

X3-Class HiPerFET™ Power MOSFET

IXFP80N25X3
IXFQ80N25X3
IXFH80N25X3

$V_{DSS} = 250V$
 $I_{D25} = 80A$
 $R_{DS(on)} \leq 16m\Omega$

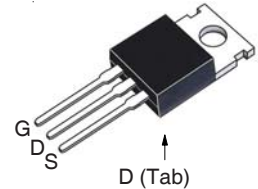
N-Channel Enhancement Mode
Avalanche Rated



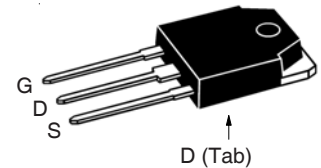
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ C$ to $150^\circ C$	250	V
V_{DGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$	250	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ C$	80	A
I_{DM}	$T_C = 25^\circ C$, Pulse Width Limited by T_{JM}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

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu A$	250		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 1.5mA$	2.5		4.5 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$			5 μA 350 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1	13	16	m Ω

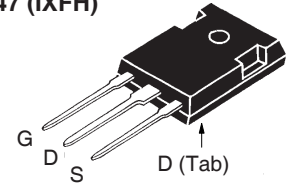
TO-220 (IXFP)



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	Ω
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
Effective Output Capacitance				
$C_{o(er)}$	Energy related	$V_{GS} = 0\text{V}$ $V_{DS} = 0.8 \cdot V_{DSS}$	320	pF
$C_{o(tr)}$	Time related		1410	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 5\Omega$ (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}	$I_F = 40\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		120	ns
Q_{RM}			600	nC
I_{RM}			10	A

Note 1. Pulse test, $t \leq 300\mu\text{s}$, 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	6,404,065B1	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 @ $T_J = 25^\circ\text{C}$

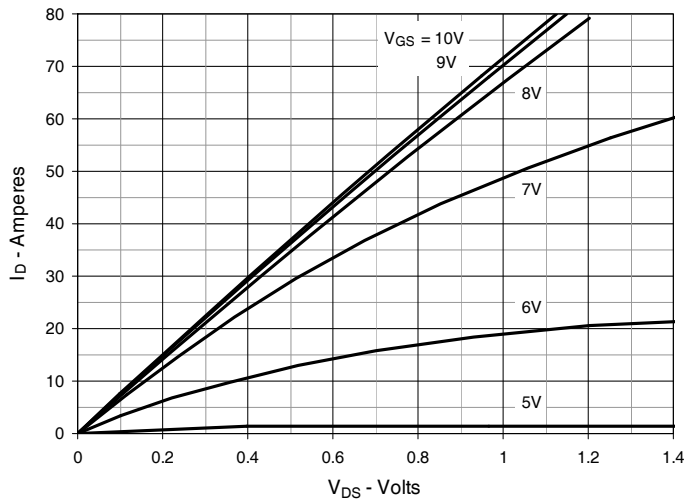


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

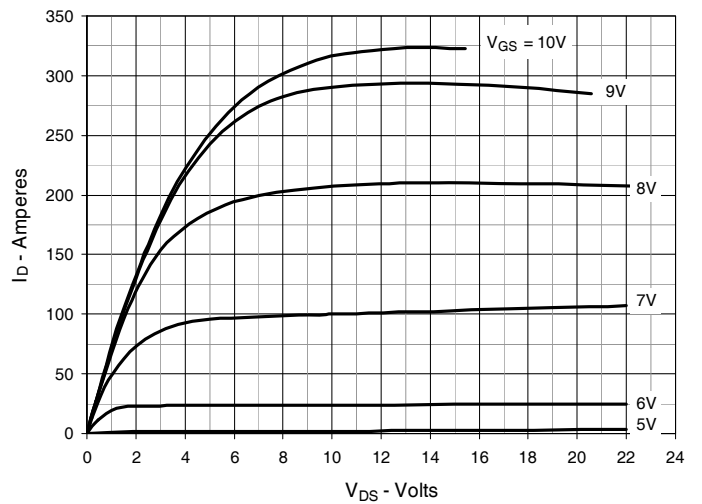


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

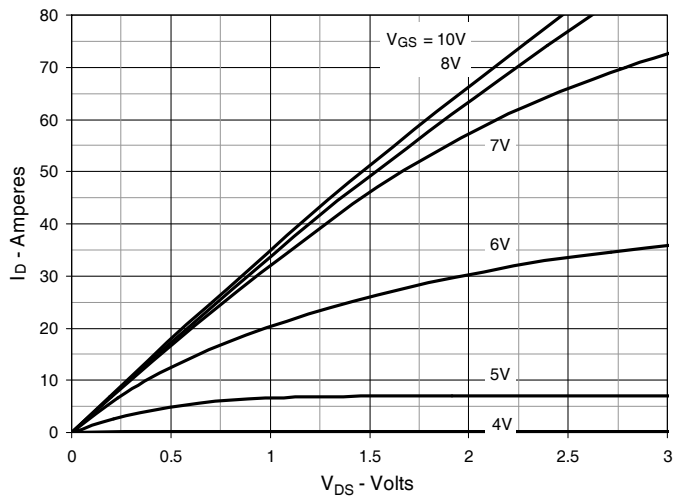


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 40\text{A}$ Value vs. Junction Temperature

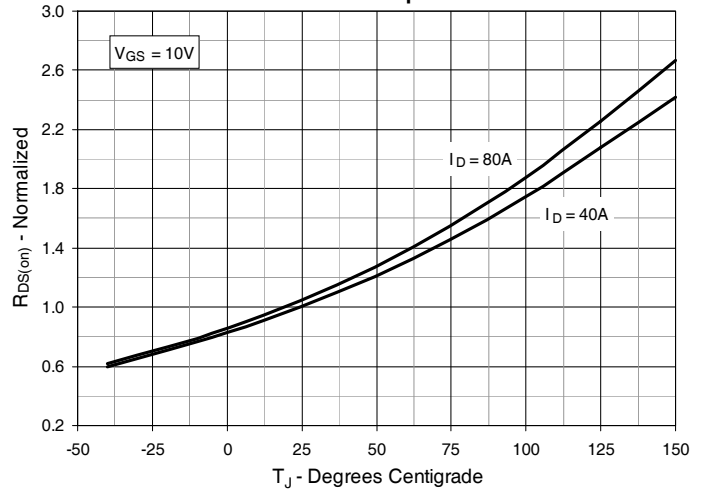


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 40\text{A}$ Value vs. Drain Current

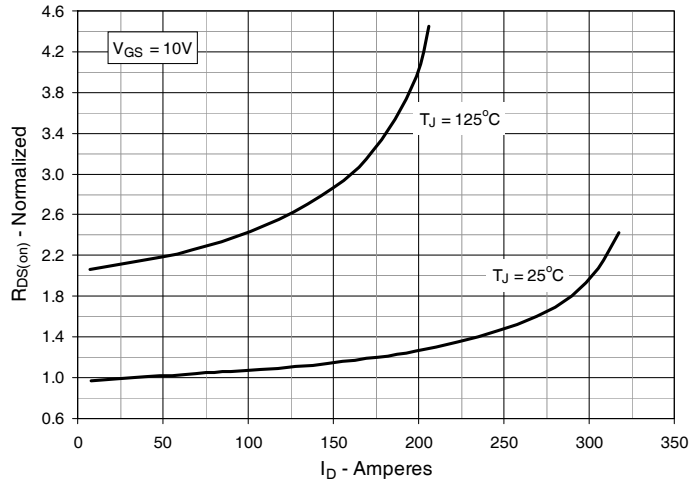


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

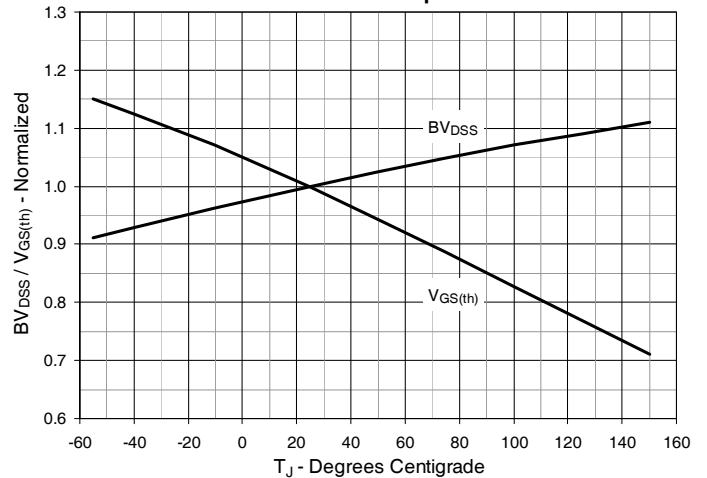


Fig. 7. Maximum Drain Current vs. Case Temperature

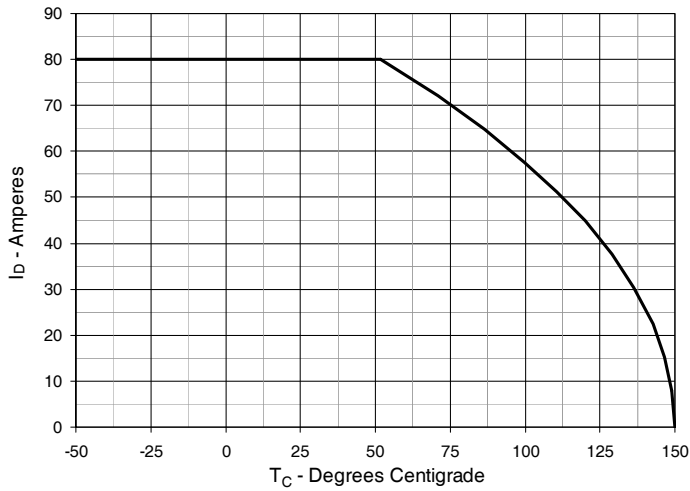


Fig. 8. Input Admittance

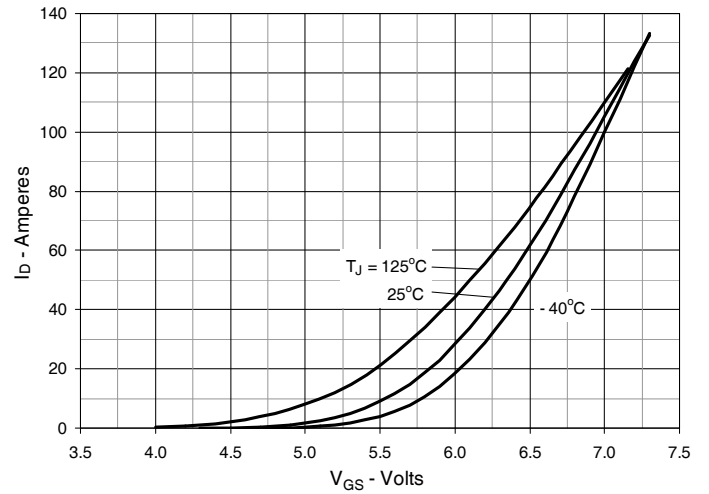


Fig. 9. Transconductance

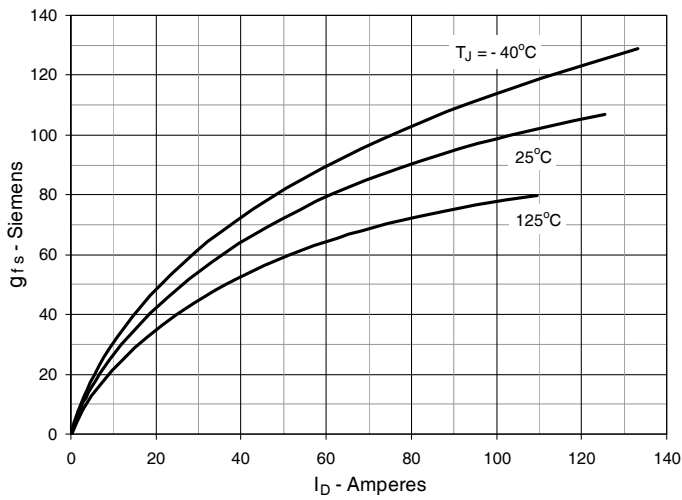


Fig. 10. Forward Voltage Drop of Intrinsic Diode

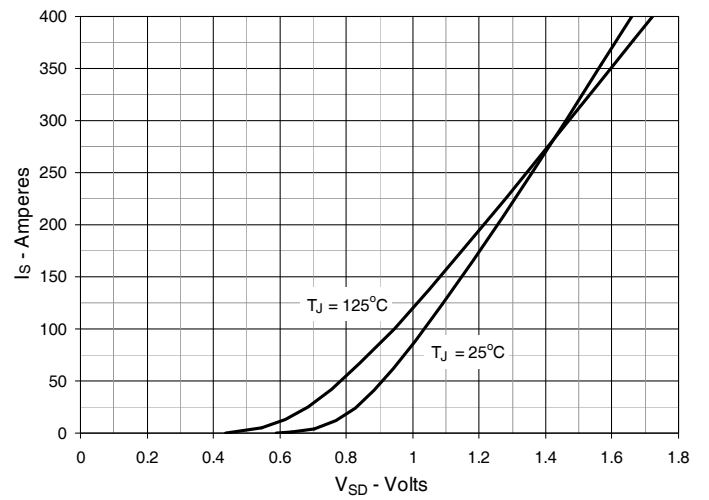


Fig. 11. Gate Charge

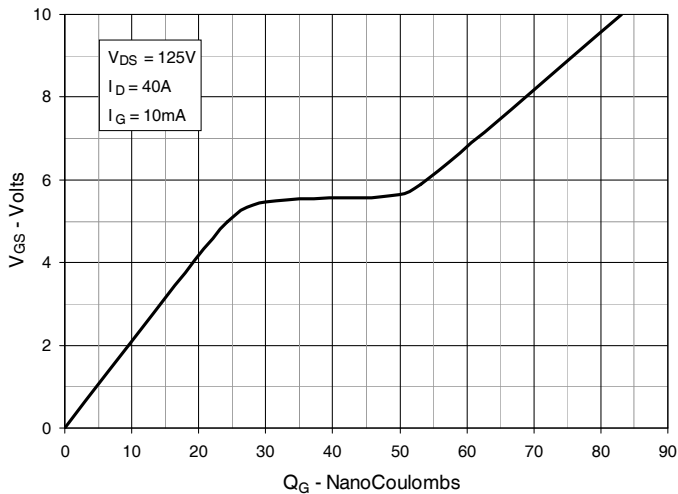


Fig. 12. Capacitance

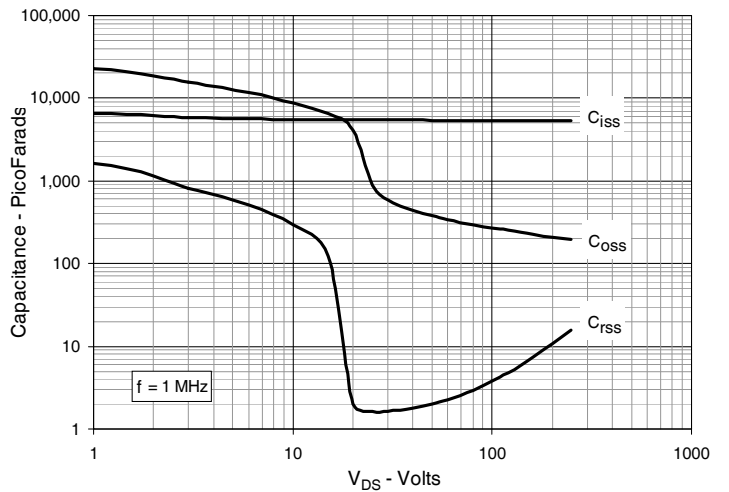


Fig. 13. Output Capacitance Stored Energy

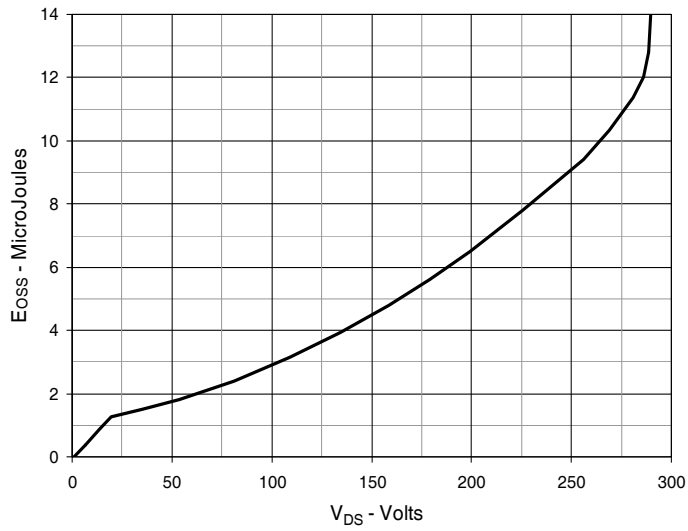


Fig. 14. Forward-Bias Safe Operating Area

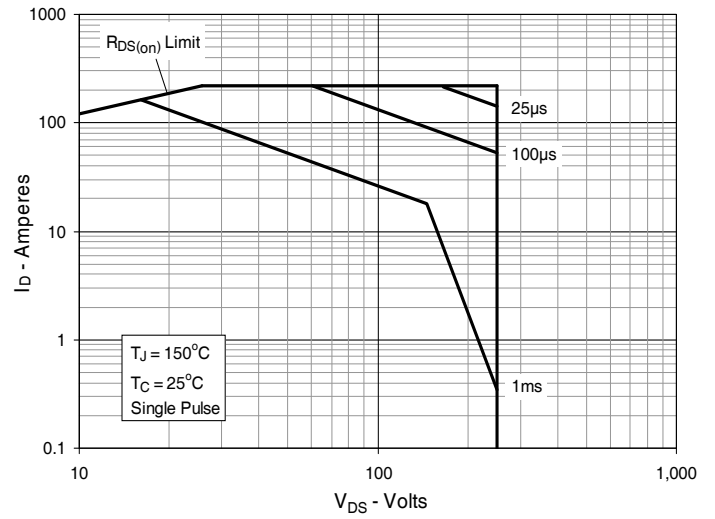
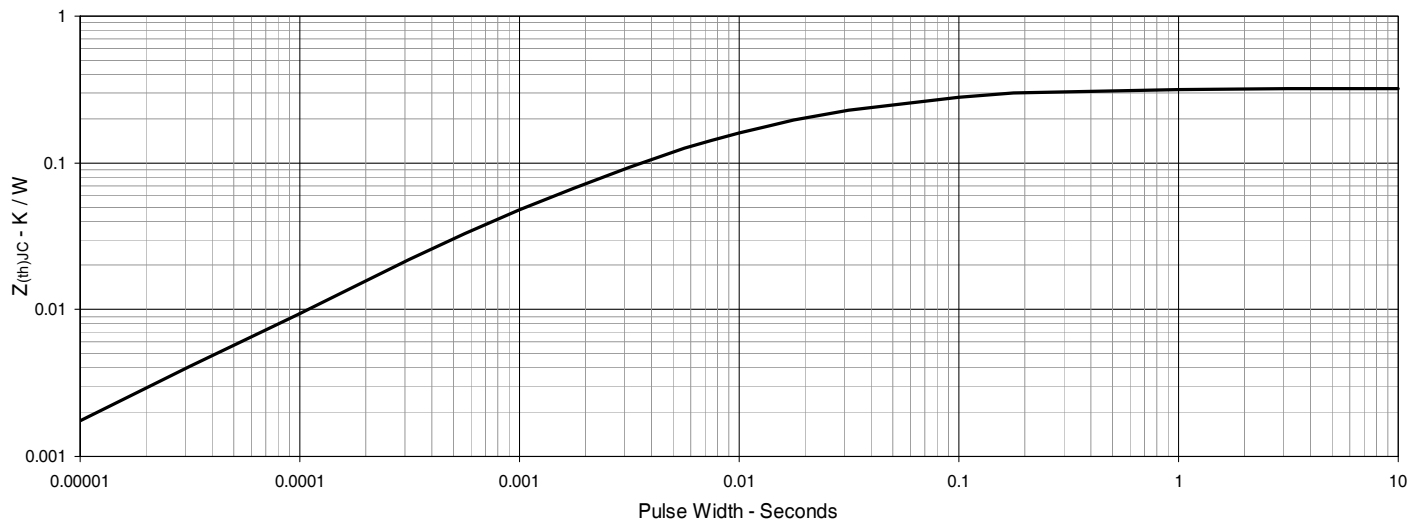
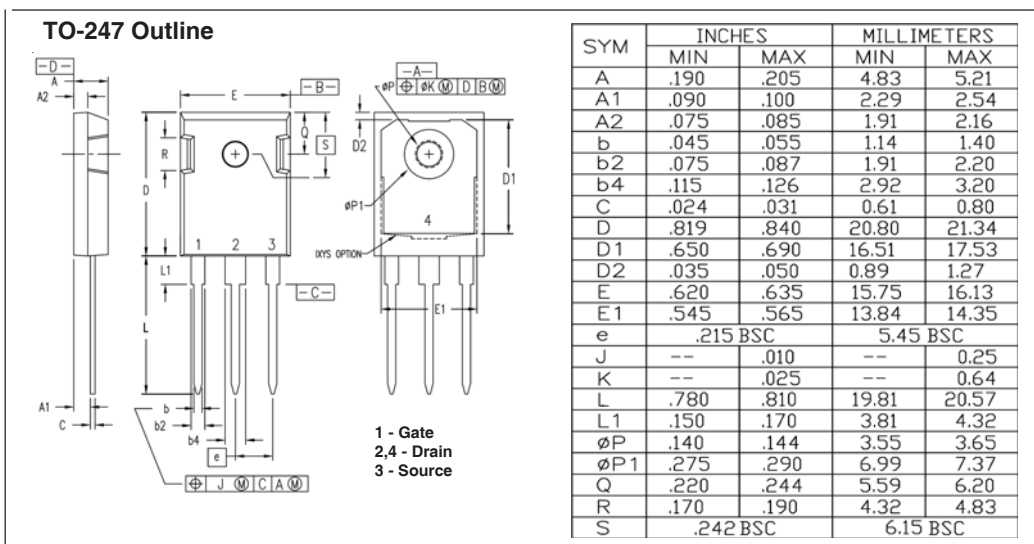
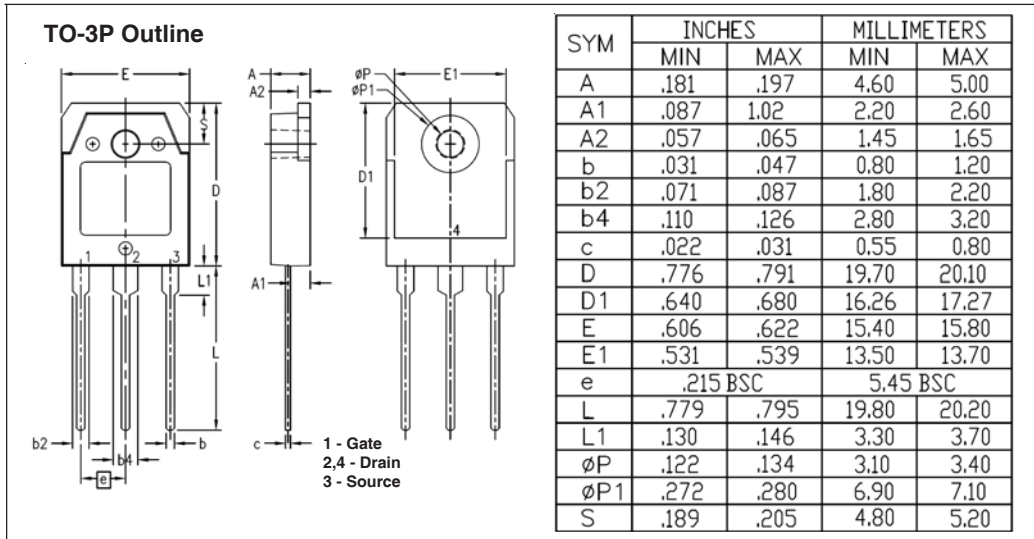
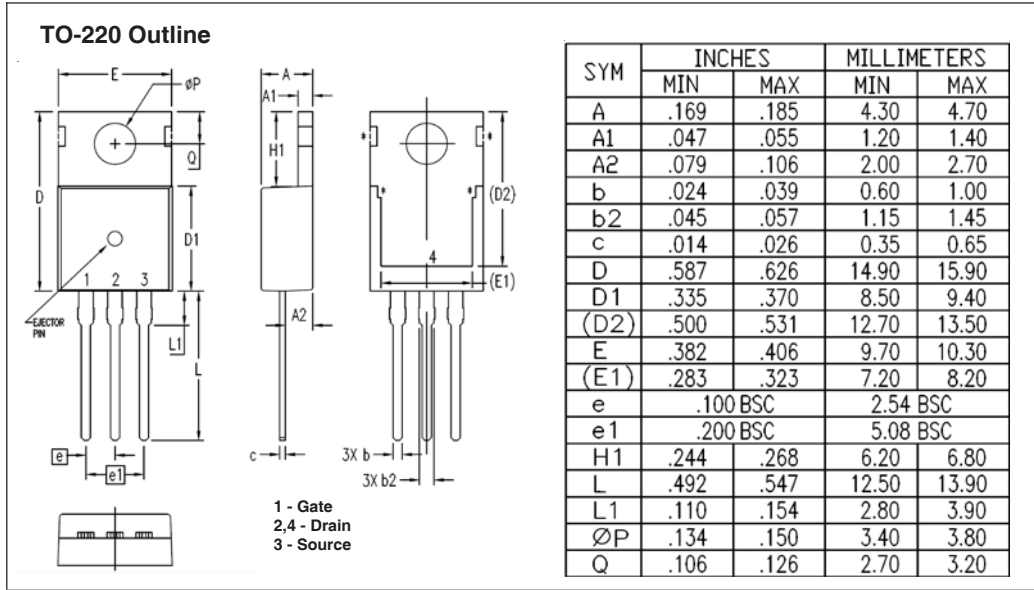


Fig. 15. Maximum Transient Thermal Impedance







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