

IXFH12N80P Datasheet



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DiGi Electronics Part Number	IXFH12N80P-DG
Manufacturer	IXYS
Manufacturer Product Number	IXFH12N80P
Description	MOSFET N-CH 800V 12A TO247AD
Detailed Description	N-Channel 800 V 12A (Tc) 360W (Tc) Through Hole TO-247AD (IXFH)



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Purchase and inquiry

Manufacturer Product Number:

IXFH12N80P

Series:

HiPerFET™, Polar

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

800 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

5.5V @ 2.5mA

Vgs (Max):

±30V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

TO-247AD (IXFH)

Base Product Number:

IXFH12

Manufacturer:

IXYS

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

12A (Tc)

Rds On (Max) @ Id, Vgs:

850mOhm @ 500mA, 10V

Gate Charge (Qg) (Max) @ Vgs:

51 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

2800 pF @ 25 V

Power Dissipation (Max):

360W (Tc)

Mounting Type:

Through Hole

Package / Case:

TO-247-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

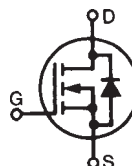


PolarHV™ HiPerFET Power MOSFET

IXFH12N80P
IXFQ12N80P
IXFV12N80P
IXFV12N80PS

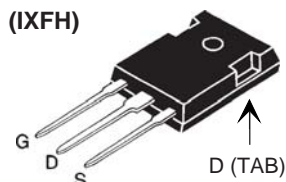
$$\begin{aligned} V_{DSS} &= 800 \text{ V} \\ I_{D25} &= 12 \text{ A} \\ R_{DS(on)} &\leq 0.85 \text{ } \Omega \\ t_{rr} &\leq 250 \text{ ns} \end{aligned}$$

N-Channel Enhancement Mode

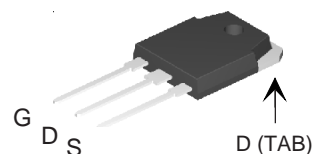


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	800	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$	800	V
V_{GS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	12	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	36	A
I_{AR}	$T_C = 25^\circ\text{C}$	6	A
E_{AR}	$T_C = 25^\circ\text{C}$	30	mJ
E_{AS}	$T_C = 25^\circ\text{C}$	0.8	J
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 5 \text{ } \Omega$	10	V/ns
P_D	$T_C = 25^\circ\text{C}$	360	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
T_{SOLD}	Plastic body for 10 s	260	$^\circ\text{C}$
M_d	Mounting torque (TO-247, TO-3P)	1.13/10	Nm/lb.in.
F_C	Mounting force (PLUS220, PLUS220SMD)	11..65/2.5..15	N/lb.
Weight	PLUS220 & PLUS220SMD	4.0	g
	TO-3P	5.5	g
	TO-247	6.0	g

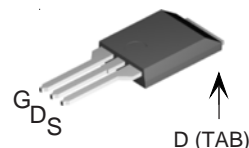
TO-247 (IXFH)



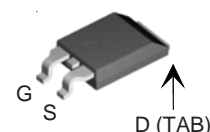
TO-3P (IXFQ)



PLUS220 (IXFV)



PLUS220 SMD (IXFV...S)



G = Gate D = Drain
S = Source TAB = Drain

Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
 - easy to drive and to protect

Advantages

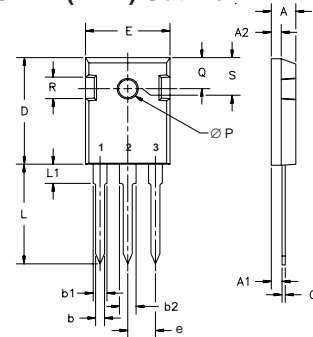
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \text{ } \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 2.5 \text{ mA}$	3.0		5.5 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0 \text{ V}$			$\pm 100 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 125^\circ\text{C}$		25 μA
				250 μA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$, Note 1			0.85 Ω

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IXFV12N80P IXFV12N80PS

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}$, Note 1	8	14	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2800	pF
C_{oss}			210	pF
C_{rss}			19	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_{D25}$ $R_G = 5\ \Omega$ (External)		23	ns
t_r			26	ns
$t_{d(off)}$			70	ns
t_f			25	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		51	nC
Q_{gs}			13	nC
Q_{gd}			19	nC
R_{thJC}	(TO-247 & TO-3P)			0.35 $^\circ\text{C/W}$
R_{thCS}			0.21	$^\circ\text{C/W}$

TO-247 (IXFH) Outline


 Terminals: 1 - Gate
 2 - Drain
 3 - Source
 Tab - Drain

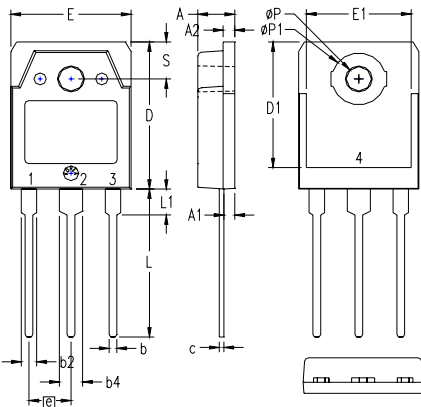
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

Source-Drain Diode **Characteristic Values**
 $(T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{ V}$			12 A
I_{SM}	Repetitive			36 A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$, Note 1			1.5 V
t_{rr}	$I_S = 12\text{ A}, V_{GS} = 0\text{ V}$ $-di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		200	250 ns
Q_{rm}			0.8	μC
I_{rm}			4	A

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

TO-3P (IXFQ) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

 1 - GATE
 2 - DRAIN (COLLECTOR)
 3 - SOURCE (EMITTER)
 4 - DRAIN (COLLECTOR)

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
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



IXFH12N80P IXFQ12N80P
IXFV12N80P IXFV12N80PS

Fig. 1. Output Characteristics @ 25°C

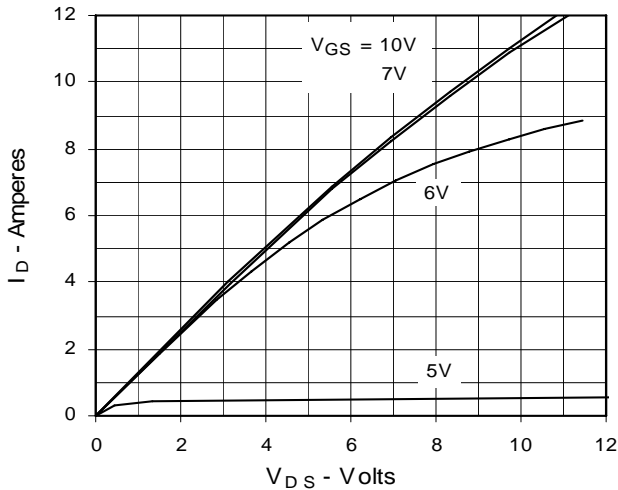


Fig. 2. Extended Output Characteristics @ 25°C

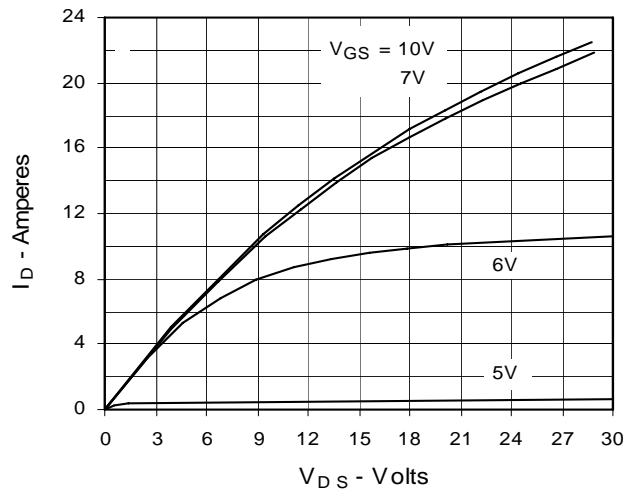


Fig. 3. Output Characteristics @ 125°C

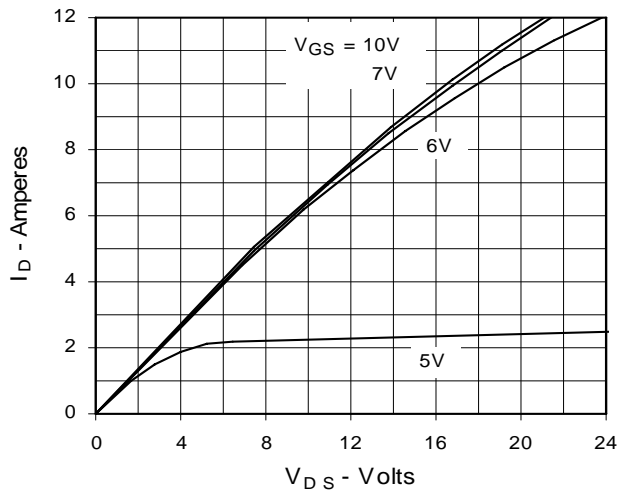


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

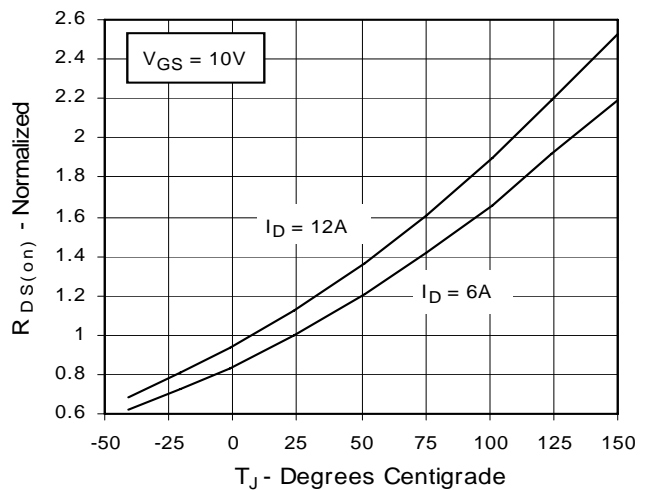


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

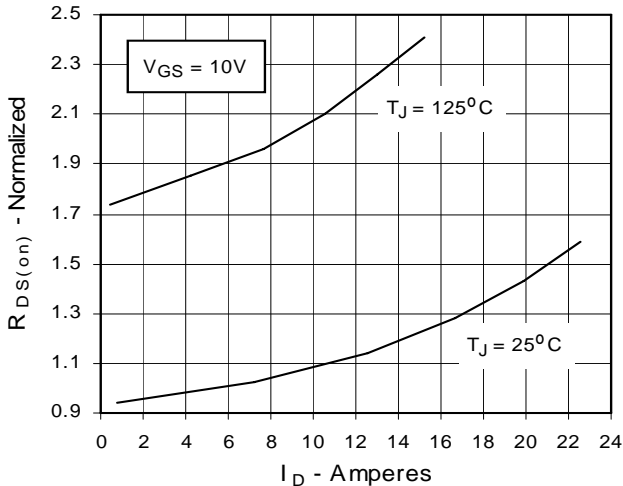
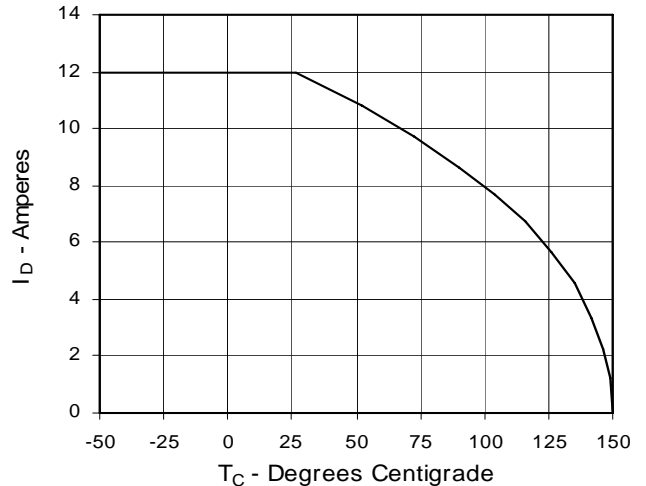


Fig. 6. Drain Current vs. Case Temperature





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Fig. 7. Input Admittance

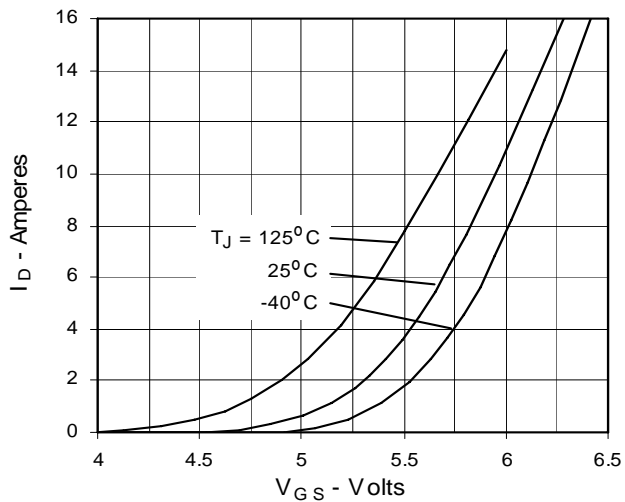


Fig. 8. Transconductance

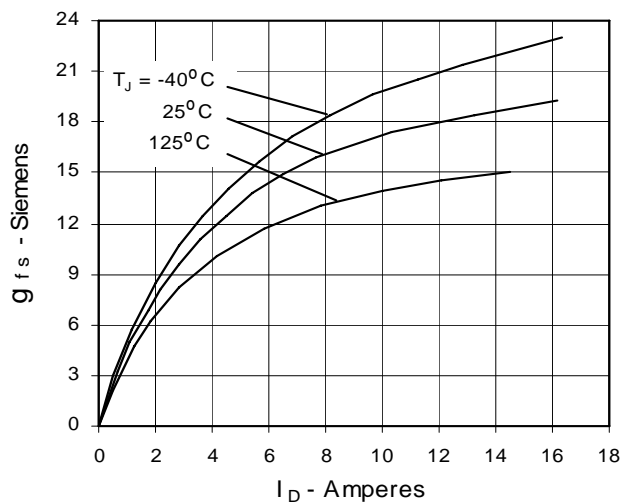


Fig. 9. Source Current vs. Source-To-Drain Voltage

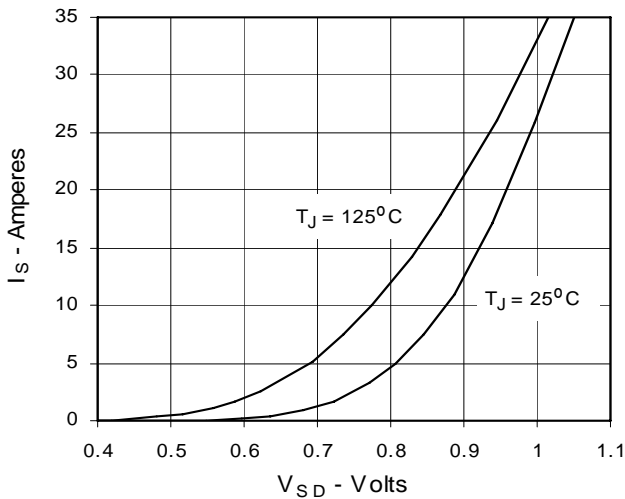


Fig. 10. Gate Charge

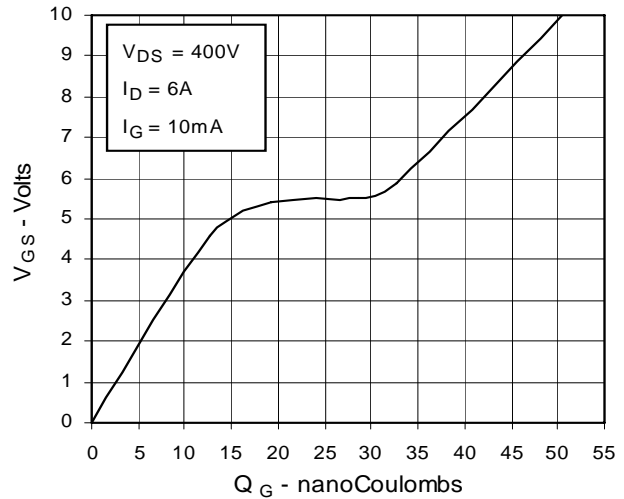


Fig. 11. Capacitance

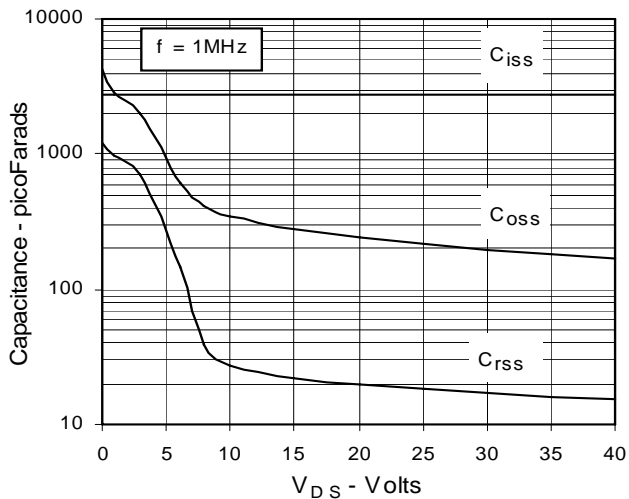
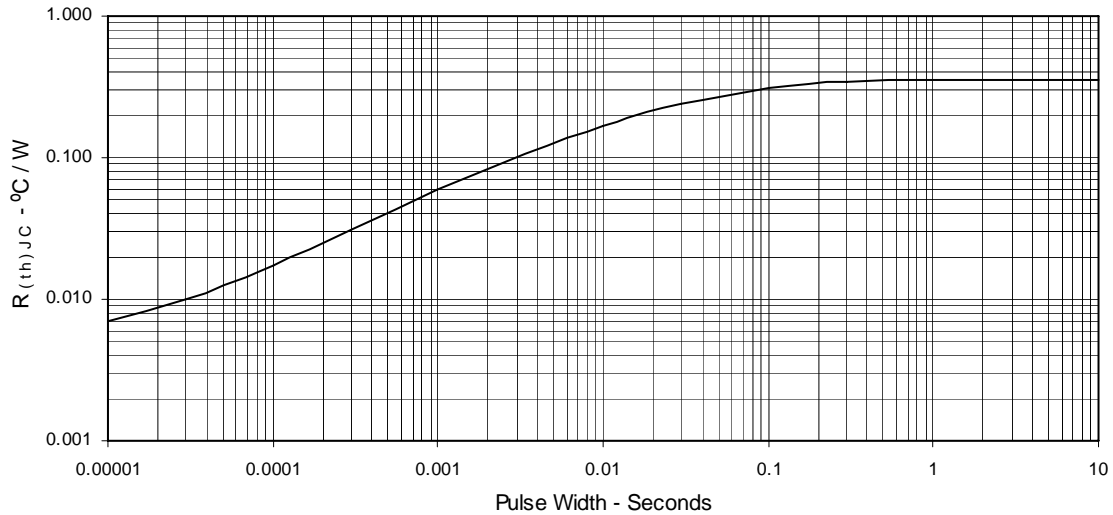
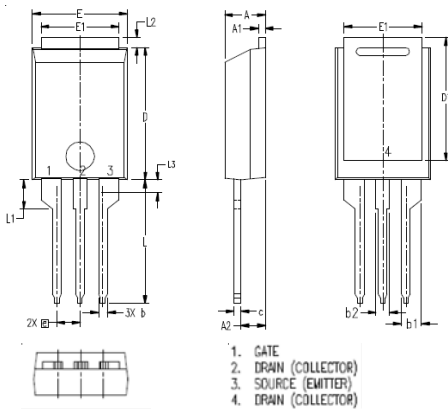


Fig. 12. Maximum Transient Thermal Resistance

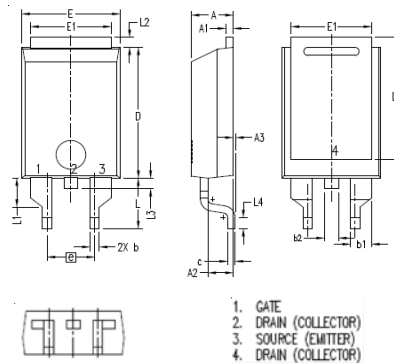


PLUS220 (IXFV) Outline



SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
b	.035	.047	0.90	1.20
b1	.080	.095	2.03	2.41
b2	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.100 BSC		2.54 BSC	
L	.512	.551	13.00	14.00
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50

PLUS220SMD (IXFV_S) Outline



SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
A3	.000	.010	0.00	0.25
b	.035	.047	0.90	1.20
b1	.080	.095	2.03	2.41
b2	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.200 BSC		5.08 BSC	
L	.209	.228	5.30	5.80
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50
L4	.039	.059	1.00	1.50



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