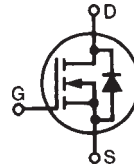


# PolarHV™ HiPerFET Power MOSFET

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

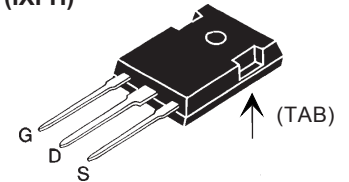
IXFH 20N80P  
IXFT 20N80P  
IXFV 20N80P  
IXFV 20N80PS



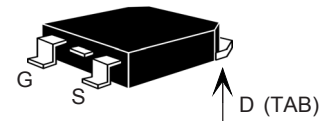
$V_{DSS} = 800 \text{ V}$   
 $I_{D25} = 20 \text{ A}$   
 $R_{DS(on)} \leq 520 \text{ m}\Omega$   
 $t_{rr} \leq 250 \text{ ns}$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	800	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	20	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	50	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	10	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.0	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 4 \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	500	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	$^\circ\text{C}$
$T_{SOLD}$	Plastic case for 10 s	260	$^\circ\text{C}$
$M_d$	Mounting torque (TO-247)	1.13/10 Nm/lb.in.	
$F_C$	Mounting force (PLUS220)	1.65 / 2.5..15	N/lb
Weight	TO-247	6	g
	TO-268	5.5	g
	PLUS220 types	4	g

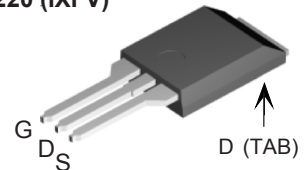
TO-247 (IXFH)



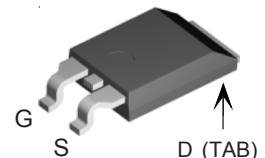
TO-268 (IXFT)



PLUS220 (IXFV)



PLUS220 SMD (IXFV..S)



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

## Features

- <sup>1</sup> International standard packages
- <sup>1</sup> Fast recovery diode
- <sup>1</sup> Unclamped Inductive Switching (UIS) rated
- <sup>1</sup> Low package inductance  
- easy to drive and to protect

## Advantages

- <sup>1</sup> Easy to mount
- <sup>1</sup> Space savings
- <sup>1</sup> High power density

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$			25 $\mu\text{A}$
	$V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			1000 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 10 \text{ A}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$			520 $\text{m}\Omega$

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C unless otherwise specified)		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20 V; I <sub>D</sub> = 10 A, pulse test	14	23	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		4685	pF
<b>C<sub>oss</sub></b>			356	pF
<b>C<sub>rss</sub></b>			26	pF
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 10 A R <sub>G</sub> = 2 Ω (External)		30	ns
<b>t<sub>r</sub></b>			24	ns
<b>t<sub>d(off)</sub></b>			85	ns
<b>t<sub>f</sub></b>			24	ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 10 A		86	nC
<b>Q<sub>gs</sub></b>			27	nC
<b>Q<sub>gd</sub></b>			24	nC
<b>R<sub>thJC</sub></b>	(TO-247, PLUS220)		0.25	°CW
<b>R<sub>thCS</sub></b>			0.21	°CW

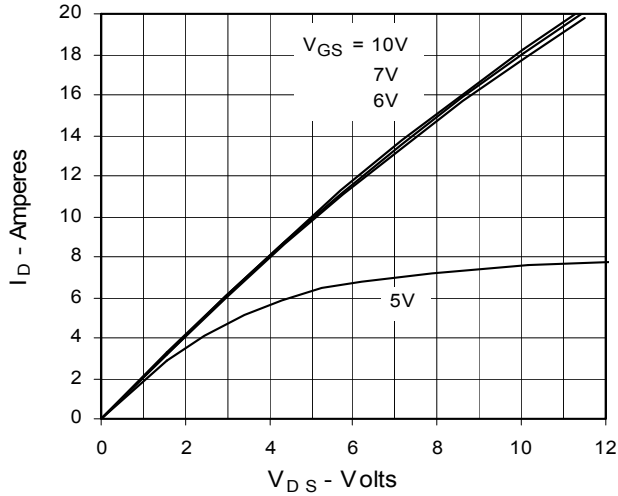
**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C unless otherwise specified)		
		Min.	Typ.	Max.
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V			20 A
<b>I<sub>SM</sub></b>	Repetitive			50 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 25A, -di/dt = 100 A/μs V <sub>R</sub> = 100V; V <sub>GS</sub> = 0 V			250 ns
<b>Q<sub>RM</sub></b>			0.8	μC
<b>I<sub>RM</sub></b>			6.0	A

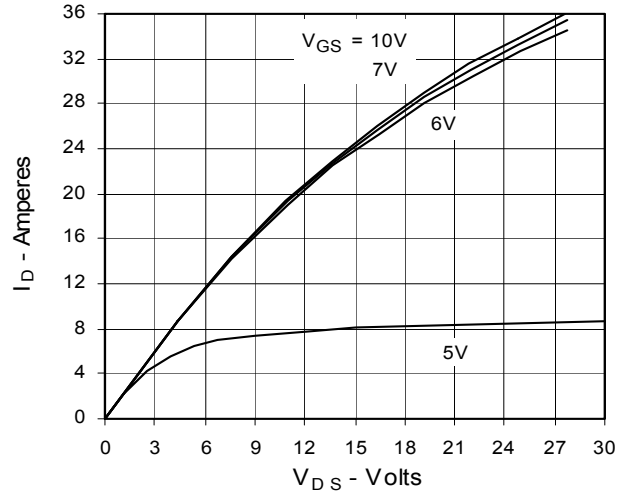
IXYS reserves the right to change limits, test conditions, and dimensions.

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
	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
	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

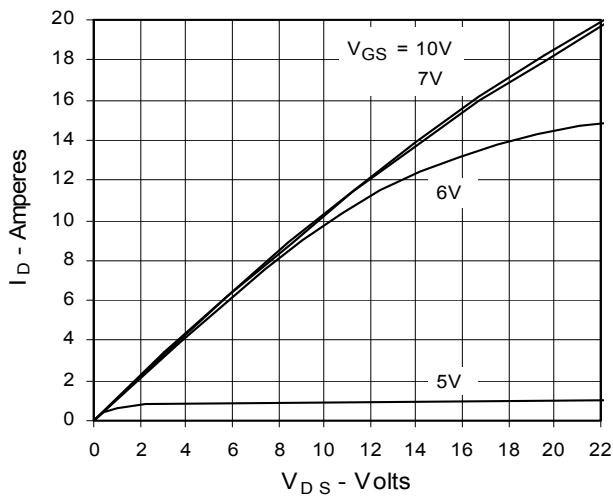
**Fig. 1. Output Characteristics**  
@ 25°C



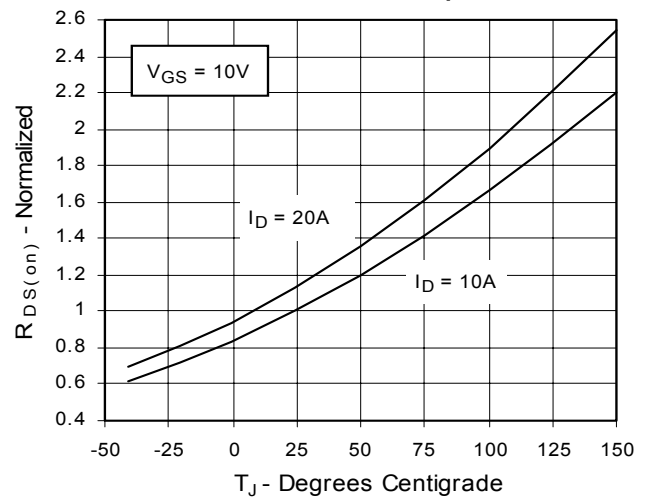
**Fig. 2. Extended Output Characteristics**  
@ 25°C



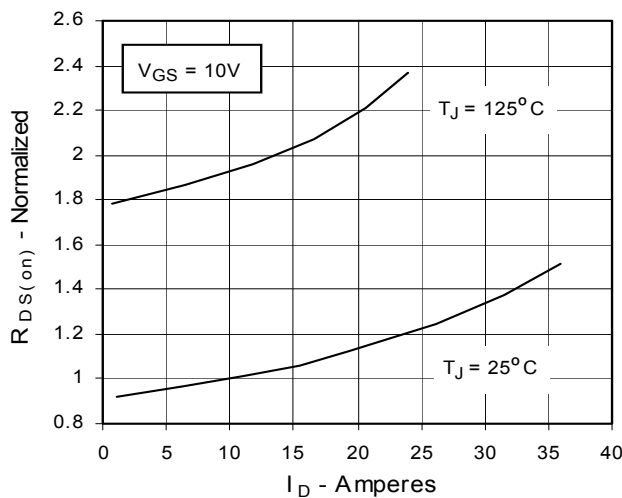
**Fig. 3. Output Characteristics**  
@ 125°C



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 10A$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 10A$  Value vs. Drain Current**



**Fig. 6. Drain Current vs. Case Temperature**

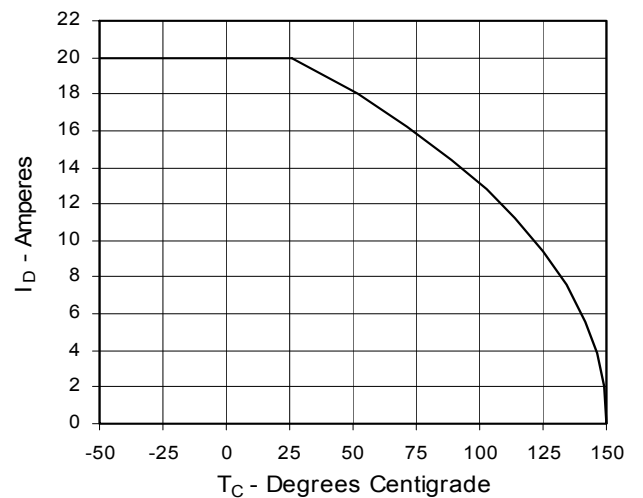


Fig. 7. Input Admittance

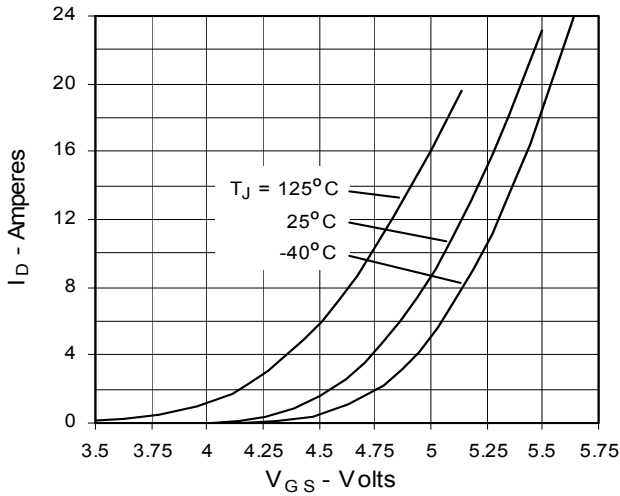


Fig. 8. Transconductance

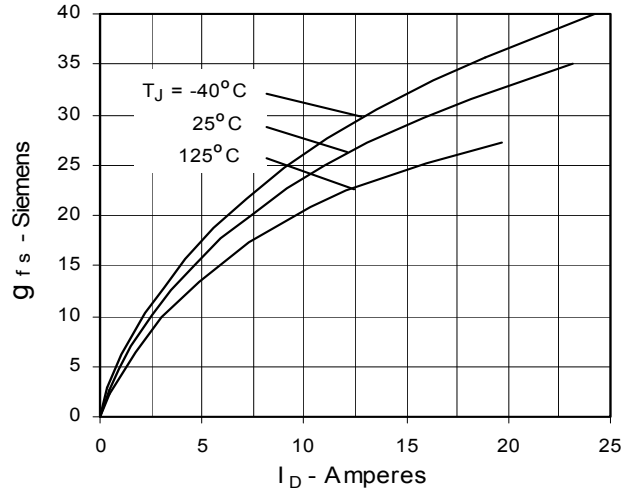


Fig. 9. Source Current vs. Source-To-Drain Voltage

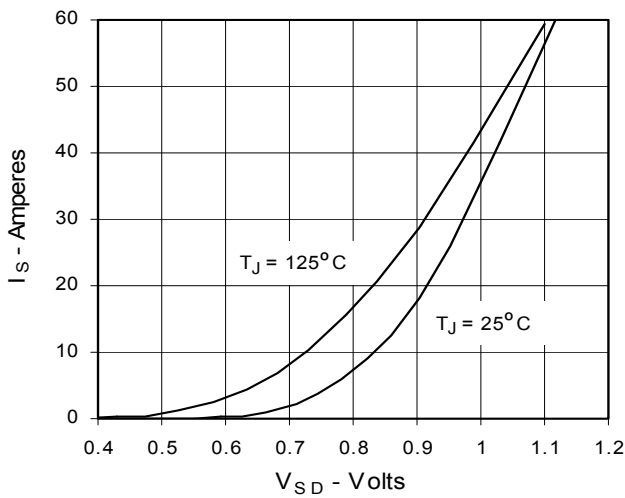


Fig. 10. Gate Charge

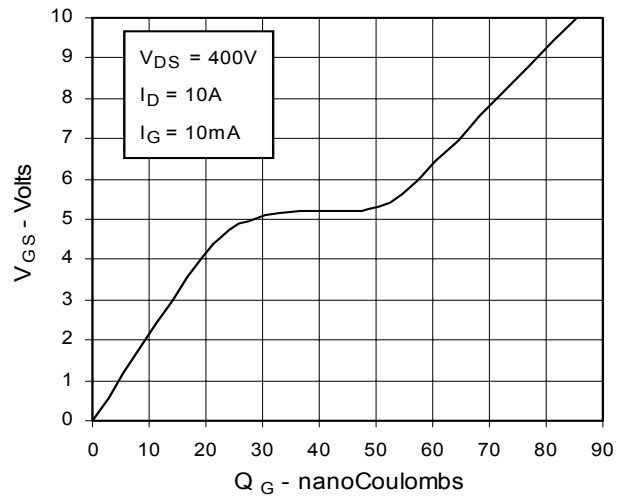


Fig. 11. Capacitance

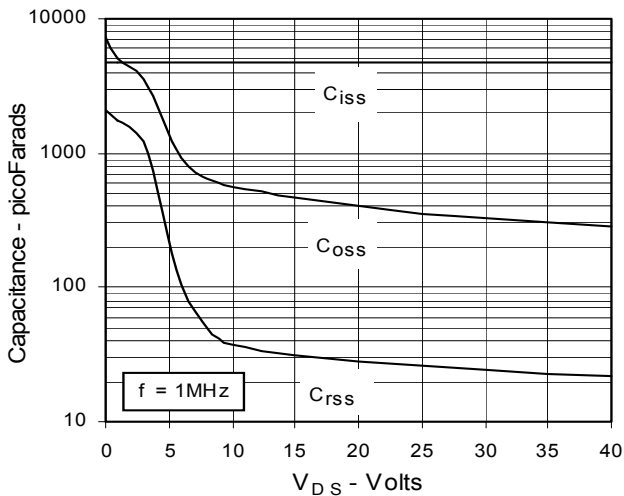
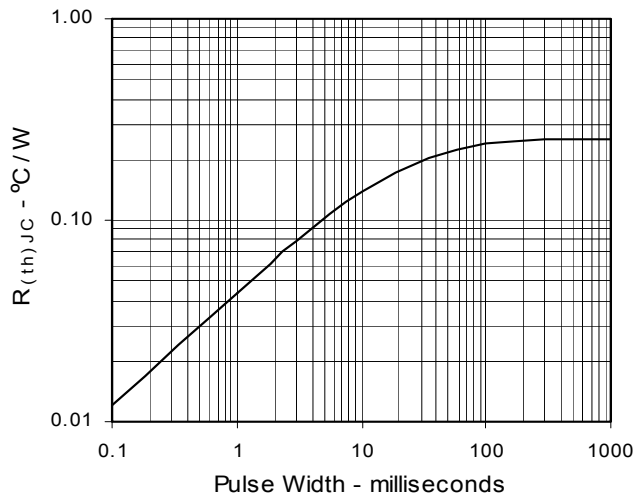
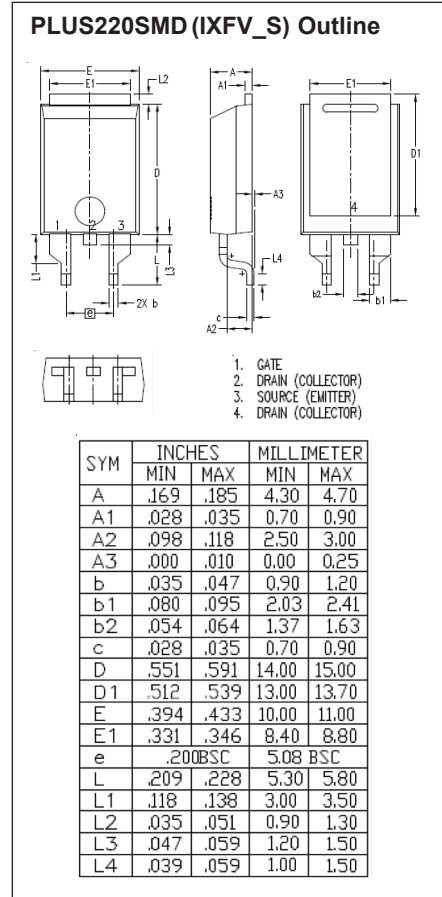
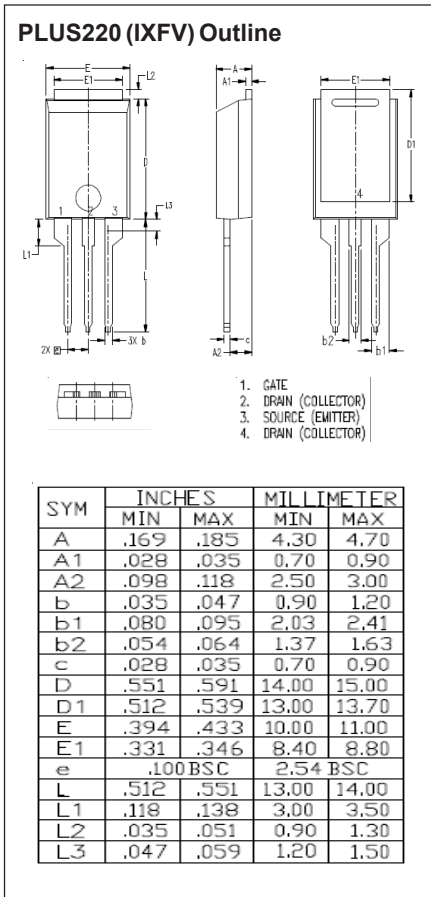
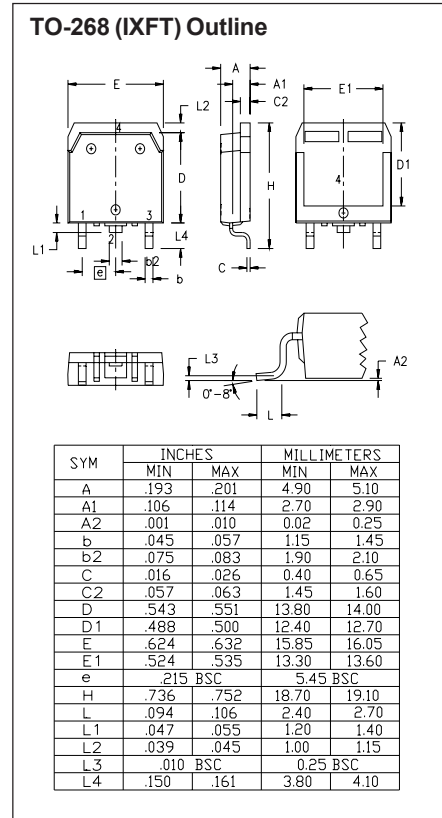
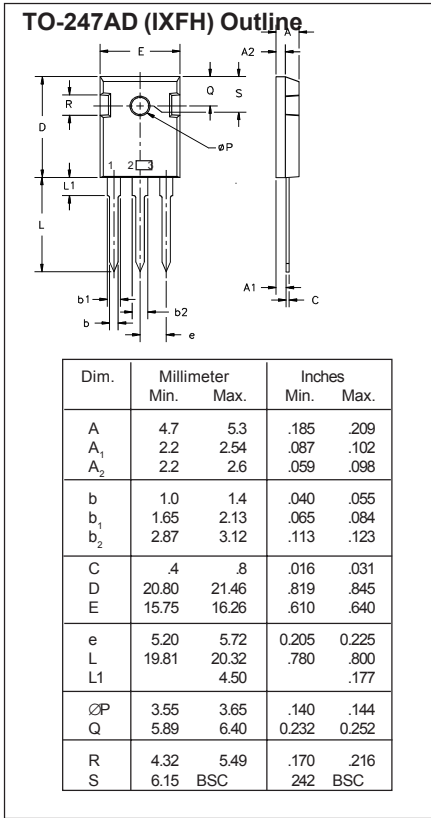


Fig. 12. Maximum Transient Thermal Resistance



**Package Outline Drawings**





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