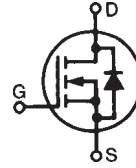


# PolarHV™ Power MOSFET

N-Channel Enhancement Mode  
Fast Recovery Diode  
Avalanche Rated

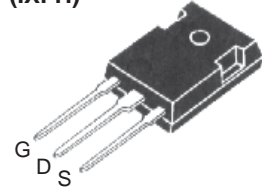
**IXFH 16N80P**  
**IXFT 16N80P**  
**IXFV 16N80P**  
**IXFV 16N80PS**

**V<sub>DSS</sub> = 800 V**  
**I<sub>D25</sub> = 16 A**  
**R<sub>DS(on)</sub> ≤ 600 mΩ**  
**t<sub>rr</sub> ≤ 250 ns**

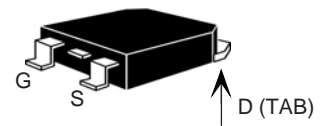


Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	800	V
V <sub>DGR</sub>	T <sub>J</sub> = 25°C to 150°C; R <sub>GS</sub> = 1 MΩ	800	V
V <sub>GSS</sub>	Continuous	±30	V
V <sub>GSM</sub>	Transient	±40	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	16	A
I <sub>DM</sub>	T <sub>C</sub> = 25°C, pulse width limited by T <sub>JM</sub>	40	A
I <sub>AR</sub>	T <sub>C</sub> = 25°C	8	A
E <sub>AR</sub>	T <sub>C</sub> = 25°C	30	mJ
E <sub>AS</sub>	T <sub>C</sub> = 25°C	1.0	J
dv/dt	I <sub>S</sub> ≤ I <sub>DM</sub> , di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ V <sub>DSS</sub> T <sub>J</sub> ≤ 150°C, R <sub>G</sub> = 5 Ω	10	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25°C	460	W
T <sub>J</sub>		-55 ... +150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55 ... +150	°C
T <sub>L</sub>	1.6 mm (0.062 in.) from case for 10 s	300	°C
T <sub>SOLD</sub>	Plastic body for 10 s	260	°C
M <sub>d</sub>	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
F <sub>c</sub>	Mounting force (PLUS220)	11..65/2.5..15	N/lb
Weight	TO-247	6.0	g
	TO-268	5.0	g
	PLUS220 & PLUS220SMD	4.0	g

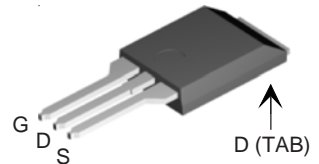
TO-247 (IXFH)



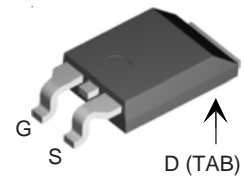
TO-268 (IXFT)



PLUS220 (IXFV)



PLUS220SMD (IXFV...S)



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

Symbol	Test Conditions (T <sub>J</sub> = 25°C, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	800		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 4 mA	3.0		5.0 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0 V			±100 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> V <sub>GS</sub> = 0 V T <sub>J</sub> = 125°C			25 μA
				250 μA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 I <sub>D25</sub> Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			600 mΩ

### Features

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

### Advantages

- Easy to mount
- Space savings
- High power density

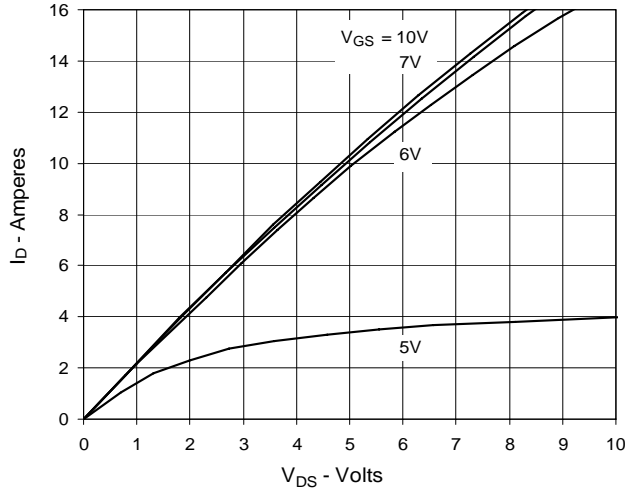
Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20 V; I <sub>D</sub> = 0.5 I <sub>D25</sub> , pulse test	9	16	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		4600	pF
<b>C<sub>oss</sub></b>			330	pF
<b>C<sub>rss</sub></b>			23	pF
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub> R <sub>G</sub> = 5 Ω (External)		27	ns
<b>t<sub>r</sub></b>			32	ns
<b>t<sub>d(off)</sub></b>			75	ns
<b>t<sub>f</sub></b>			29	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> = 0.5 I <sub>D25</sub>		71	nC
<b>Q<sub>gs</sub></b>			21	nC
<b>Q<sub>gd</sub></b>			23	nC
<b>R<sub>thJC</sub></b>	(TO-247)			0.27 °C/W
<b>R<sub>thCS</sub></b>			0.21	°C/W

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			16 A
<b>I<sub>SM</sub></b>	Repetitive			48 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, pulse test			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		150	250 ns
<b>I<sub>RM</sub></b>			7	A
<b>Q<sub>RM</sub></b>			0.7	μC

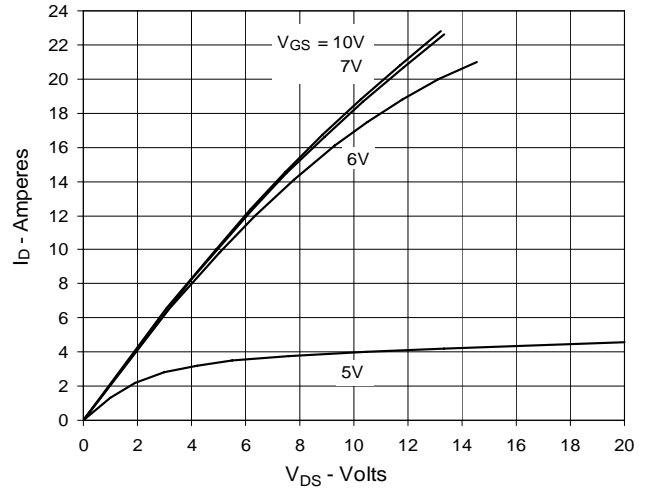
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 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  
 one or more of the following U.S. patents: 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

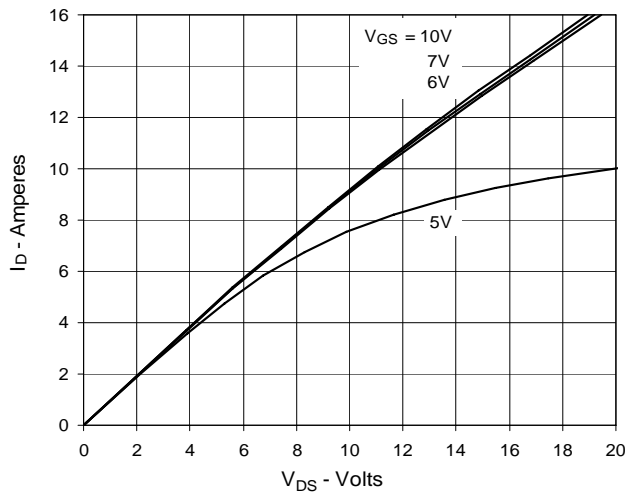
**Fig. 1. Output Characteristics @ 25°C**



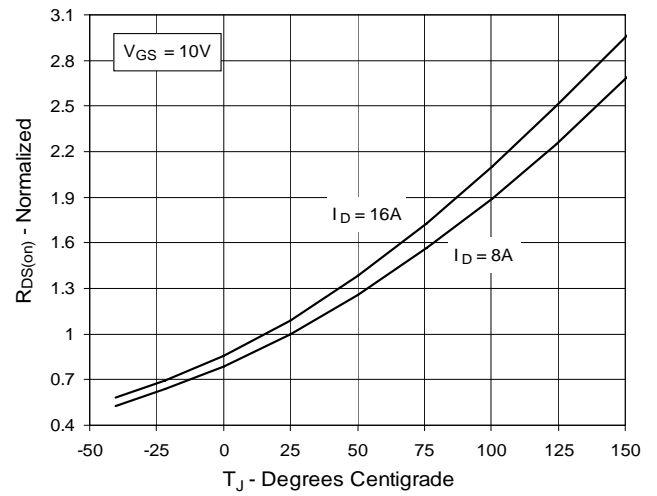
**Fig. 2. Extended Output Characteristics @ 25°C**



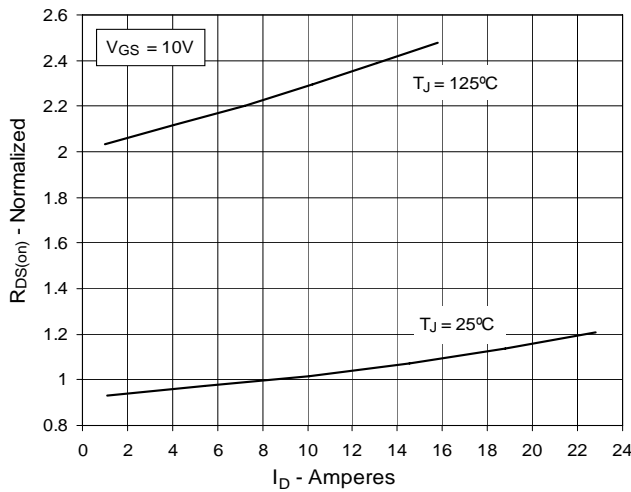
**Fig. 3. Output Characteristics @ 125°C**



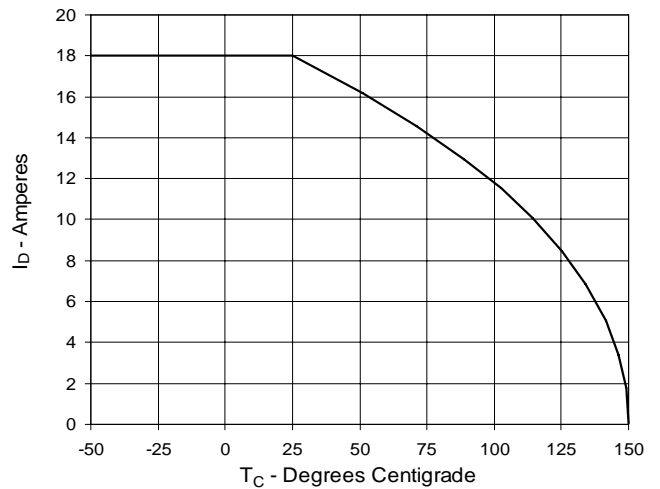
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 8A$  Value vs. Junction Temperature**



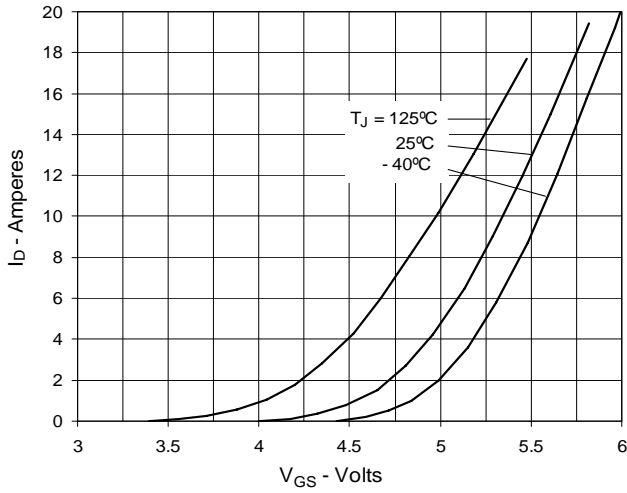
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 8A$  Value vs. Drain Current**



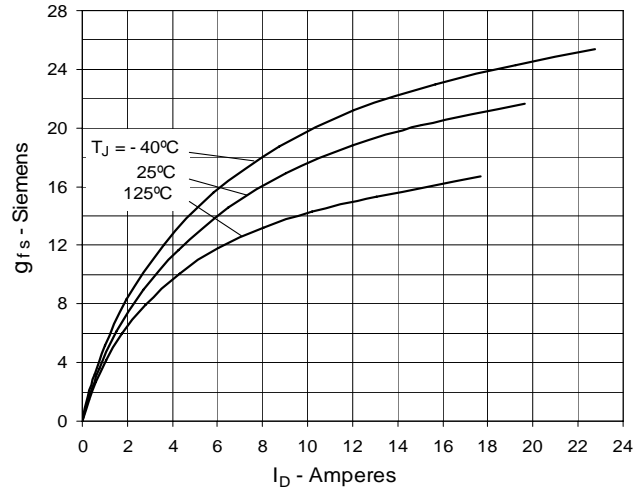
**Fig. 6. Maximum Drain Current vs. Case Temperature**



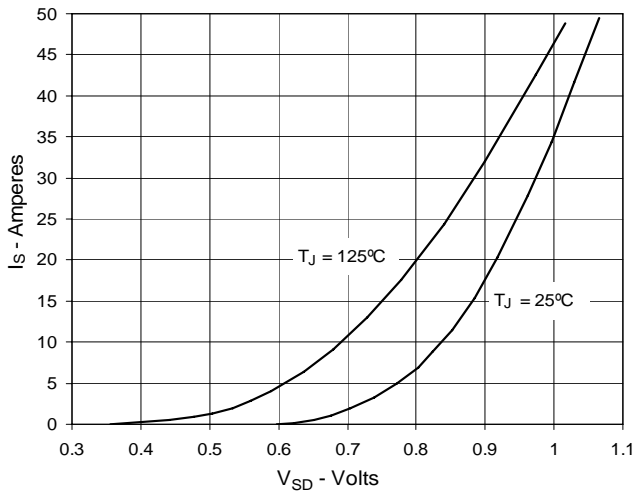
**Fig. 7. Input Admittance**



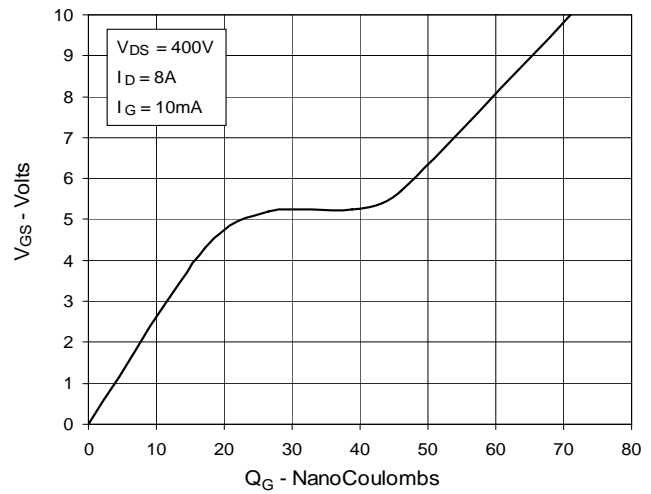
**Fig. 8. Transconductance**



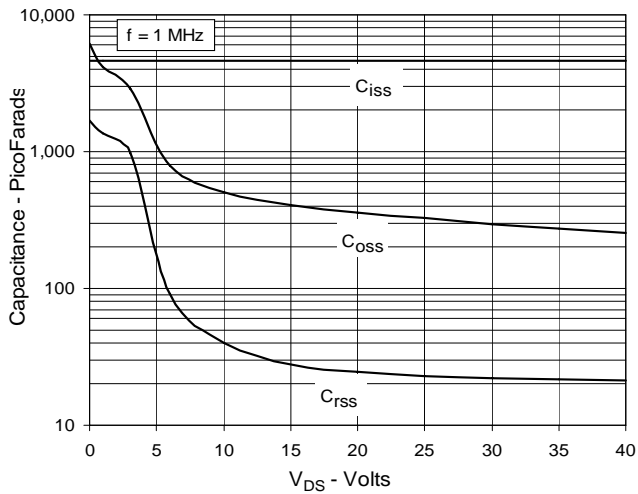
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



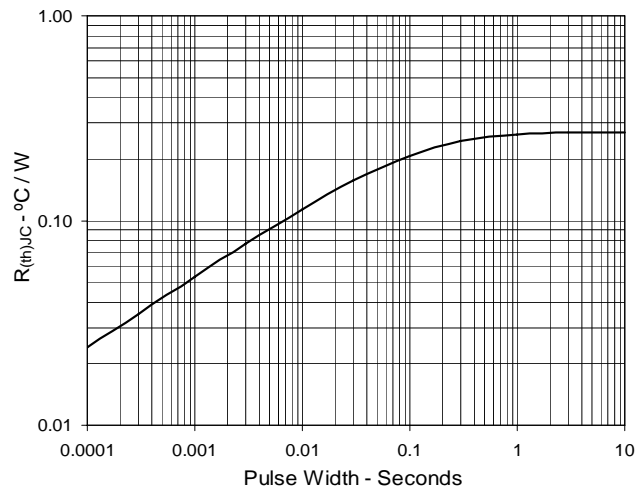
**Fig. 10. Gate Charge**



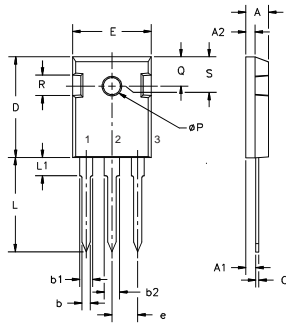
**Fig. 11. Capacitance**



**Fig. 12. Maximum Transient Thermal Resistance**

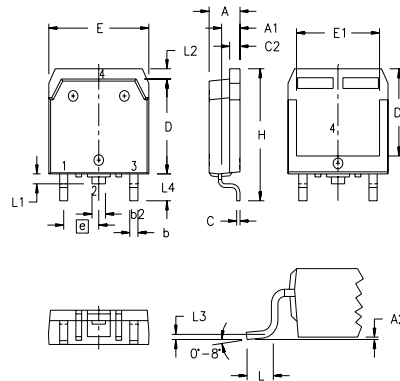


### TO-247 AD (IXFH) Outline



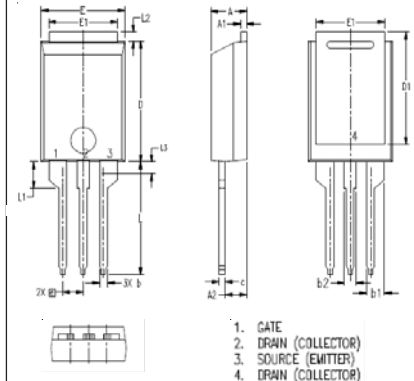
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L <sub>1</sub>		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

### TO-268 (IXFT) Outline



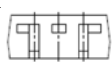
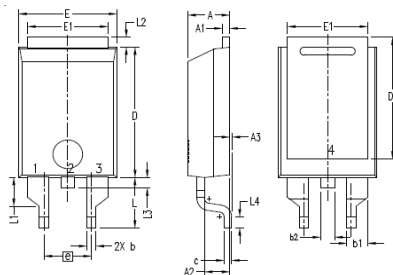
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A <sub>1</sub>	.106	.114	2.70	2.90
A <sub>2</sub>	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b <sub>2</sub>	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C <sub>2</sub>	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D <sub>1</sub>	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E <sub>1</sub>	.524	.535	13.30	13.60
e	.215	BSC	5.45	BSC
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L <sub>1</sub>	.047	.055	1.20	1.40
L <sub>2</sub>	.039	.045	1.00	1.15
L <sub>3</sub>	.010	BSC	0.25	BSC
L <sub>4</sub>	.150	.161	3.80	4.10

### PLUS220 (IXFV) Outline



SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A <sub>1</sub>	.028	.035	0.70	0.90
A <sub>2</sub>	.098	.118	2.50	3.00
b	.035	.047	0.90	1.20
b <sub>1</sub>	.080	.095	2.03	2.41
b <sub>2</sub>	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D <sub>1</sub>	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E <sub>1</sub>	.331	.346	8.40	8.80
e	.100	BSC	2.54	BSC
L	.512	.551	13.00	14.00
L <sub>1</sub>	.118	.138	3.00	3.50
L <sub>2</sub>	.035	.051	0.90	1.30
L <sub>3</sub>	.047	.059	1.20	1.50
L <sub>4</sub>	.047	.059	1.20	1.50

### PLUS220SMD (IXFV\_S) Outline



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

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A <sub>1</sub>	.028	.035	0.70	0.90
A <sub>2</sub>	.098	.118	2.50	3.00
A <sub>3</sub>	.000	.010	0.00	0.25
b	.035	.047	0.90	1.20
b <sub>1</sub>	.080	.095	2.03	2.41
b <sub>2</sub>	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D <sub>1</sub>	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E <sub>1</sub>	.331	.346	8.40	8.80
e	.200	BSC	5.08	BSC
L	.209	.228	5.30	5.80
L <sub>1</sub>	.118	.138	3.00	3.50
L <sub>2</sub>	.035	.051	0.90	1.30
L <sub>3</sub>	.047	.059	1.20	1.50
L <sub>4</sub>	.039	.059	1.00	1.50