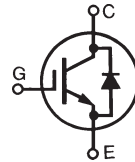


# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

**IXBA14N300HV**  
**IXBT14N300HV**  
**IXBH14N300HV**

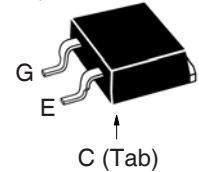
**$V_{CES} = 3000V$**   
 **$I_{C110} = 14A$**   
 **$V_{CE(sat)} \leq 2.7V$**



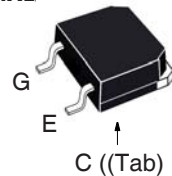
Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	3000	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	3000	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	38	A
$I_{C110}$	$T_C = 110^\circ C$	14	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	120	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 120$ 1500	A V
<b><math>T_{SC}</math></b> <b>(SCSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 82\Omega$ , $V_{CE} = 1500V$ , Non-Repetitive	10	$\mu s$
$P_C$	$T_C = 25^\circ C$	200	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	$^\circ C$
$F_C$	Mounting Force (TO-263HV)	10..65 / 22..14.6	N/lb
$M_d$	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
<b>Weight</b>	TO-263HV	2.5	g
	TO-268HV	4.0	g
	TO-247HV	6.0	g

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			25 $\mu A$ 750 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 14A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.2 2.7	V V

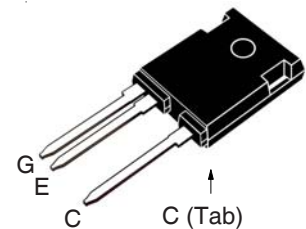
TO-263HV (IXBA)



TO-268HV (IXBT)



TO-247HV (IXBH)



G = Gate      C = Collector  
E = Emitter    Tab = Collector

## Features

- High Voltage Packages
- High Blocking Voltage
- Anti-Parallel Diode
- Low Conduction Losses

## Advantages

- Low Gate Drive Requirement
- High Power Density

## Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 14\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	8	13	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1275	pF
$C_{oes}$			50	pF
$C_{res}$			18	pF
$Q_g$	$I_C = 14\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1500\text{V}$		62	nC
$Q_{ge}$			7	nC
$Q_{gc}$			30	nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 14\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 20\Omega$		40	ns
$t_r$			380	ns
$t_{d(off)}$			166	ns
$t_f$			1900	ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 14\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 20\Omega$		64	ns
$t_r$			746	ns
$t_{d(off)}$			180	ns
$t_f$			1730	ns
$R_{thJC}$	TO-247HV			0.62 $^\circ\text{C/W}$
$R_{thCS}$			0.21	$^\circ\text{C/W}$

### Reverse Diode

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = 14\text{A}, V_{GE} = 0\text{V}$			2.7 V
$t_{rr}$	$I_F = 7\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		1.4	$\mu\text{s}$
$I_{RM}$			23	A
$Q_{RM}$	$V_R = 100\text{V}, V_{GE} = 0\text{V}$		16	$\mu\text{C}$

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	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	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 @  $T_J = 25^\circ\text{C}$

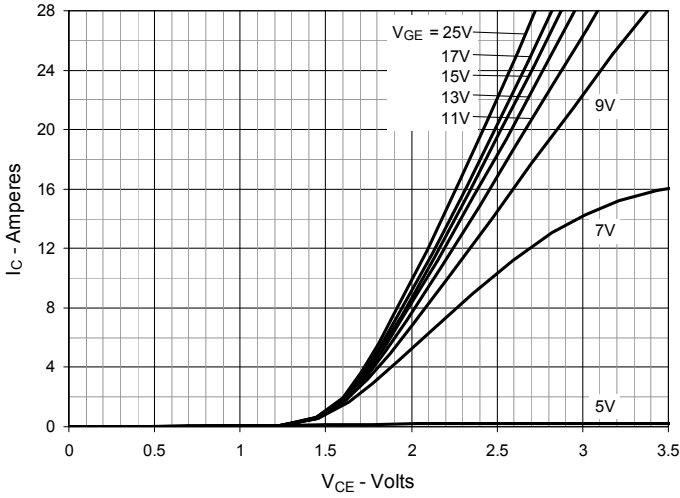


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

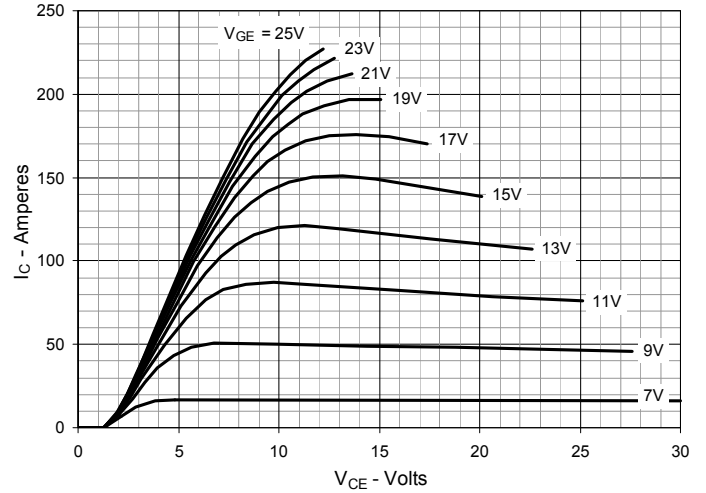


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

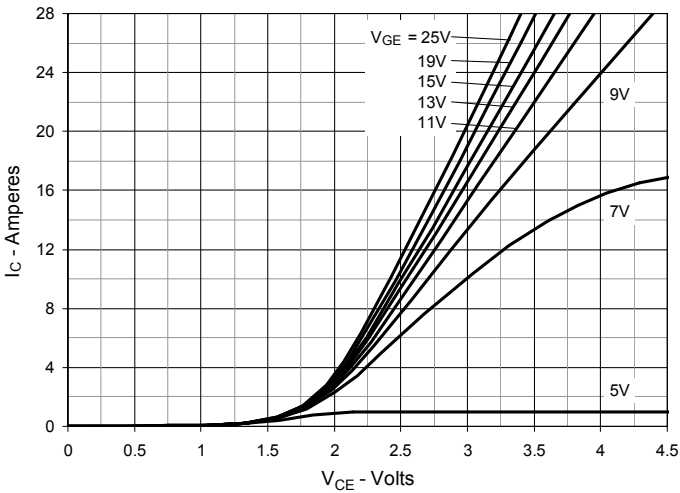


Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature

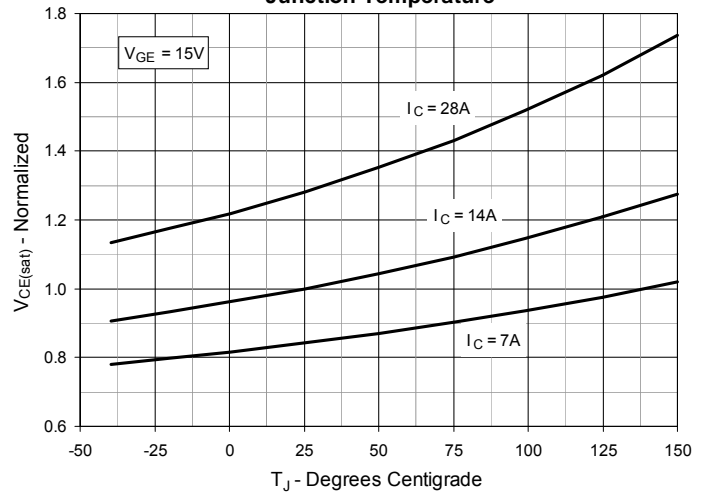


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

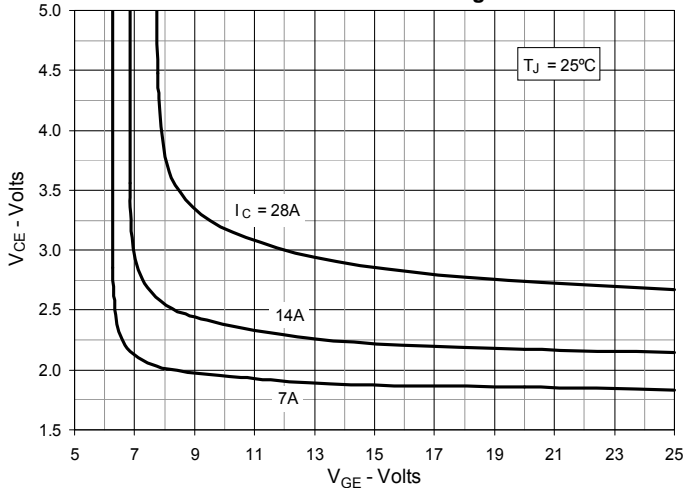


Fig. 6. Input Admittance

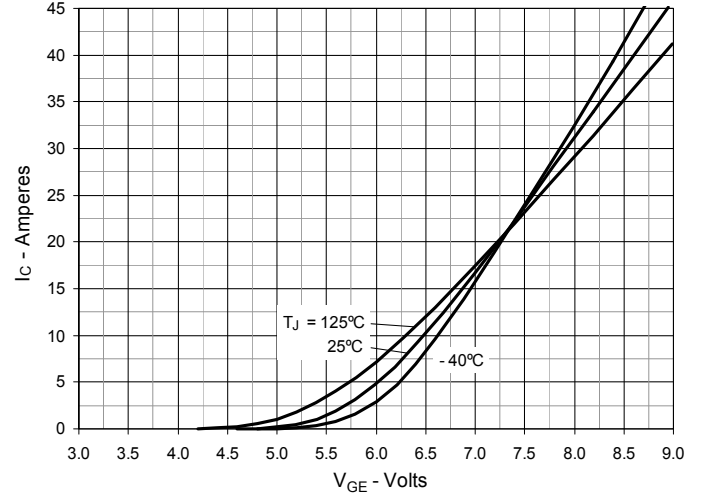


Fig. 7. Transconductance

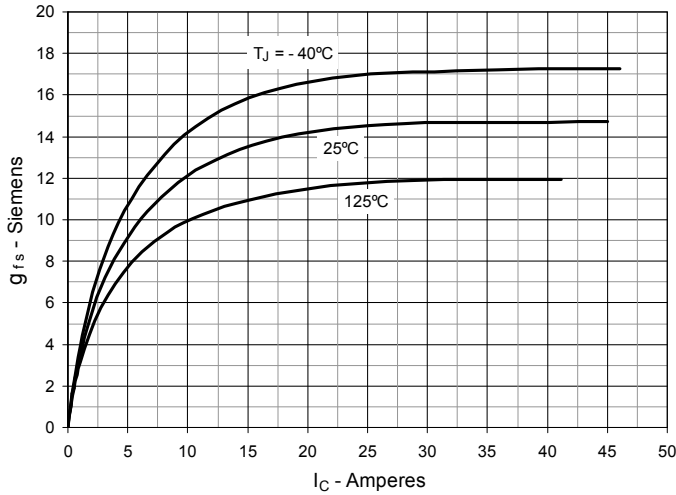


Fig. 8. Forward Voltage Drop of Intrinsic Diode

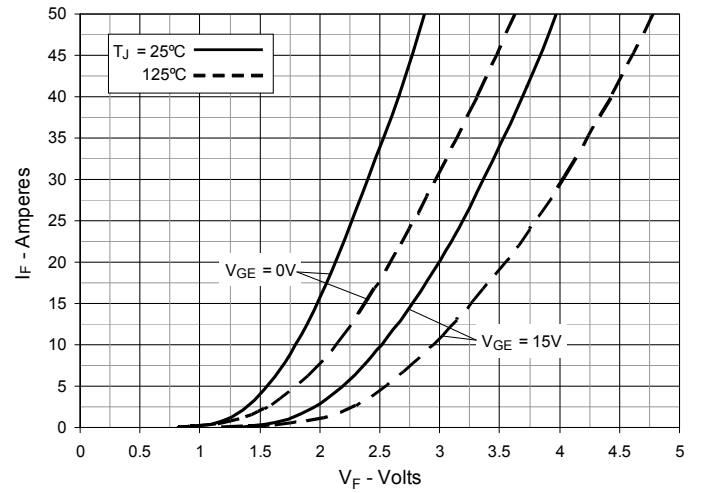


Fig. 9. Gate Charge

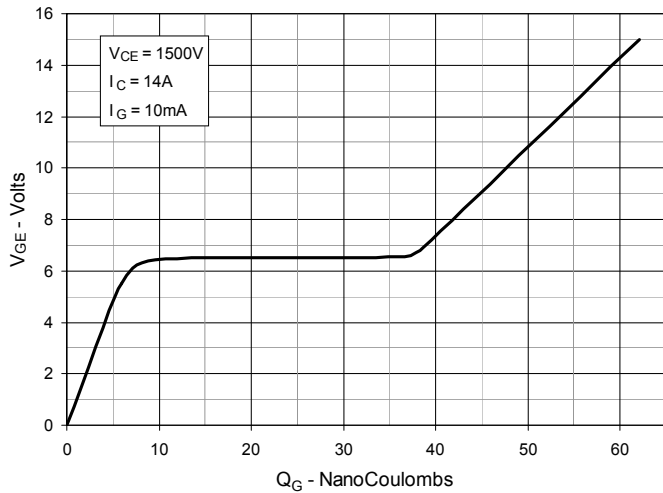


Fig. 10. Capacitance

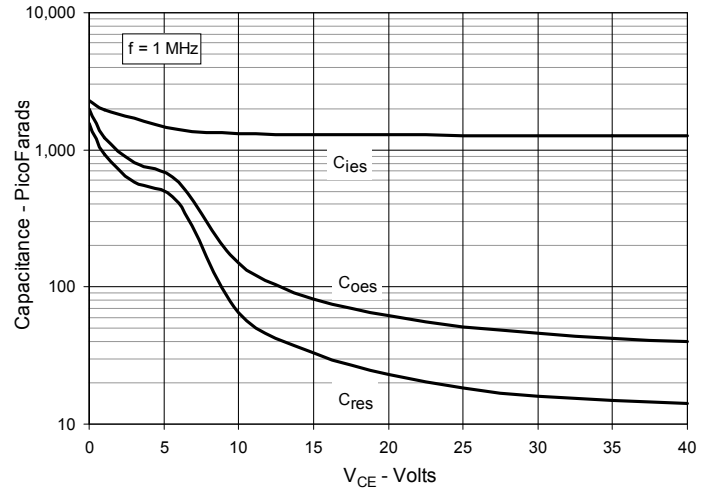


Fig. 11. Reverse-Bias Safe Operating Area

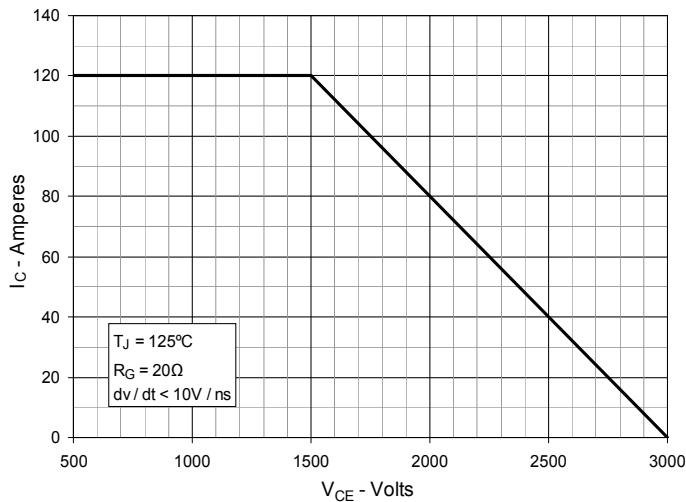


Fig. 12. Maximum Transient Thermal Impedance

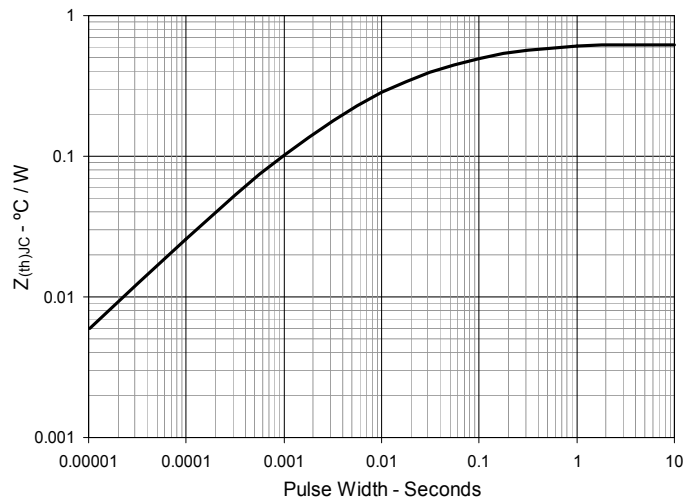


Fig. 13. Forward-Bias Safe Operating Area

@  $T_C = 25^\circ\text{C}$

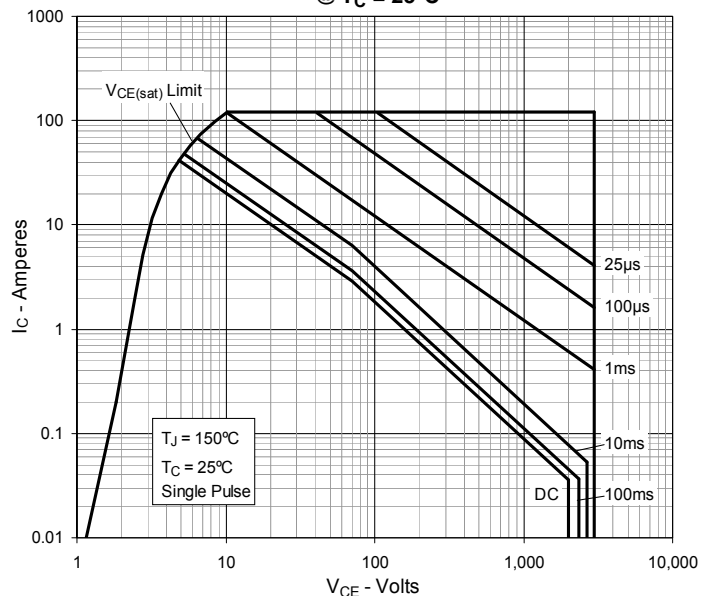
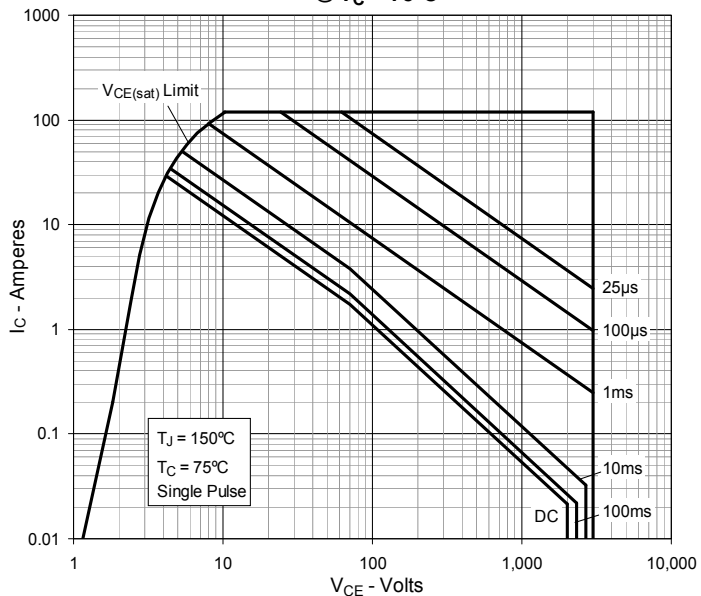
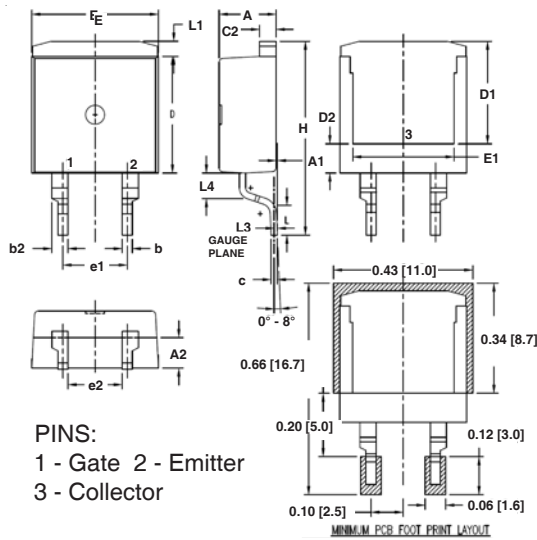


Fig. 14. Forward-Bias Safe Operating Area

@  $T_C = 75^\circ\text{C}$



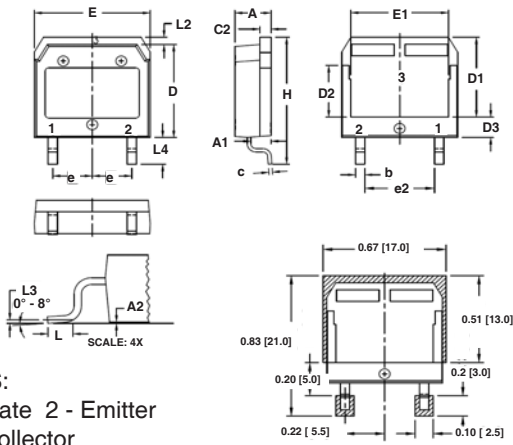
TO-263HV Outline



PINS:  
1 - Gate 2 - Emitter  
3 - Collector

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
D2	.083	.098	2.10	2.50
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200 BSC		5.08 BSC	
(e2)	.163	.174	4.13	4.43
H	.591	.614	15.00	15.60
L	.079	.102	2.00	2.60
L1	.039	.055	1.00	1.40
L3	.010 BSC		0.254 BSC	
(L4)	.071	.087	1.80	2.20

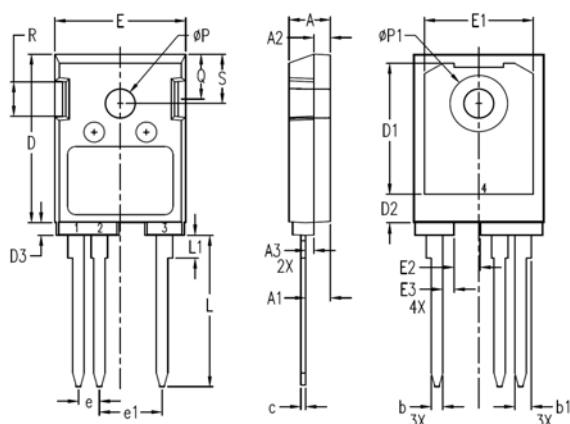
TO-268HV (IXBT)



PINS:  
1 - Gate 2 - Emitter  
3 - Collector

SYM	INCHES		MILLIMETER	
	MIN	MAX	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
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
(e)	.215 BSC		5.45 BSC	
(e2)	.374	.386	9.50	9.80
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
(L3)	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

TO-247HV (IXBH)



PINS:  
1 - Gate 2 - Emitter  
3,4 - Collector

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100 BSC		2.54 BSC	
e1	.300 BSC		7.62 BSC	
L	.724	.748	18.40	19.00
L1	.106	.118	2.70	3.00
$\phi P$	.138	.142	3.50	3.60
$\phi P_1$	.272	.280	6.90	7.10
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30
S	.240	.248	6.10	6.30