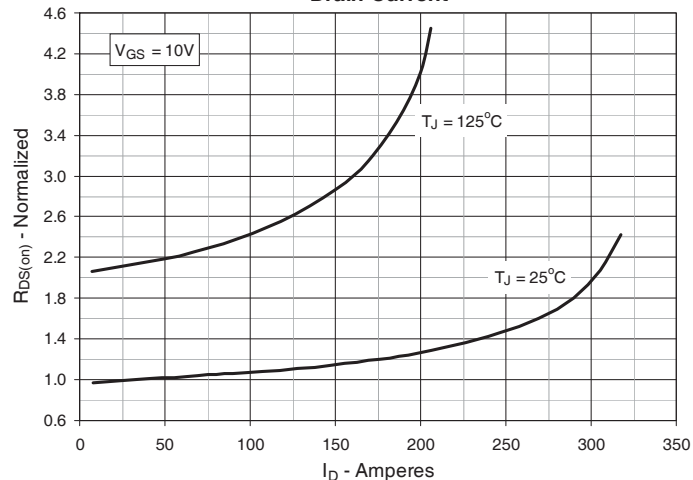


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

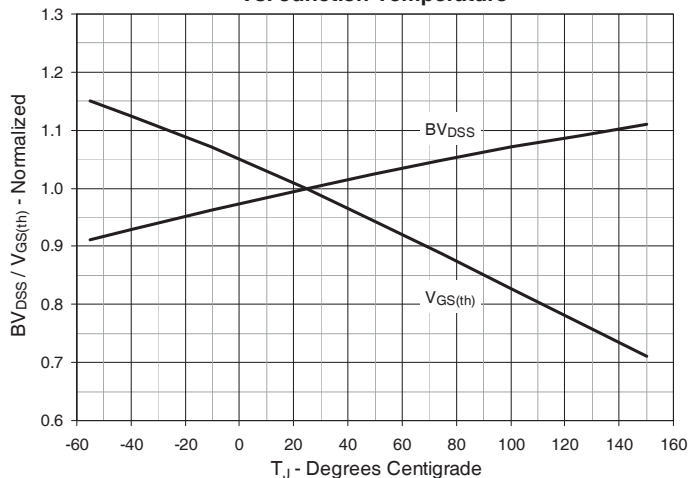


Fig. 7. Maximum Drain Current vs. Case Temperature

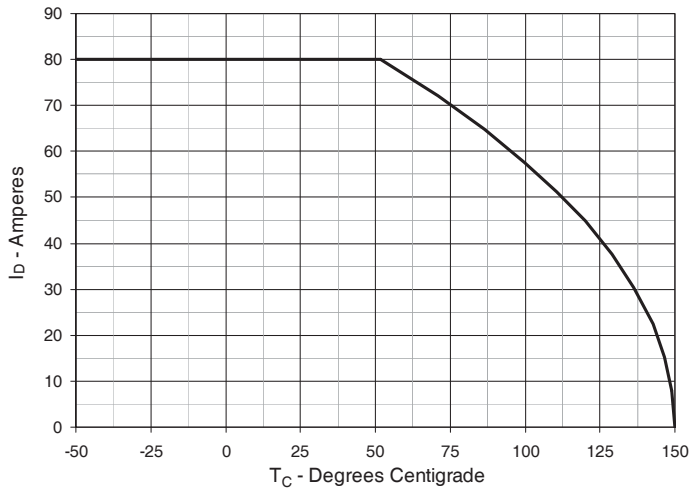


Fig. 8. Input Admittance

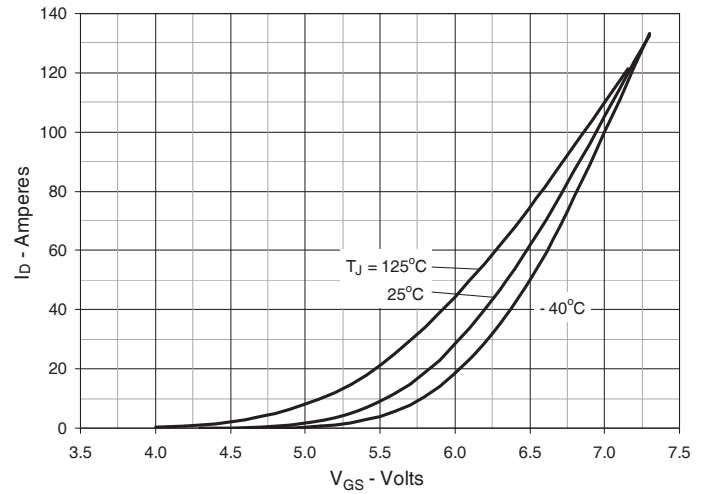


Fig. 9. Transconductance

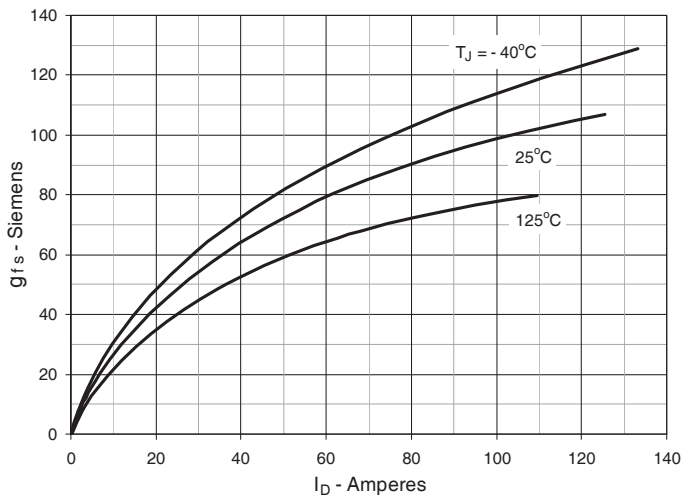


Fig. 10. Forward Voltage Drop of Intrinsic Diode

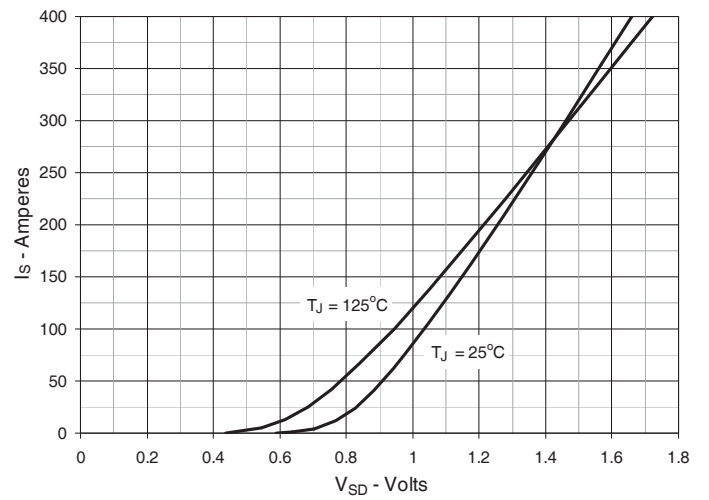


Fig. 11. Gate Charge

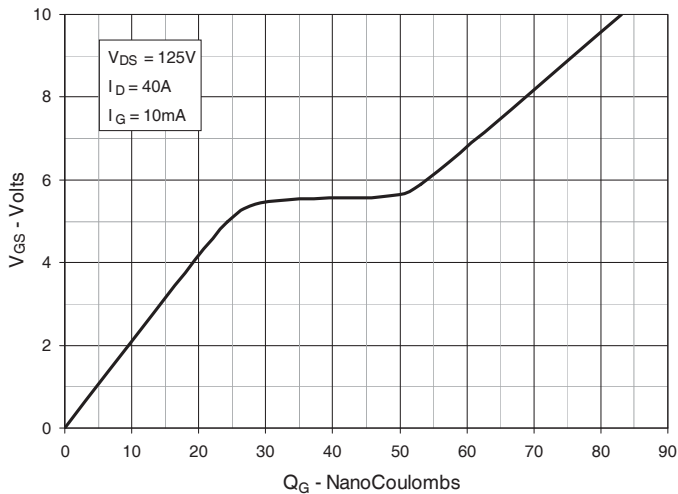


Fig. 12. Capacitance

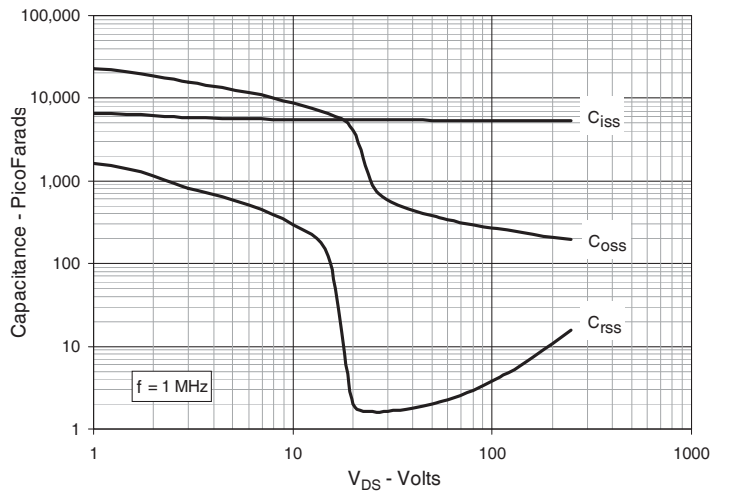


Fig. 13. Output Capacitance Stored Energy

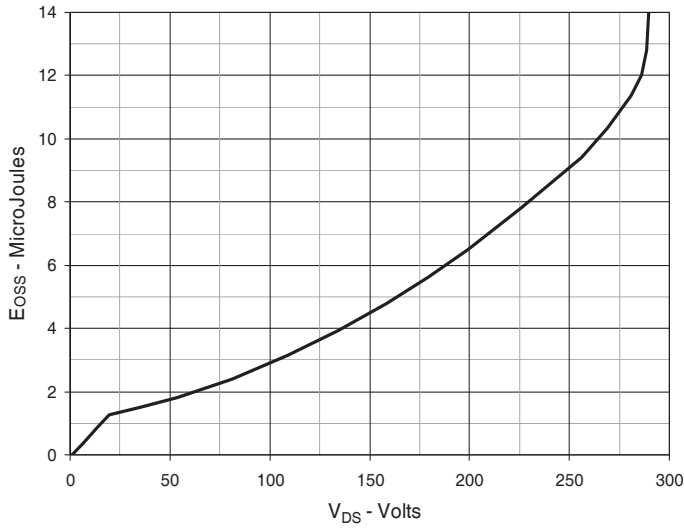


Fig. 14. Forward-Bias Safe Operating Area

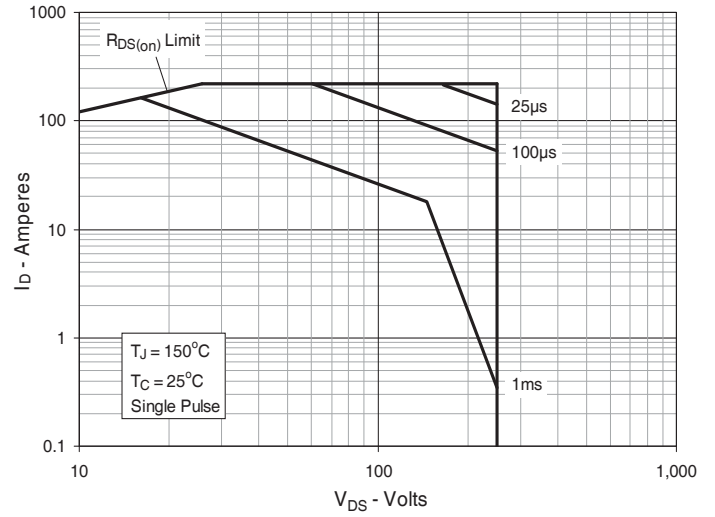
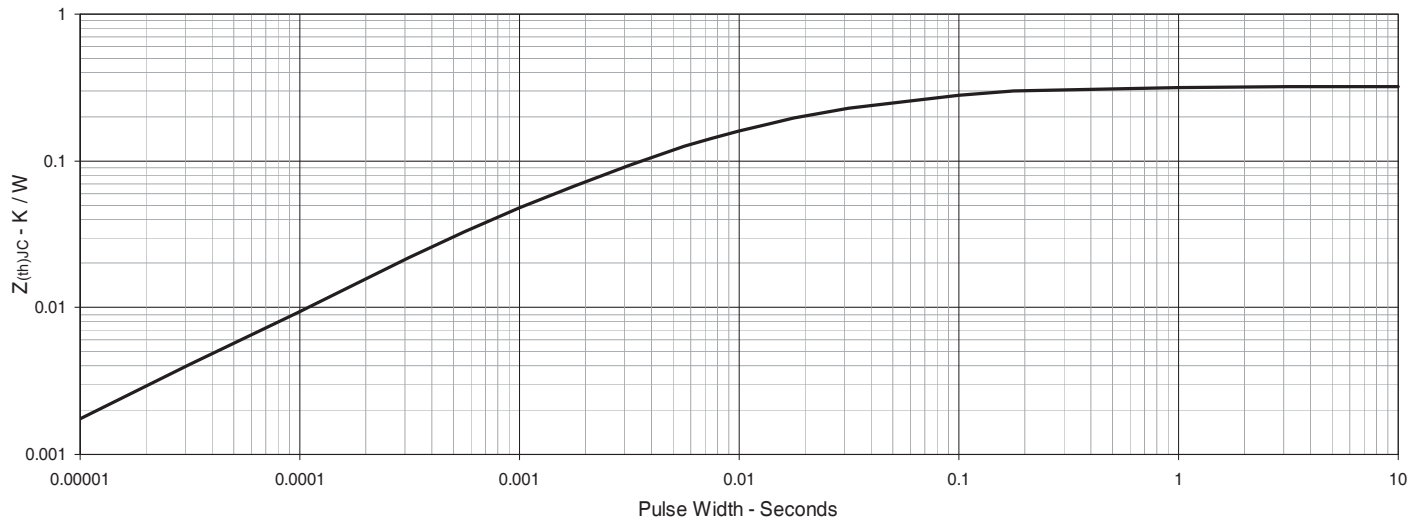


Fig. 15. Maximum Transient Thermal Impedance





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