

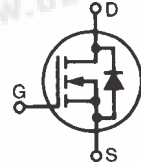


PolarHV™ Power MOSFET

N-Channel Enhancement Mode
Avalanche Rated

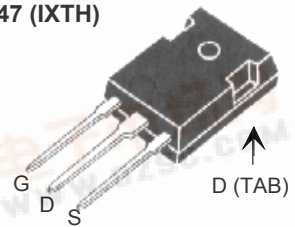
IXTH 30N60P
IXTQ 30N60P
IXTT 30N60P
IXTV 30N60P
IXTV 30N60PS

$$\begin{aligned} V_{DSS} &= 600 \text{ V} \\ I_{D25} &= 30 \text{ A} \\ R_{DS(on)} &\leq 240 \text{ m}\Omega \end{aligned}$$

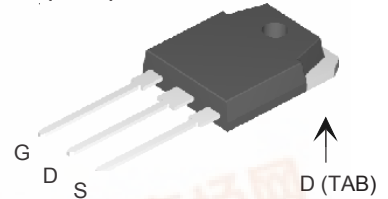


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$	600	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	30	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	80	A
I_{AR}	$T_C = 25^\circ\text{C}$	30	A
E_{AR}	$T_C = 25^\circ\text{C}$	50	mJ
E_{AS}	$T_C = 25^\circ\text{C}$	1.5	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	$T_C = 25^\circ\text{C}$	540	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-3P, TO-247)	1.13/10	Nm/lb.in.
F_c	Mounting force (PLUS220)	11..65/2.5..15	N/lb.
Weight	TO-247	6.0	g
	TO-3P	5.5	g
	PLUS220	4.0	g
	TO-268	5.0	g

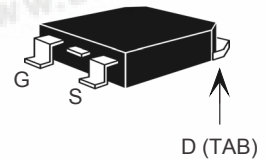
TO-247 (IXTH)



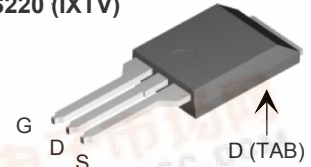
TO-3P (IXTQ)



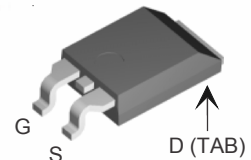
TO-268 (IXTT)



PLUS220 (IXTV)



PLUS220 (IXTV...S)



G = Gate
S = Source

D = Drain
TAB = Drain

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	600		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	3.0		5.0 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$			$\pm 100 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			25 μA 250 μA
	$V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2\%$			240 $\text{m}\Omega$

Features

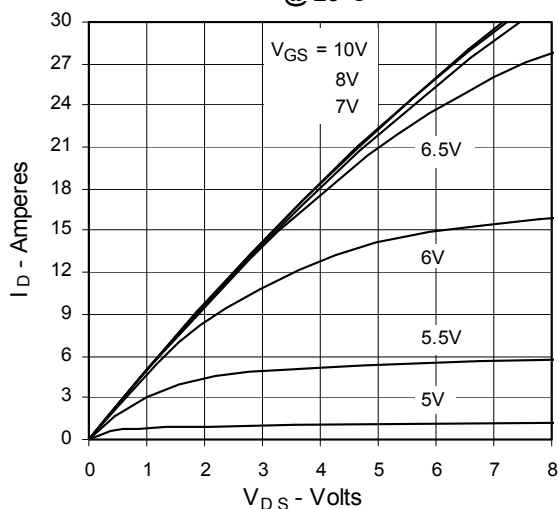
- Fast Recovery diode
- Unclamped Inductive Switching (UIS) rated
- International standard packages
- Low package inductance
- easy to drive and to protect



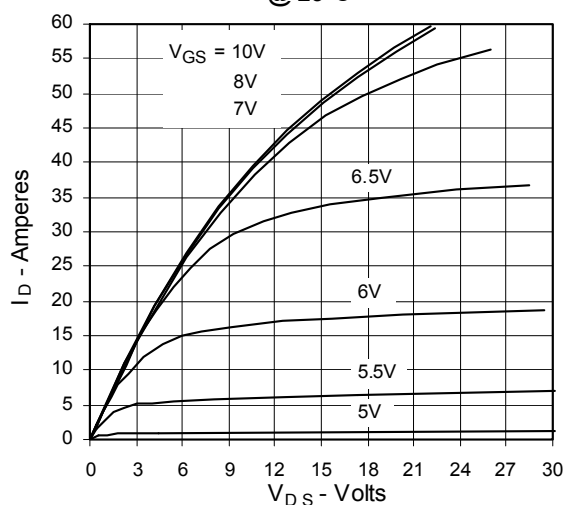
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}$, pulse test	22	25	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		5050	pF
C_{oss}			540	pF
C_{rss}			53	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 I_{D25}$ $R_G = 4\ \Omega$ (External)		29	ns
t_r			20	ns
$t_{d(off)}$			80	ns
t_f			25	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		82	nC
Q_{gs}			28	nC
Q_{gd}			30	nC
R_{thJC}				0.23 $^\circ\text{C/W}$
R_{thCS}			0.21	$^\circ\text{C/W}$

Source-Drain Diode		Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
Symbol	Test Conditions	Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{ V}$			30 A
I_{SM}	Repetitive			80 A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			1.5 V
t_{rr}	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$		500	ns
Q_{RM}	$V_R = 100\text{ V}$		4.0	μC

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

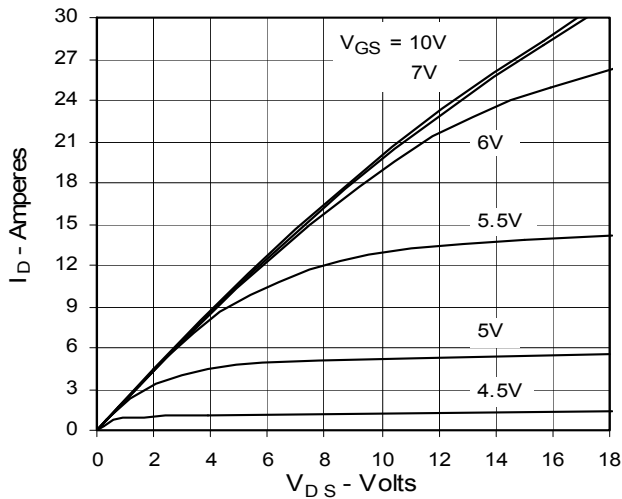


**Fig. 2. Extended Output Characteristics
@ 25°C**

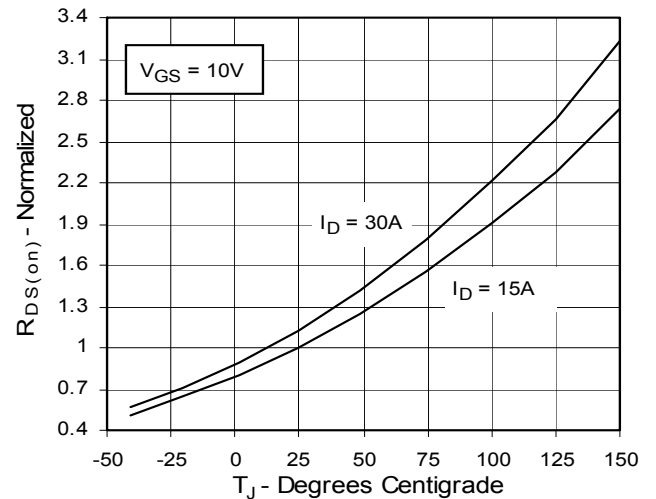


**IXTH 30N60P IXTQ 30N60P IXTT 30N60P
IXTV 30N60P IXTV 30N60PS**

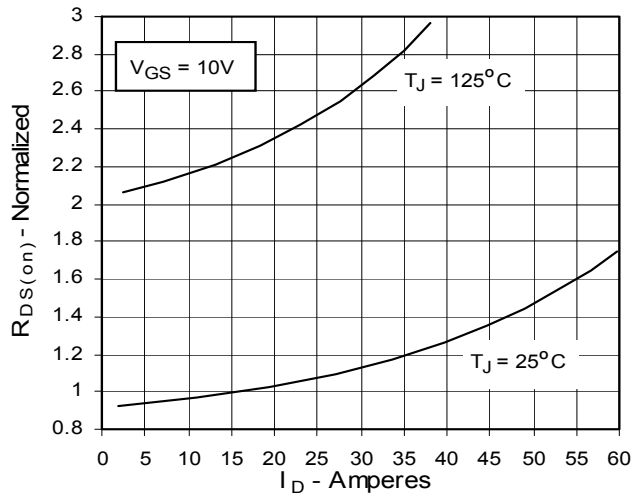
**Fig. 3. Output Characteristics
@ 125°C**



**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**

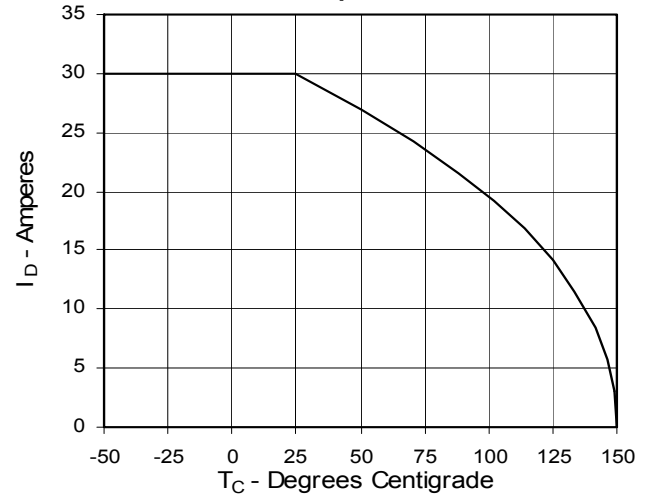


Fig. 7. Input Admittance

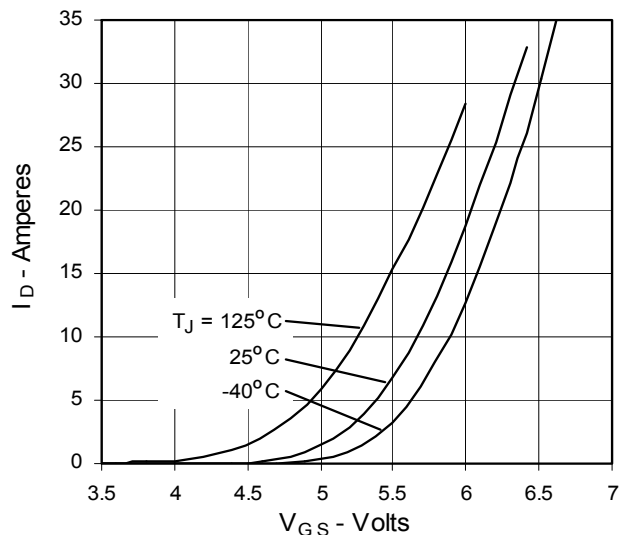


Fig. 8. Transconductance

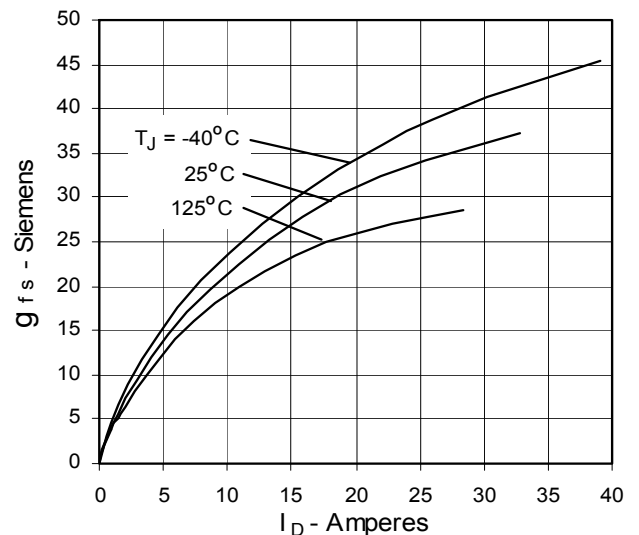


Fig. 9. Source Current vs. Source-To-Drain Voltage

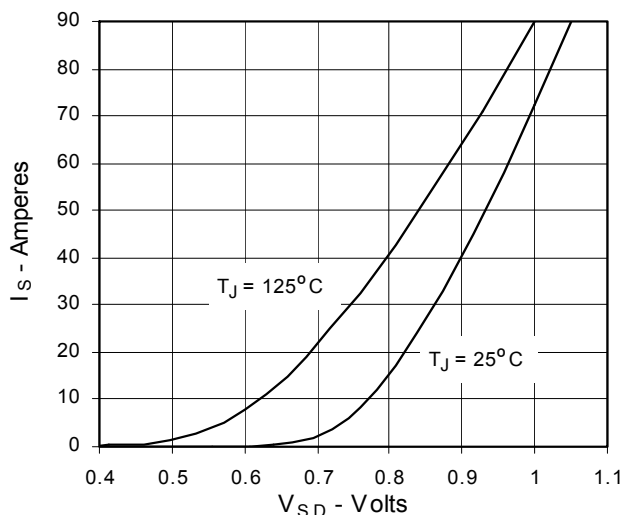


Fig. 10. Gate Charge

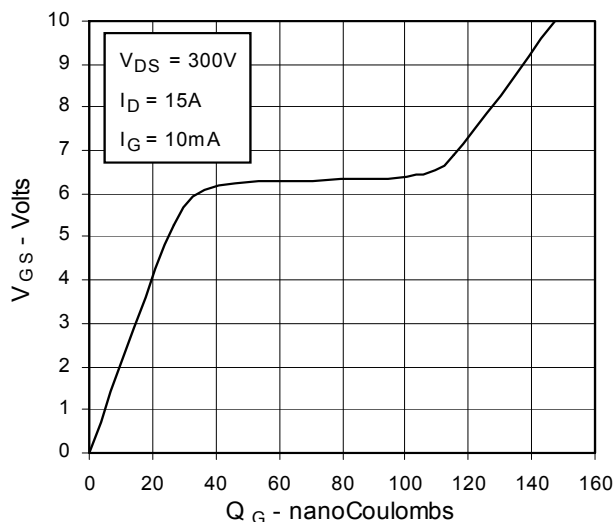


Fig. 11. Capacitance

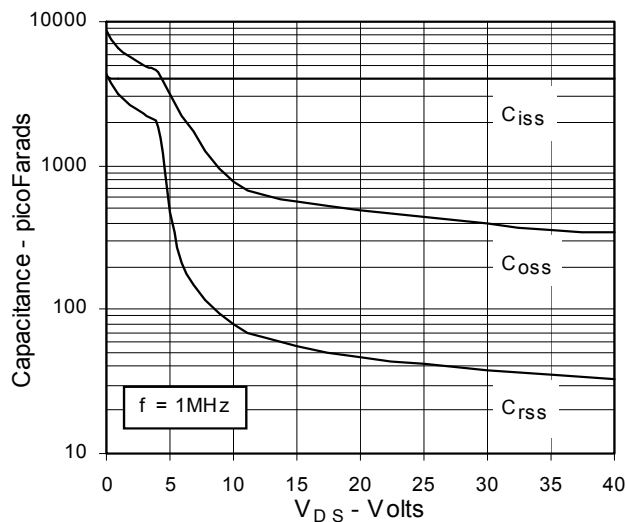


Fig. 12. Forward-Bias Safe Operating Area

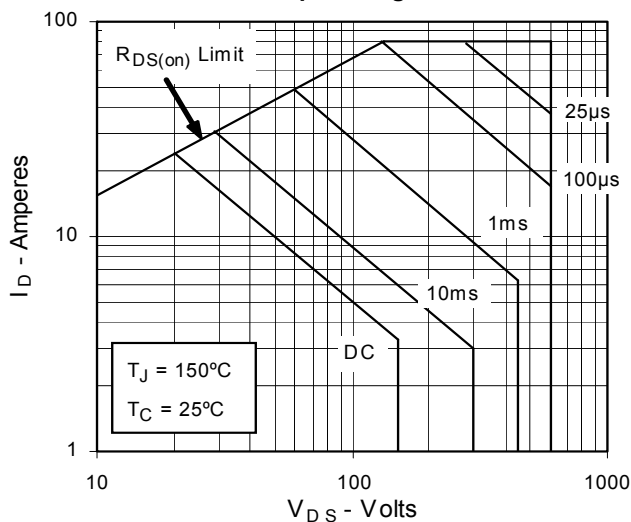
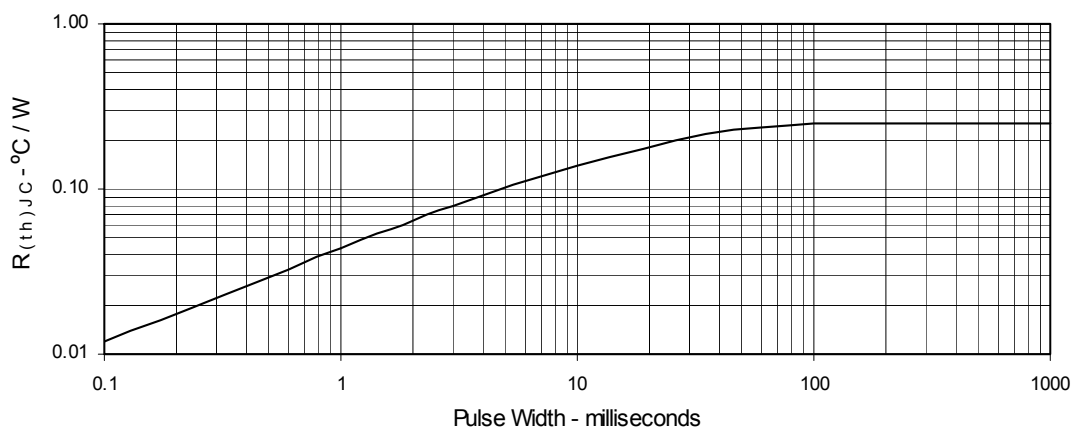
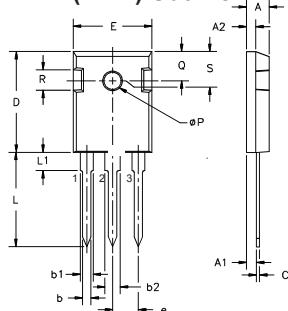


Fig. 13. Maximum Transient Thermal Resistance



Package Outline Drawings

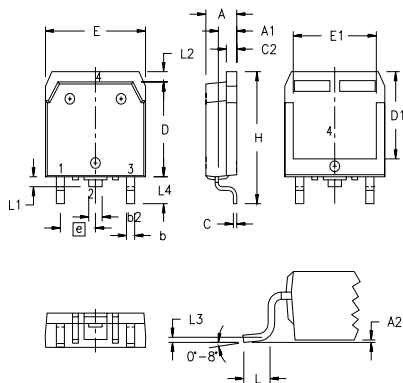
TO-247AD (IXTH) Outline



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

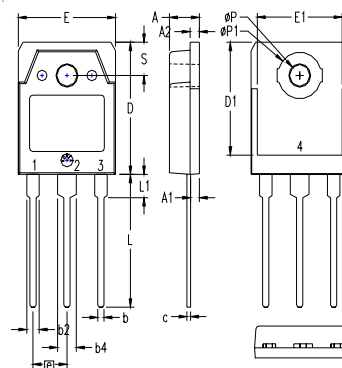
Dim.	Millimeter Min. Max.	Inches Min. Max.
A	4.7 5.3	.185 .209
A ₁	2.2 2.54	.087 .102
A ₂	2.2 2.6	.059 .098
b	1.0 1.4	.040 .055
b ₁	1.65 2.13	.065 .084
b ₂	2.87 3.12	.113 .123
C	.4 .8	.016 .031
D	20.80 21.46	.819 .845
E	15.75 16.26	.610 .640
e	5.20 5.72	0.205 0.225
L	19.81 20.32	.780 .800
L1	4.50	.177
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

TO-268 (IXTT) Outline



SYM	INCHES MIN MAX	MILLIMETERS MIN MAX
A	.193 .201	4.90 5.10
A1	.106 .114	2.70 2.90
A2	.001 .010	0.02 0.25
b	.045 .057	1.15 1.45
b2	.075 .083	1.90 2.10
C	.016 .026	0.40 0.65
C2	.057 .063	1.45 1.60
D	.543 .551	13.80 14.00
D1	.488 .500	12.40 12.70
E	.624 .632	15.85 16.05
E1	.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
L1	.047 .055	1.20 1.40
L2	.039 .045	1.00 1.15
L3	.010 BSC	0.25 BSC
L4	.150 .161	3.80 4.10

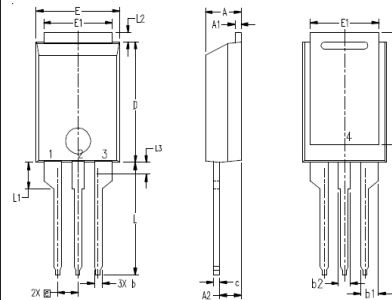
TO-3P (IXTQ) Outline



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

SYM	INCHES MIN MAX	MILLIMETERS 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

PLUS220 (IXTV) Outline

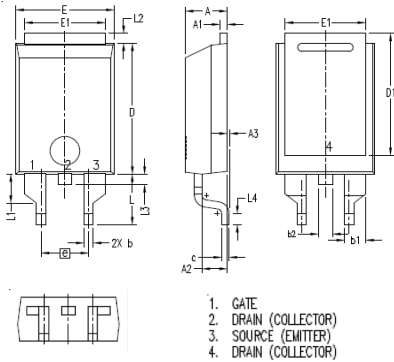


1. GATE
2. DRAIN (COLLECTOR)
3. SOURCE (EMITTER)
4. DRAIN (COLLECTOR)

SYM	INCHES MIN MAX	MILLIMETER 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

Package Outline Drawings

PLUS220SMD (IXTV_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