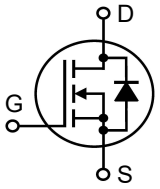
IXYS

X3-Class HiPerFET™ Power MOSFET

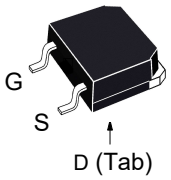
IXFT60N60X3HV

V_{DSS} = 600V
I_{D25} = 60A
$R_{DS(on)}$ ≤ 51mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-268HV (IXFT..HV)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	600	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	60	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	90	A
I_A	T_C = 25°C	12	A
E_{AS}	T_C = 25°C	1.7	J
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	50	V/ns
P_D	T_C = 25°C	625	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_{SOLD}	Plastic Body for 10s	260	°C
Weight		4	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	600			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4mA	3.5		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			35	μA
	T_J = 125°C			1.5	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			51	mΩ

Features

- International Standard 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

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Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	20	34		S
R_{Gi}	Gate Input Resistance		2.7		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		3450		pF
C_{oss}			5200		pF
C_{rss}			53		pF
	Effective Output Capacitance				
$C_{o(er)}$	Energy related; V_{GS} = 0V		170		pF
$C_{o(tr)}$	Time related; V_{DS} = 0.8 • V_{DSS}		830		pF
$t_{d(on)}$	**Resistive Switching Times**		35		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		18		ns
$t_{d(off)}$	R_G = 3Ω (External)		76		ns
t_f			5		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		51		nC
Q_{gs}			19		nC
Q_{gd}			17		nC
R_{thJC}				0.20	°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
I_S	V_{GS} = 0V			60	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			240	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 30A, -di/dt = 200A/μs		175		ns
Q_{RM}	V_R = 100V		2.7		μC
I_{RM}			31.0		A

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

Littelfuse 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 4,860,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123B1 6,306,728B1 6,404,065B1 6,534,343 6,583,505 6,683,344 6,710,405B2 6,710,463 6,727,585 6,759,692 6,771,478B2 7,005,734B2 7,063,975B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ T_J = 25ºC

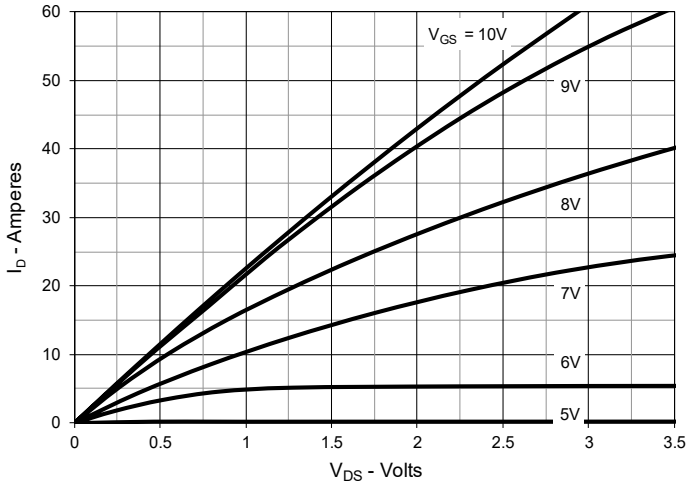

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

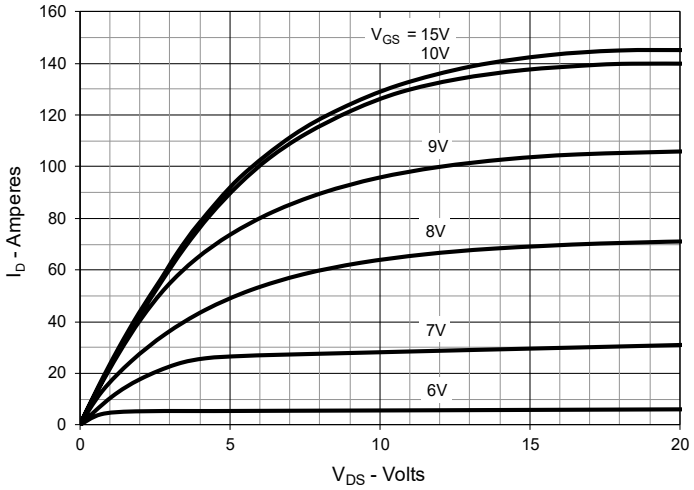

Fig. 3. Output Characteristics @ T_J = 125ºC

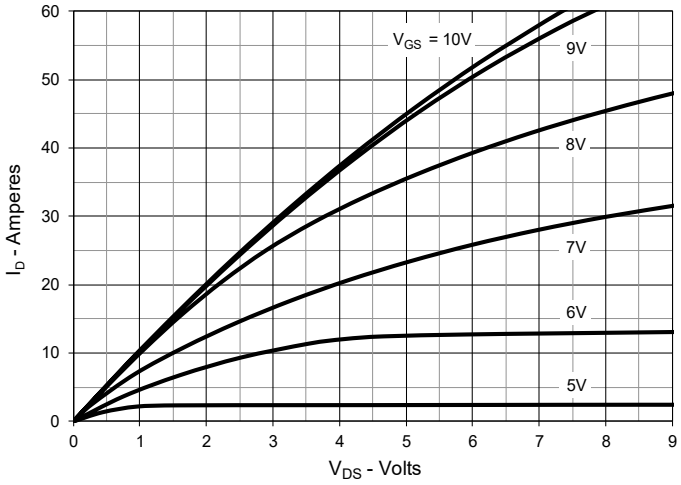

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Junction Temperature

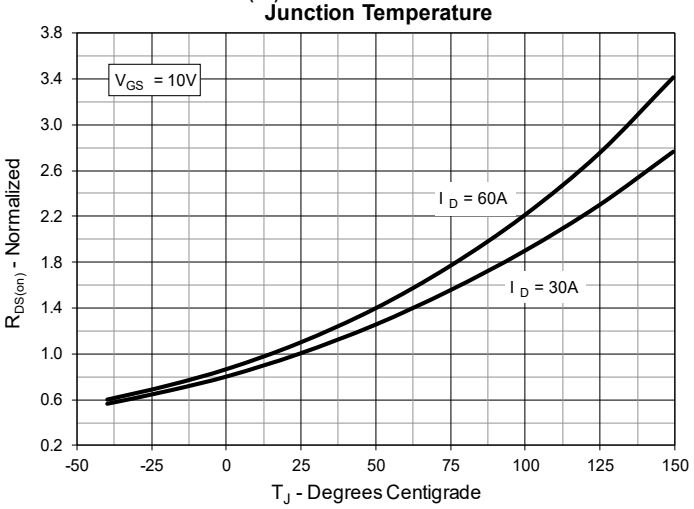

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Drain Current

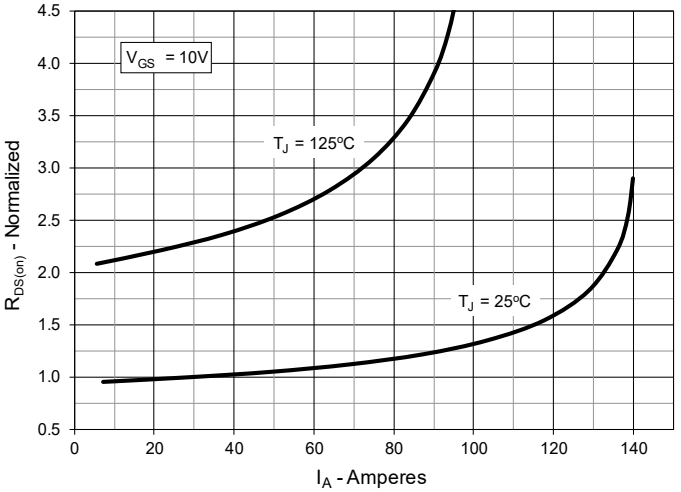

Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

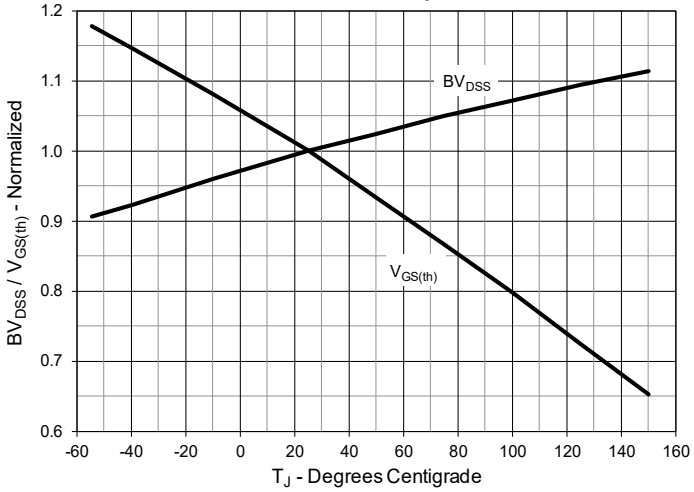

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Fig. 7. Maximum Drain Current vs. Case Temperature

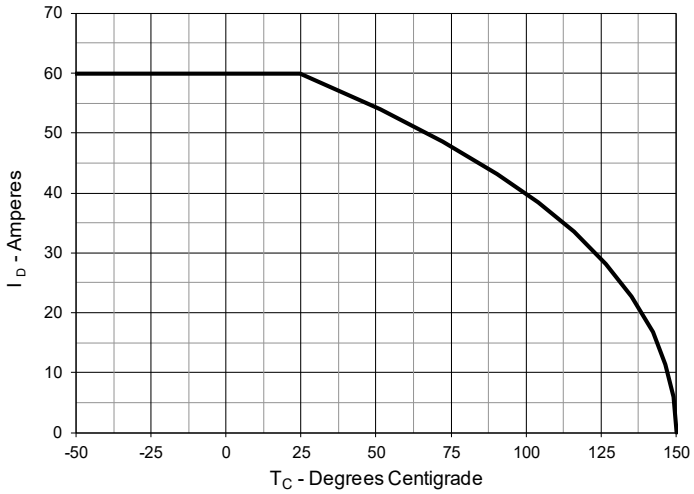

Fig. 8. Input Admittance

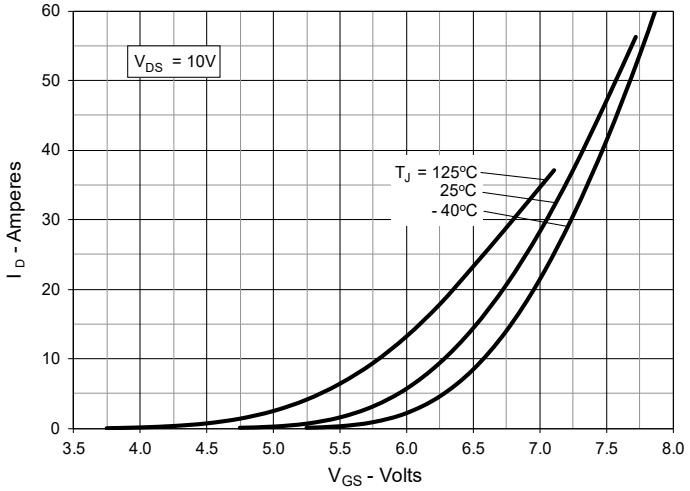

Fig. 9. Transconductance

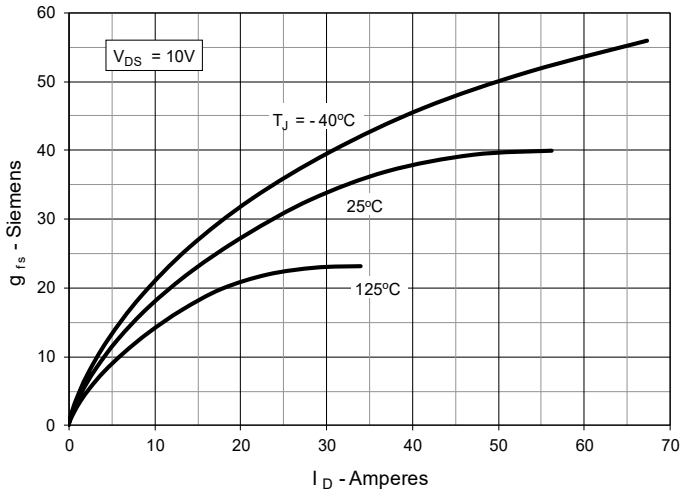

Fig. 10. Forward Voltage Drop of Intrinsic Diode

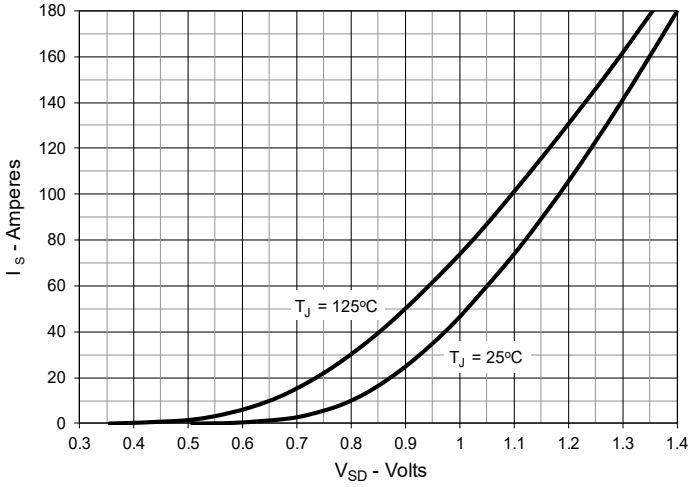

Fig. 11. Gate Charge

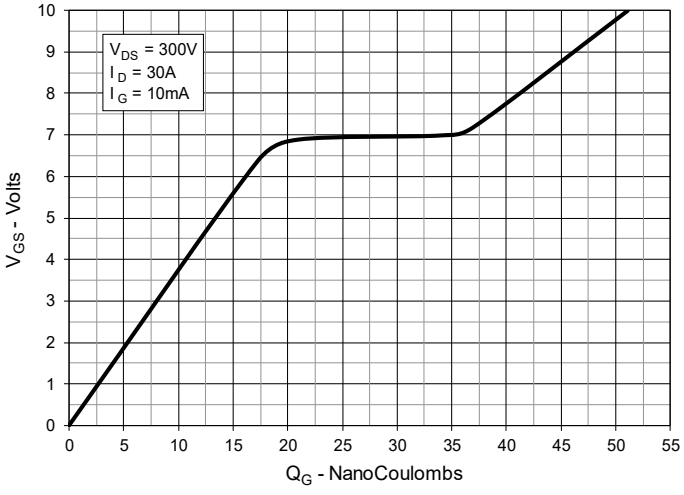

Fig. 12. Capacitance

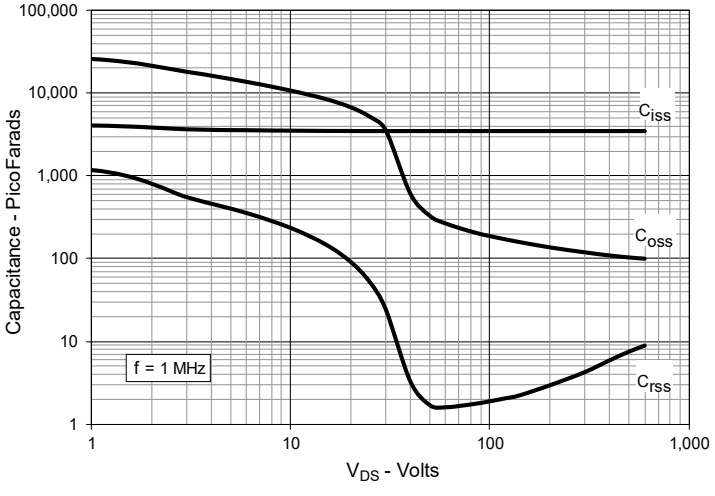

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Fig. 13. Output Capacitance Stored Energy

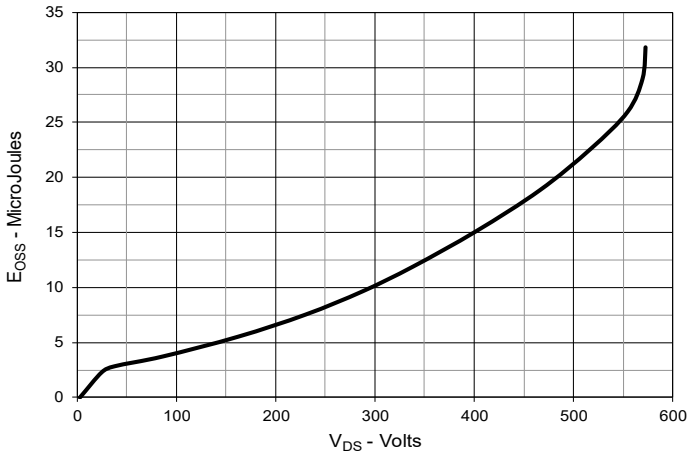


Fig. 14. Forward-Bias Safe Operating Area

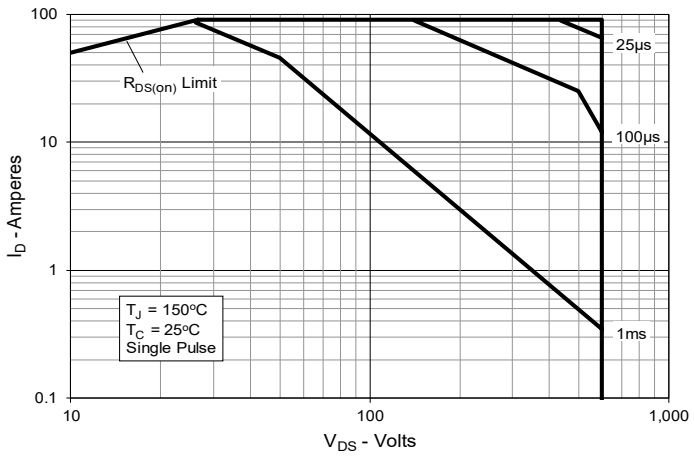
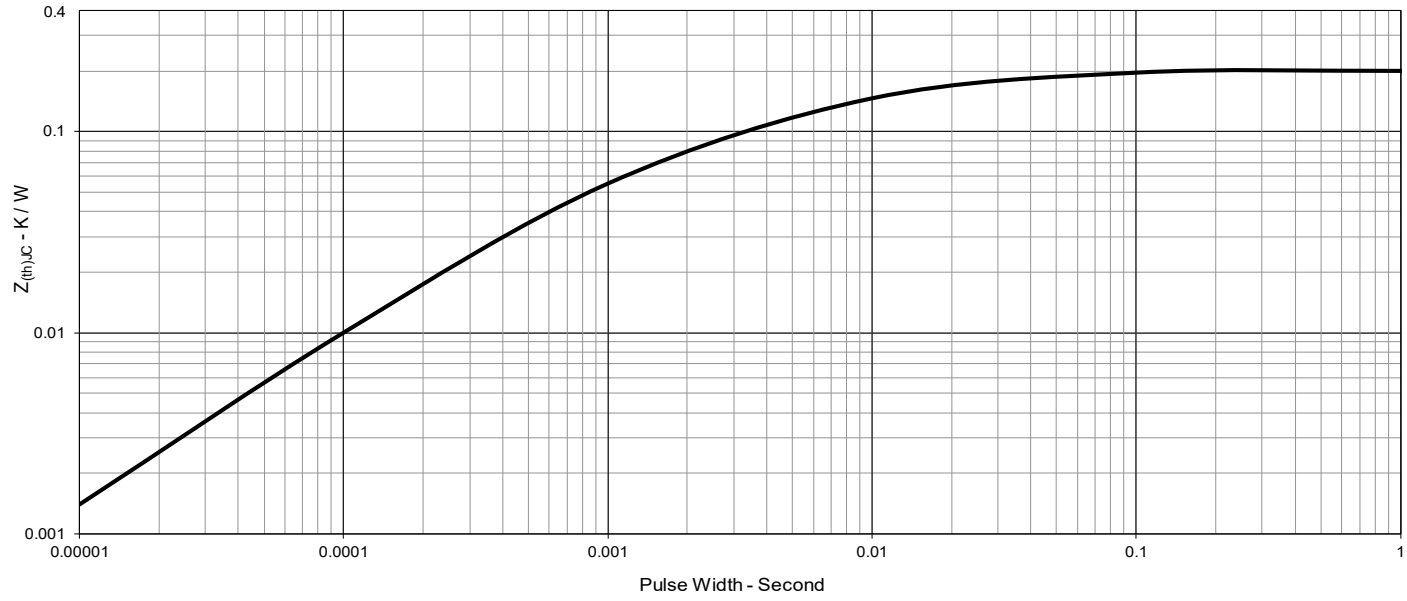


Fig. 15. Maximum Transient Thermal Impedance



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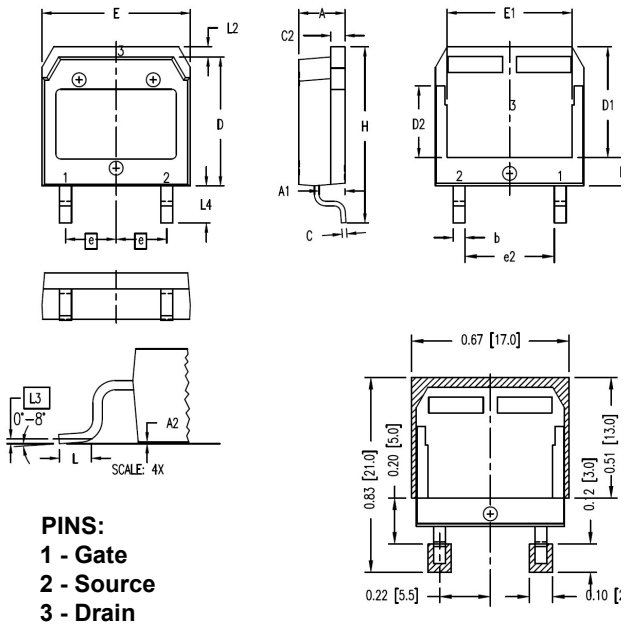
TO-268HV Outline



PINS:
1 - Gate
2 - Source
3 - Drain

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

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