

**X-Class HiPERFET  
Power MOSFET**
**IXFA8N85XHV  
IXFP8N85X  
IXFQ8N85X**

$$V_{DSS} = 850V$$

$$I_{D25} = 8A$$

$$R_{DS(on)} \leq 850m\Omega$$

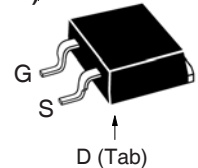
N-Channel Enhancement Mode



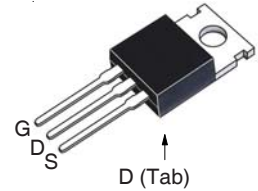
Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	850	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	850	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	8	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	16	A
$I_A$	$T_C = 25^\circ C$	4	A
$E_{AS}$	$T_C = 25^\circ C$	300	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	50	V/ns
$P_D$	$T_C = 25^\circ C$	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 / 2.2..14.6	N/lb
$M_d$	Mounting Torque (TO-220 & TO-3P)	1.13 / 10	Nm/lb.in
<b>Weight</b>	TO-263HV	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	850		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			10 $\mu A$ 750 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 4A$ , Note 1			850 m $\Omega$

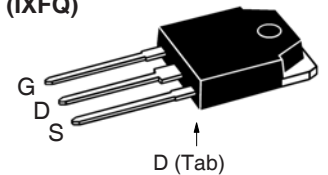
TO-263HV (IXFA)



TO-220 (IXFP)



TO-3P (IXFQ)



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

**Features**

- International Standard Packages
- High Voltage Package
- Low  $R_{DS(ON)}$  and  $Q_G$
- Avalanche Rated
- Low Package Inductance

**Advantages**

- High Power Density
- Easy to Mount
- Space Savings

**Applications**

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$g_{fs}$	$V_{DS} = 10\text{V}$ , $I_D = 4\text{A}$ , Note 1	2.7	4.5	S
$R_{Gi}$	Gate Input Resistance		3	$\Omega$
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		654	pF
$C_{oss}$			714	pF
$C_{rss}$			11	pF
<b>Effective Output Capacitance</b>				
$C_{o(er)}$	Energy related	$V_{GS} = 0\text{V}$ $V_{DS} = 0.8 \cdot V_{DSS}$	40	pF
$C_{o(tr)}$	Time related		120	pF
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 4\text{A}$		17.0	nC
$Q_{gs}$			3.6	nC
$Q_{gd}$			10.0	nC
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 4\text{A}$ $R_G = 10\Omega$ (External)		15	ns
$t_r$			25	ns
$t_{d(off)}$			32	ns
$t_f$			23	ns
$R_{thJC}$				0.63 $^\circ\text{C/W}$
$R_{thCS}$	TO-220		0.50	$^\circ\text{C/W}$
	TO-3P		0.21	$^\circ\text{C/W}$

#### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$I_S$	$V_{GS} = 0\text{V}$			8 A
$I_{SM}$	Repetitive, pulse Width Limited by $T_{JM}$			32 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	$I_F = 4\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		125	ns
$Q_{RM}$			1.1	$\mu\text{C}$
$I_{RM}$			18.0	A

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

#### **PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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	6,404,065B1	6,683,344	6,727,585	7,005,734B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343	6,710,405B2	6,759,692	7,063,975B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	

Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

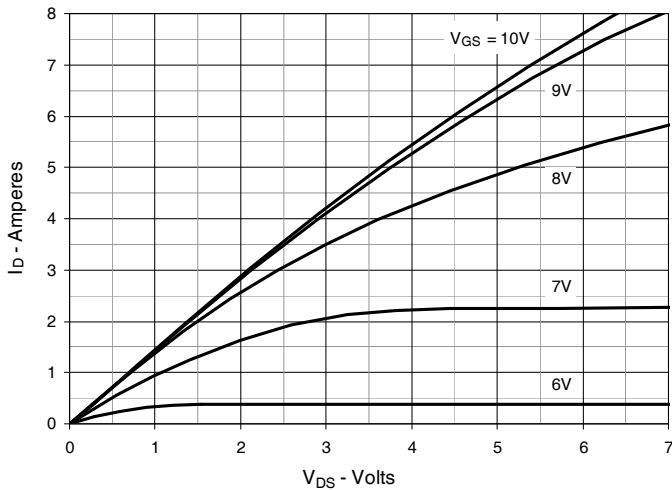


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

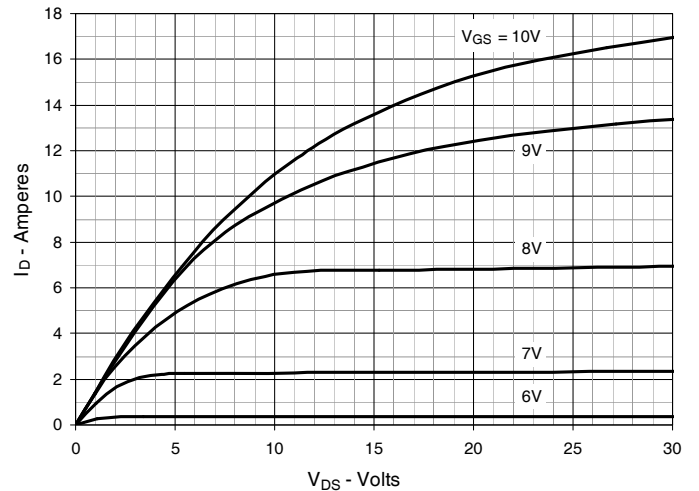


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

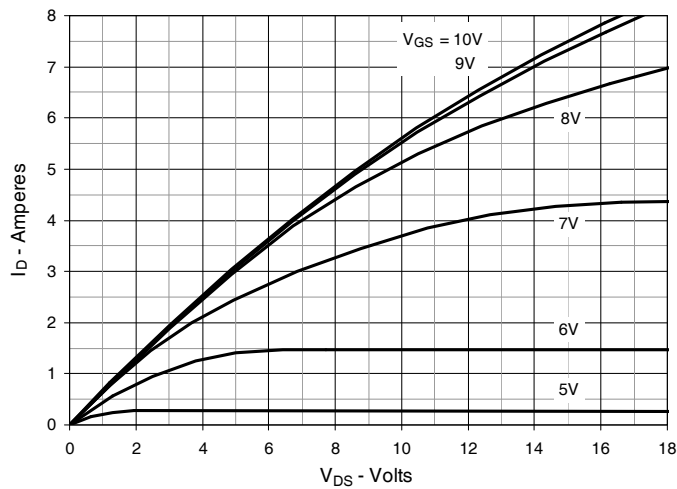


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 4\text{A}$  Value vs. Junction Temperature

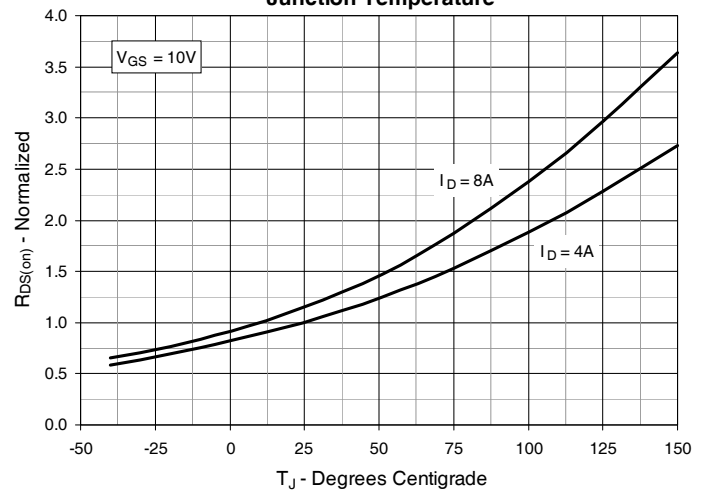


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 4\text{A}$  Value vs. Drain Current

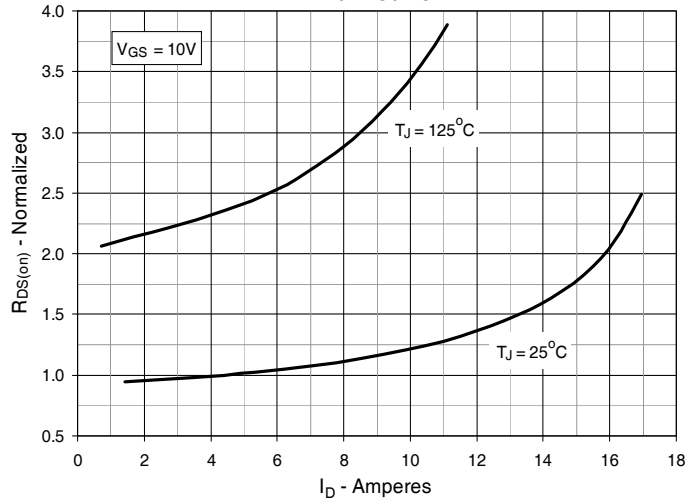


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

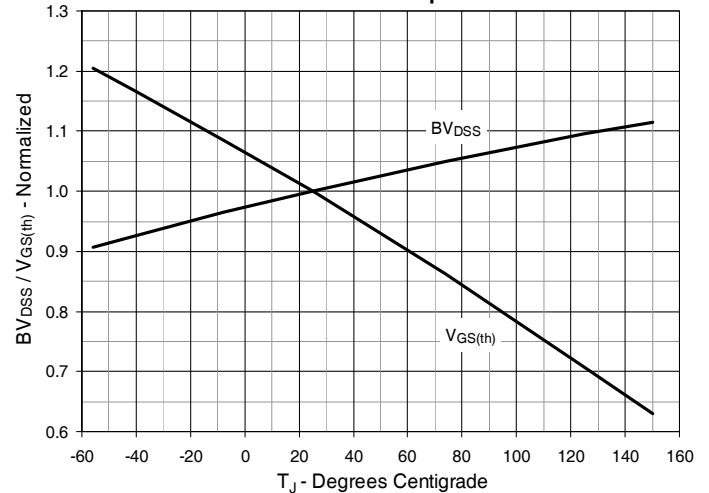


Fig. 7. Maximum Drain Current vs. Case Temperature

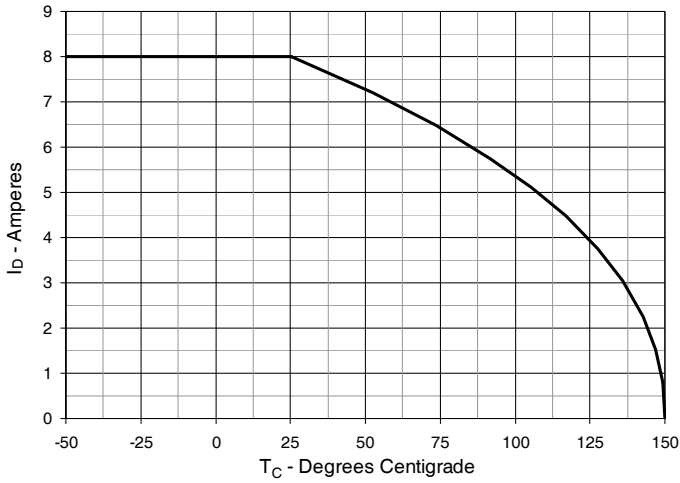


Fig. 8. Input Admittance

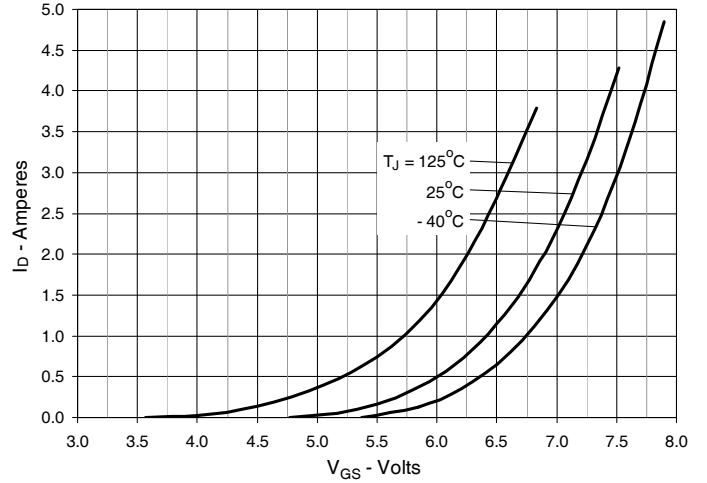


Fig. 9. Transconductance

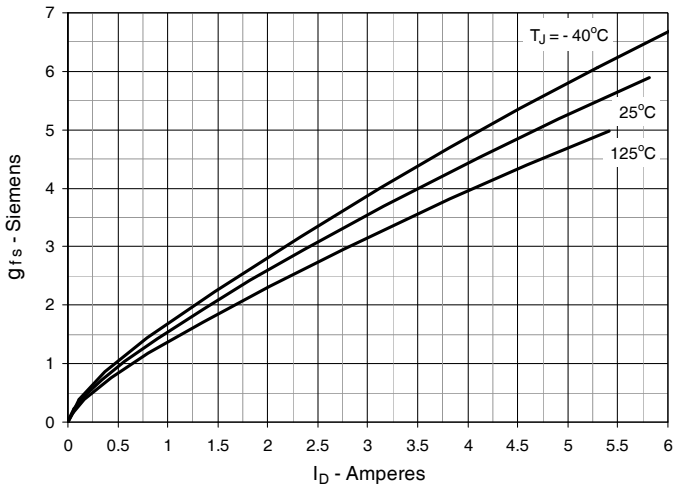


Fig. 10. Forward Voltage Drop of Intrinsic Diode

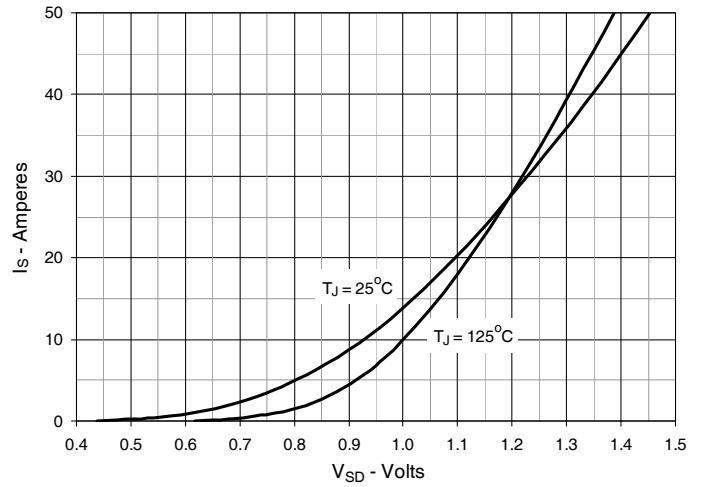


Fig. 11. Gate Charge

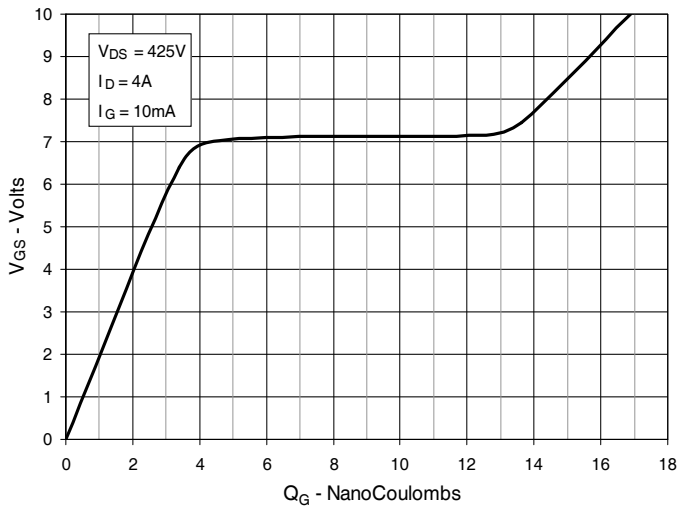


Fig. 12. Capacitance

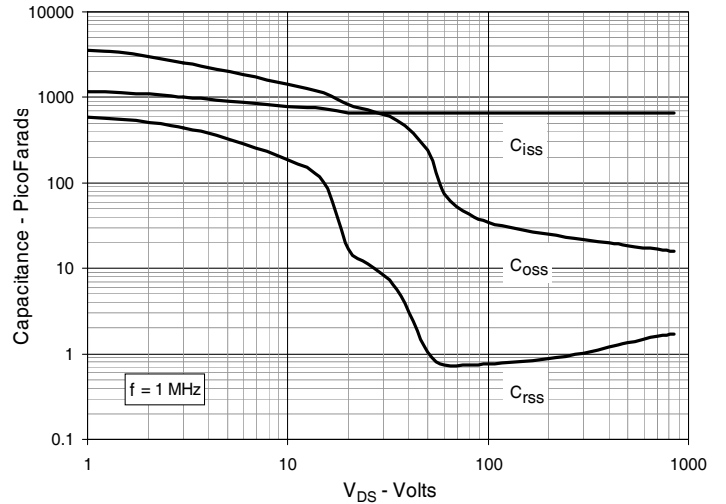


Fig. 13. Output Capacitance Stored Energy

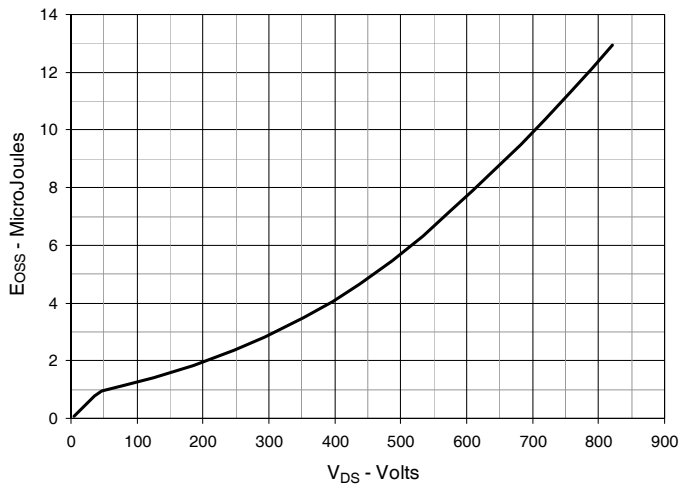


Fig. 14. Forward-Bias Safe Operating Area

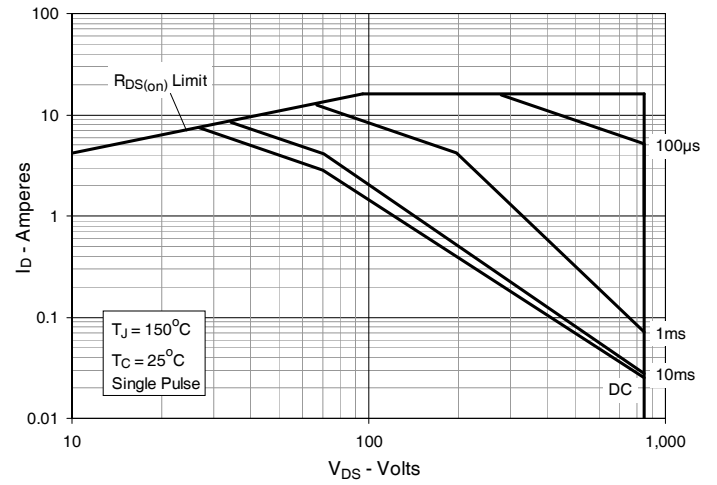
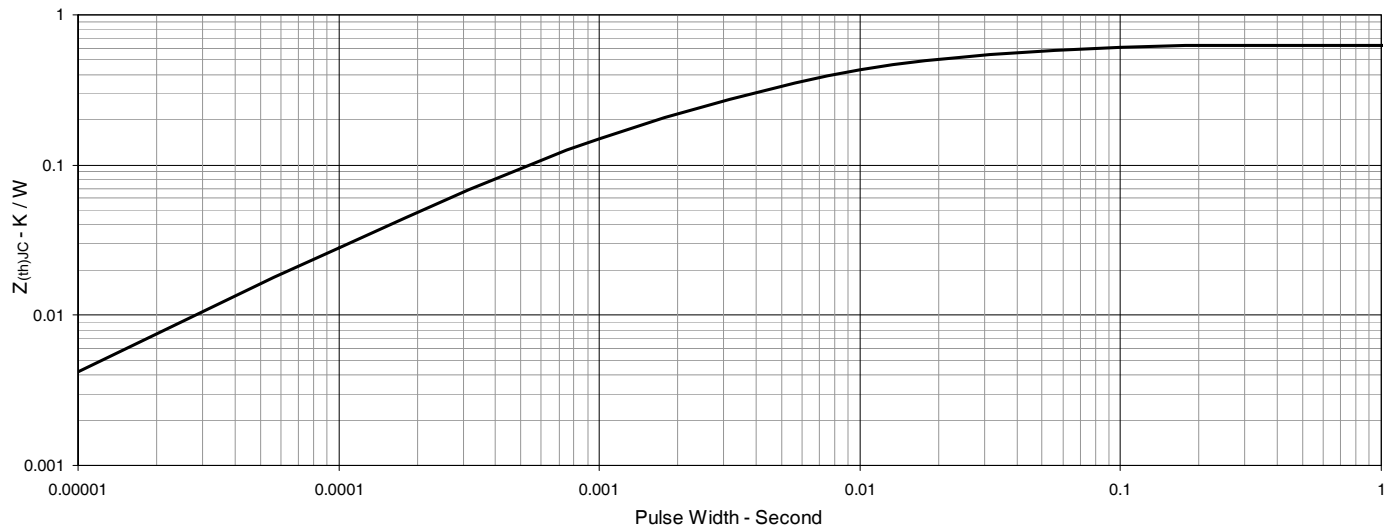
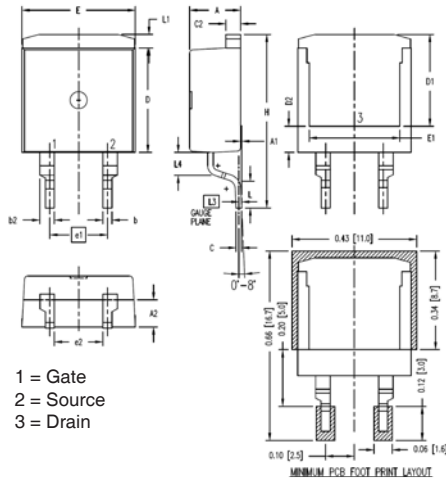
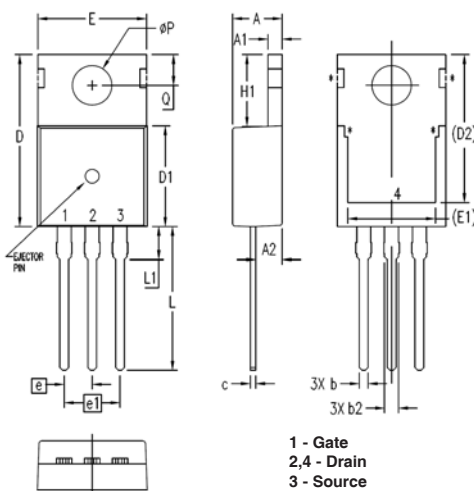


Fig. 15. Maximum Transient Thermal Impedance

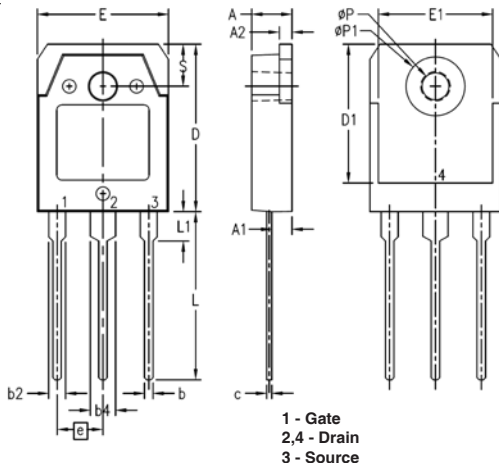


**TO-263HV Outline**


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-220 Outline**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
ØP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

**TO-3P Outline**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.181	.197	4.60	5.00
A1	.087	1.02	2.20	2.60
A2	.057	.065	1.45	1.65
b	.031	.047	0.80	1.20
b2	.071	.087	1.80	2.20
b4	.110	.126	2.80	3.20
c	.022	.031	0.55	0.80
D	.776	.791	19.70	20.10
D1	.640	.680	16.26	17.27
E	.606	.622	15.40	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.130	.146	3.30	3.70
ØP	.122	.134	3.10	3.40
ØP1	.272	.280	6.90	7.10
S	.189	.205	4.80	5.20



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