

# High Voltage Power MOSFETs

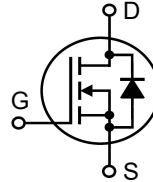
# IXTA4N150HV IXTT4N150HV

$$V_{DSS} = 1500V$$

$$I_{D25} = 4A$$

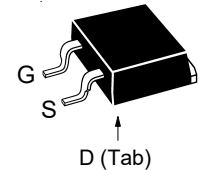
$$R_{DS(on)} \leq 6\Omega$$

N-Channel Enhancement Mode  
Fast Intrinsic Diode

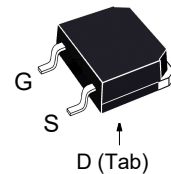


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	1500	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	1500	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	4	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	12	A
$I_A$	$T_C = 25^\circ C$	4	A
$E_{AS}$	$T_C = 25^\circ C$	350	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	5	V/ns
$P_D$	$T_C = 25^\circ C$	280	W
$T_J$		- 55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		- 55 ... +150	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
Weight	TO-263	2.5	g
	TO-268	4.0	g

## TO-263HV



## TO-268HV



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

## Features

- High Blocking Voltage
- High Voltage Package
- Fast Intrinsic Diode
- Low Package Inductance

## Advantages

- Easy to Mount
- Space Savings
- High Power Density

## Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	1500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	2.5		5.0 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 $\mu A$ 100 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			6 $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	2.8	4.6	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		1576	pF
$C_{oss}$			105	pF
$C_{rss}$			35	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 5\Omega$ (External)		19	ns
$t_r$			23	ns
$t_{d(off)}$			42	ns
$t_f$			22	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		44.5	nC
$Q_{gs}$			7.7	nC
$Q_{gd}$			21.7	nC
$R_{thJC}$				0.45 $^\circ\text{C/W}$

### Source-Drain Diode

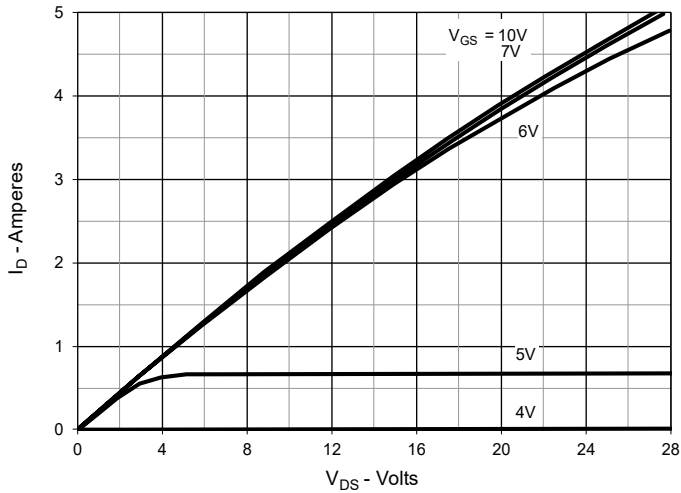
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			4 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			16 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.3 V
$t_{rr}$	$I_F = 2\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$		0.9	$\mu\text{s}$
$I_{RM}$			15.0	A
$Q_{RM}$			6.7	$\mu\text{C}$

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

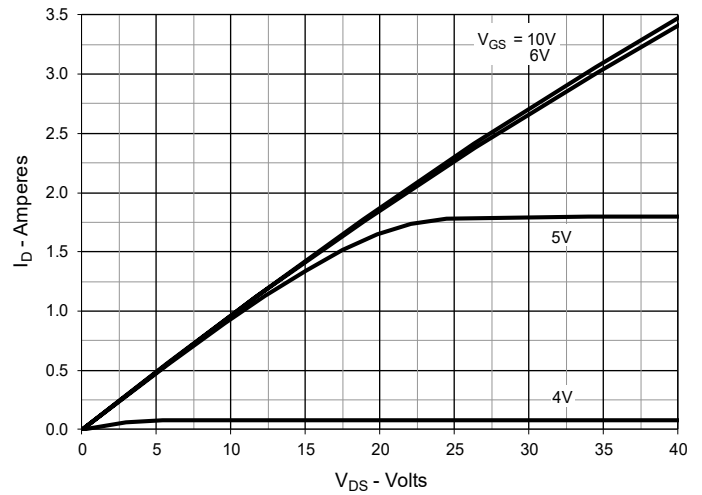
Littelfuse reserves the right to change limits, test conditions, and dimensions.

LF 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	7,157,338 B2
	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	

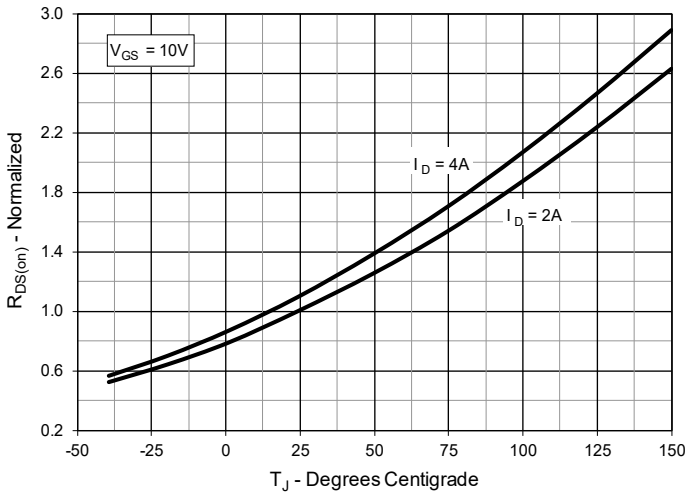
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



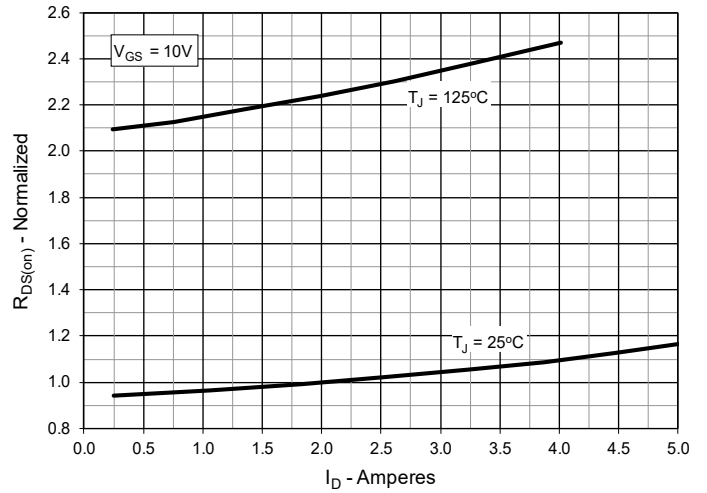
**Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$**



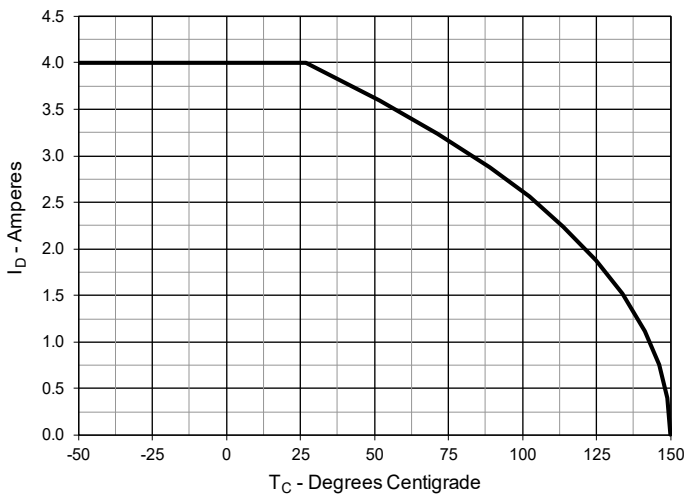
**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 2\text{A}$  Value vs. Junction Temperature**



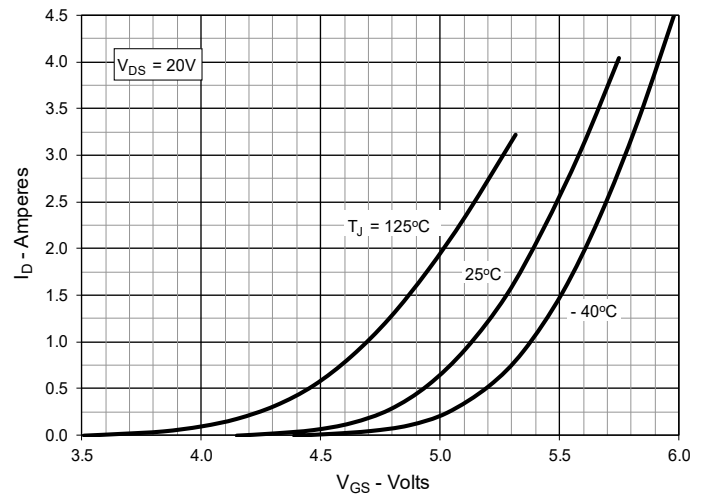
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 2\text{A}$  Value vs. Drain Current**



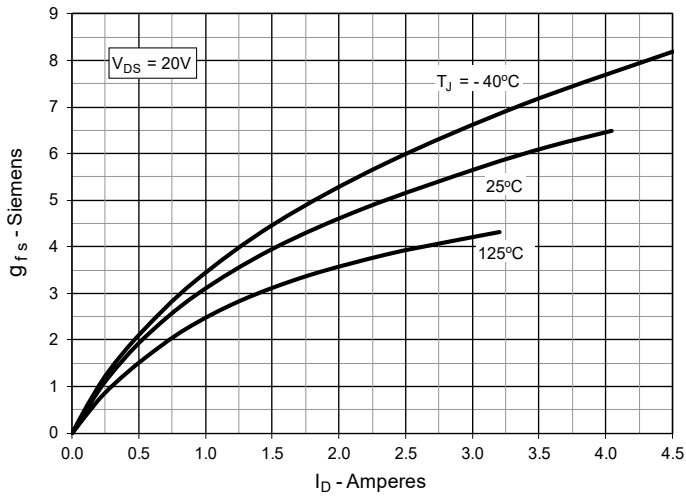
**Fig. 5. Maximum Drain Current vs. Case Temperature**



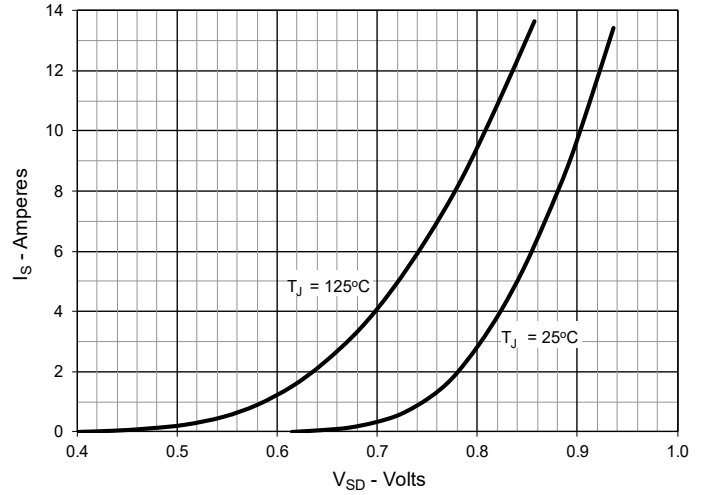
**Fig. 6. Input Admittance**



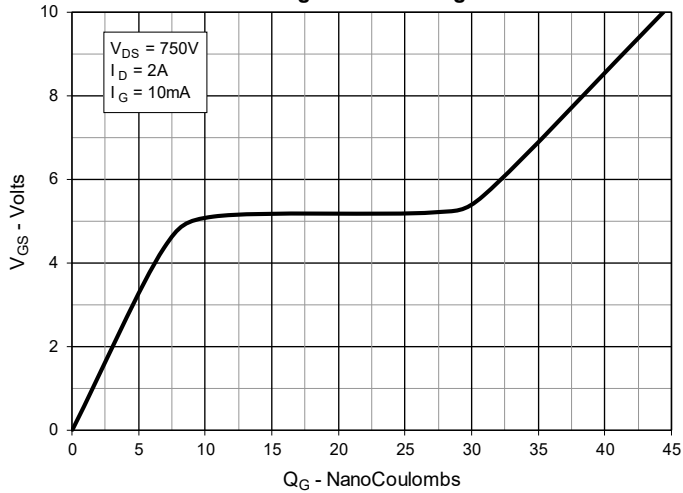
**Fig. 7. Transconductance**



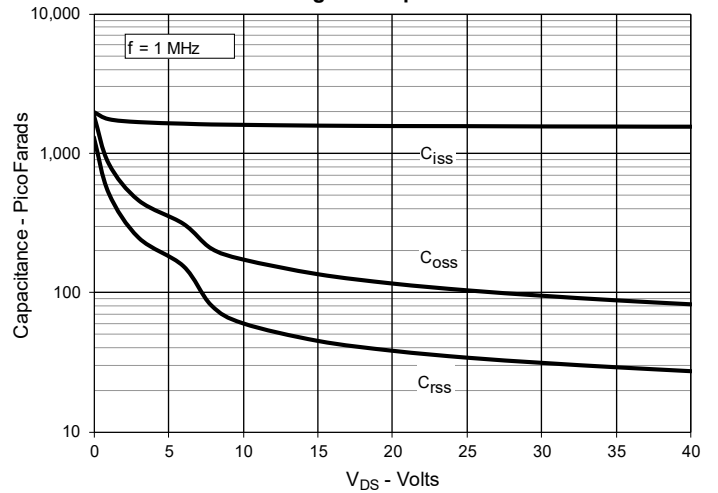
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



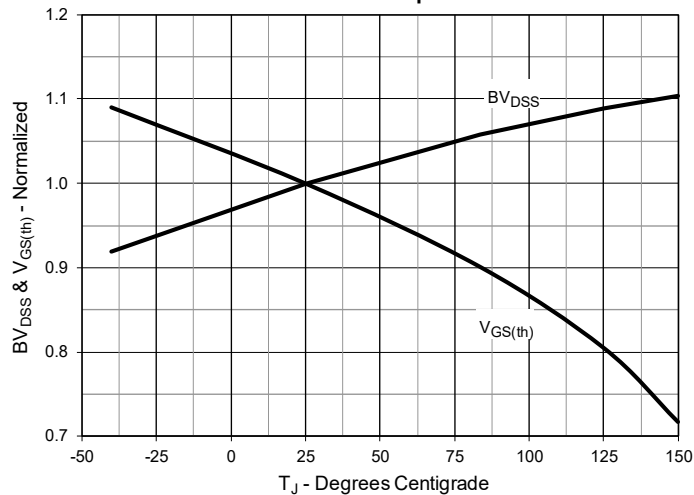
**Fig. 9. Gate Charge**



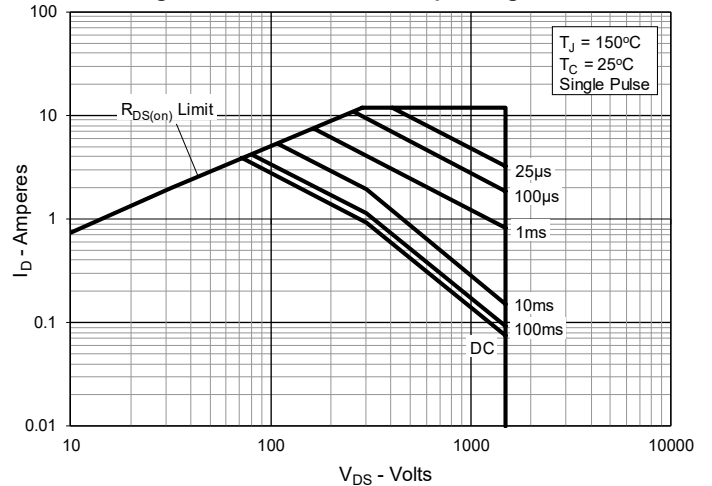
**Fig. 10. Capacitance**



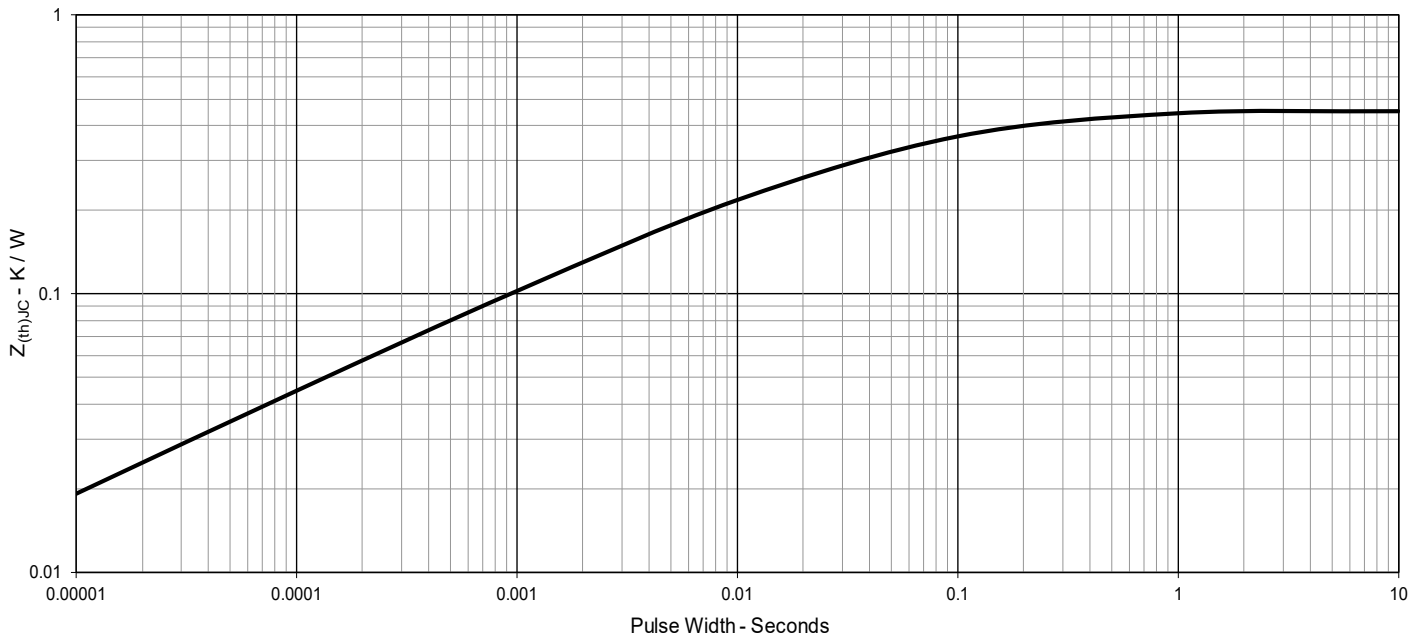
**Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature**



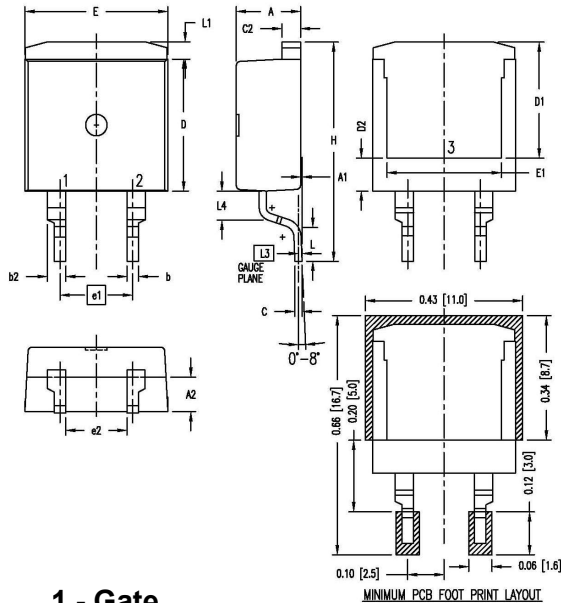
**Fig. 12. Forward-Bias Safe Operating Area**



**Fig. 13. Maximum Transient Thermal Impedance**

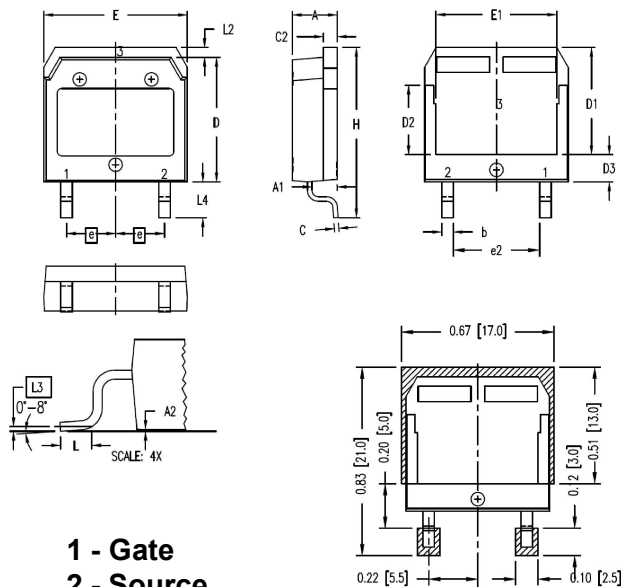


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**TO-263HV Outline**


- 1 - Gate**
- 2 - Source**
- 3 - Drain**

SYM	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.170	0.185	4.30	4.70
A1	0.000	0.008	0.00	0.20
A2	0.091	0.098	2.30	2.50
b	0.028	0.035	0.70	0.90
b2	0.046	0.054	1.18	1.38
c	0.018	0.024	0.45	0.60
C2	0.049	0.055	1.25	1.40
D	0.354	0.370	9.00	9.40
D1	0.311	0.327	7.90	8.30
D2	0.083	0.098	2.10	2.50
E	0.386	0.402	9.80	10.20
E1	0.307	0.323	7.80	8.20
e1	0.200	BSC	5.08	BSC
e (2)	0.163	0.174	4.13	4.43
H	0.591	0.614	15.00	15.60
L	0.079	0.102	2.00	2.60
L1	0.039	0.055	1.00	1.40
L3	0.100	BSC	0.254	BSC
L4	0.071	0.087	1.80	2.20

**TO-268HV Outline**


- 1 - Gate**
- 2 - Source**
- 3 - Drain**

SYM	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.193	0.201	4.90	5.10
A1	0.106	0.114	2.70	2.90
A2	0.001	0.010	0.02	0.25
b	0.045	0.057	1.15	1.45
C	0.016	0.026	0.40	0.65
C2	0.057	0.063	1.45	1.60
D	0.543	0.551	13.80	14.00
D1	0.465	0.476	11.80	12.10
D2	0.295	0.307	7.50	7.80
D3	0.114	0.126	2.90	3.20
E	0.624	0.632	15.85	16.05
E1	0.524	0.535	13.30	13.60
e	0.215	BSC	5.45	BSC
e (2)	0.374	0.386	9.50	9.80
H	0.736	0.752	18.70	19.10
L	0.067	0.079	1.70	2.00
L2	0.039	0.045	1.00	1.15
L3	0.010	BSC	0.25	BSC
L4	0.150	0.161	3.80	4.10