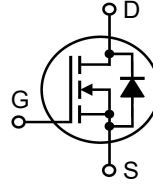


**X3-Class  
HiPerFET™  
Power MOSFET**

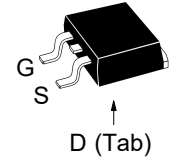
**IXFA36N60X3**

**V<sub>DSS</sub> = 600V**  
**I<sub>D25</sub> = 36A**  
**R<sub>DS(on)</sub> ≤ 90mΩ**

N-Channel Enhancement Mode  
Avalanche Rated



**TO-263  
(IXFA)**



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

Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	600	V
V <sub>DGR</sub>	T <sub>J</sub> = 25°C to 150°C, R <sub>GS</sub> = 1MΩ	600	V
V <sub>GSS</sub>	Continuous	±20	V
V <sub>GSM</sub>	Transient	±30	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	36	A
I <sub>DM</sub>	T <sub>C</sub> = 25°C, Pulse Width Limited by T <sub>JM</sub>	48	A
I <sub>A</sub>	T <sub>C</sub> = 25°C	8	A
E <sub>AS</sub>	T <sub>C</sub> = 25°C	750	mJ
dv/dt	I <sub>S</sub> ≤ I <sub>DM</sub> , V <sub>DD</sub> ≤ V <sub>DSS</sub> , T <sub>J</sub> ≤ 150°C	50	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25°C	446	W
T <sub>J</sub>		-55 ... +150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55 ... +150	°C
T <sub>SOLD</sub>	Plastic Body for 10s	260	°C
F <sub>C</sub>	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight		2.5	g

**Features**

- International Standard Package
- Low R<sub>DS(ON)</sub> and Q<sub>G</sub>
- 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 <sub>J</sub> = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA	600		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 2.5mA	3.5		5.0 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> , V <sub>GS</sub> = 0V T <sub>J</sub> = 125°C			25 μA 1 mA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1			90 mΩ

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$g_{fs}$	$V_{DS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	16	26	S
$R_{Gi}$	Gate Input Resistance		2.1	$\Omega$
$C_{iss}$	} $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		2030	pF
$C_{oss}$			3050	pF
$C_{rss}$			3.6	pF
<b>Effective Output Capacitance</b>				
$C_{o(er)}$	Energy related	} $V_{GS} = 0\text{V}$ $V_{DS} = 0.8 \cdot V_{DSS}$	110	pF
$C_{o(tr)}$	Time related		510	pF
$t_{d(on)}$	} <b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 10\Omega$ (External)		23	ns
$t_r$			8	ns
$t_{d(off)}$			45	ns
$t_f$			4	ns
$Q_{g(on)}$	} $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		29	nC
$Q_{gs}$			10	nC
$Q_{gd}$			10	nC
$R_{thJC}$				0.28 $^\circ\text{C/W}$

**Source-Drain Diode**

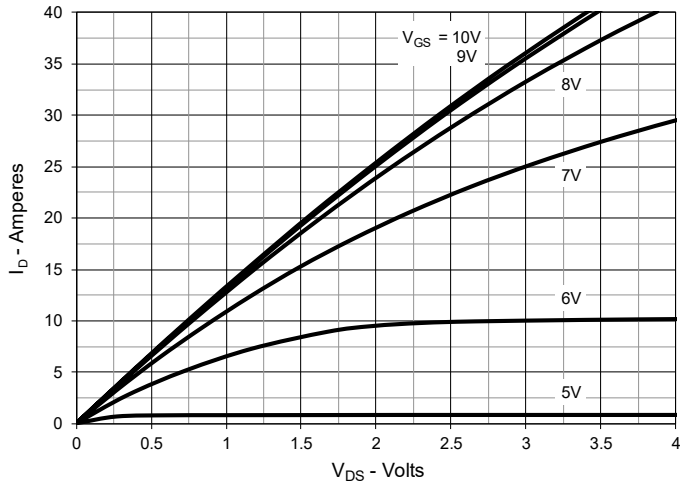
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$I_S$	$V_{GS} = 0\text{V}$			36 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			144 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	} $I_F = 18\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		180	ns
$Q_{RM}$			1.6	$\mu\text{C}$
$I_{RM}$			18.0	A

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

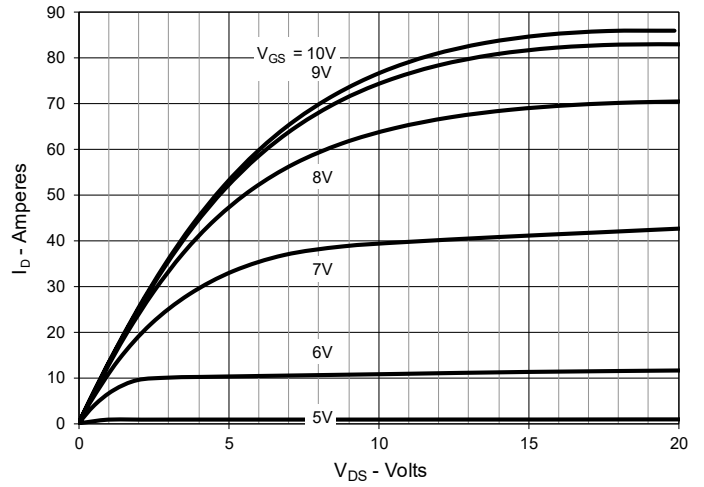
Littelfuse reserves the right to change limits, test conditions and dimensions.

IXYS MOSFETs and IGBTs are covered	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
by one or more of the following U.S. patents:	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	

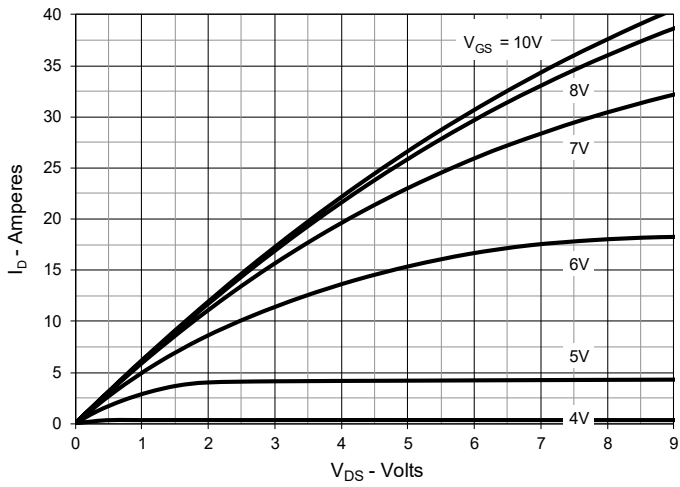
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



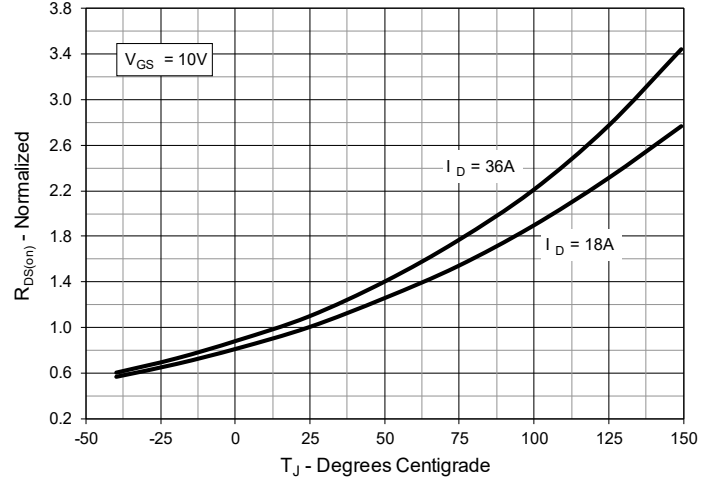
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



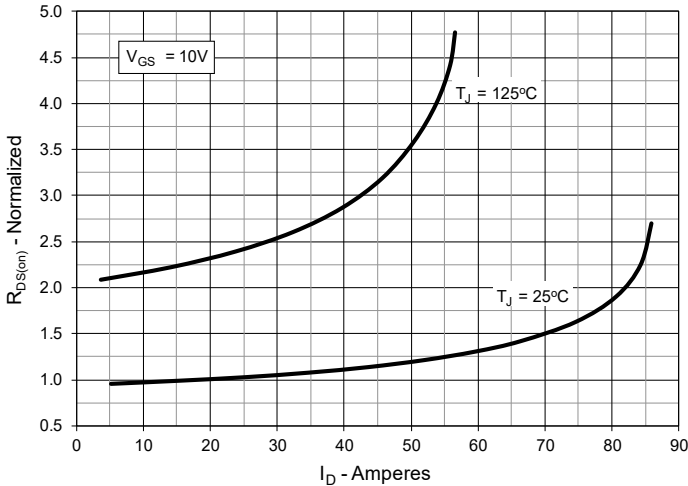
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



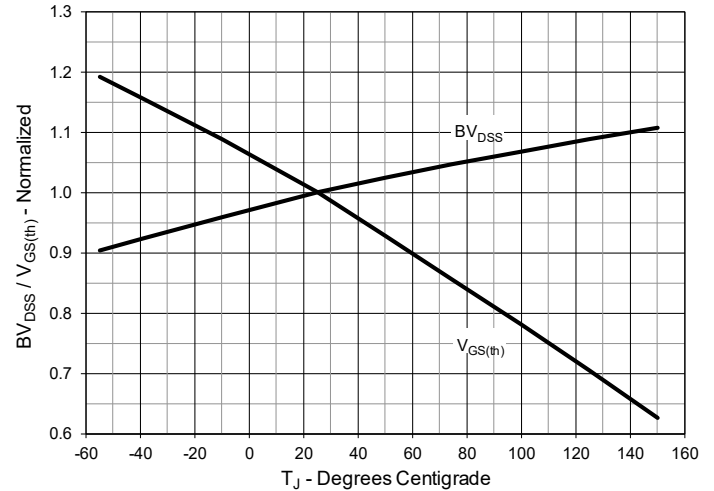
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 18\text{A}$  Value vs. Junction Temperature**

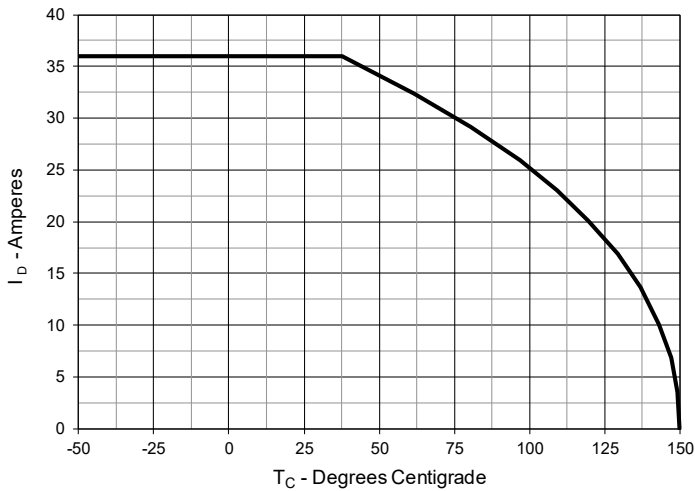
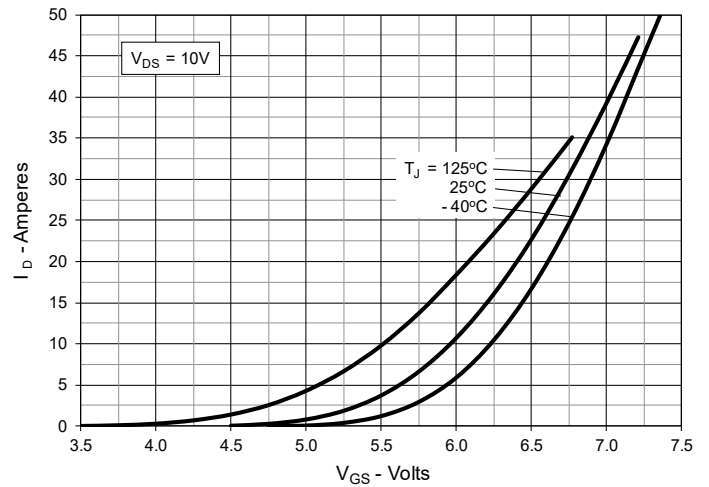
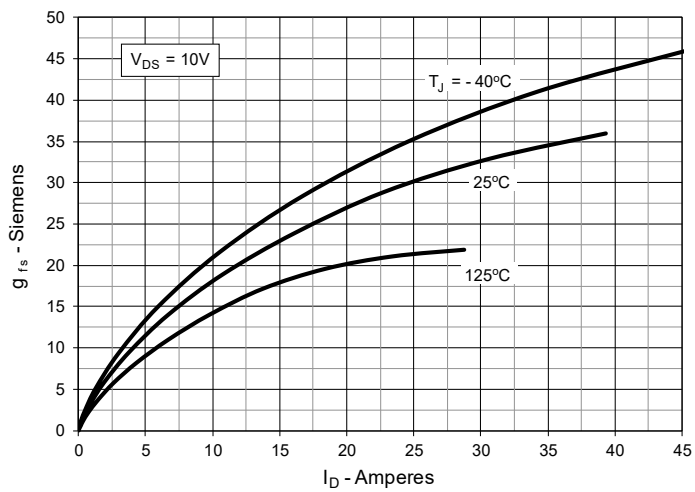
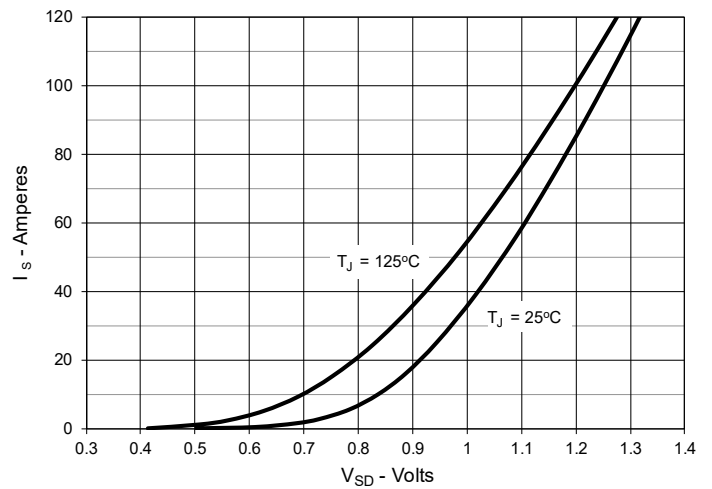
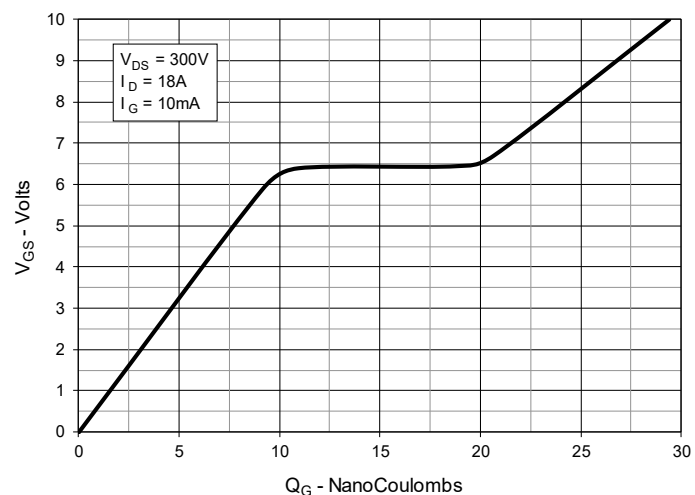
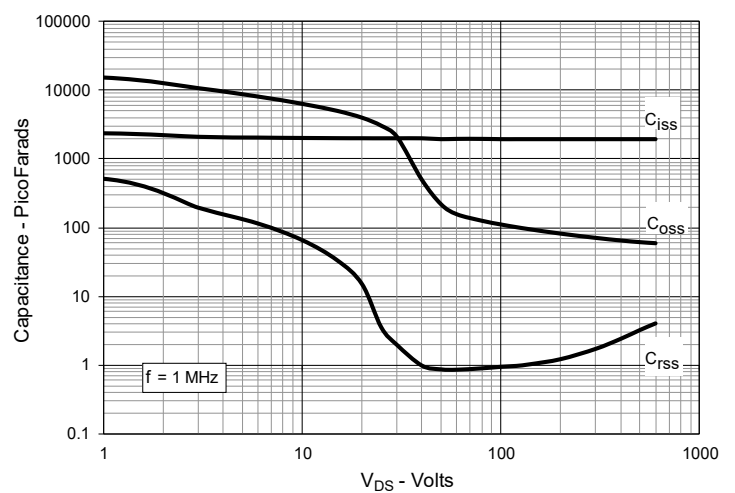


**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 18\text{A}$  Value vs. Drain Current**

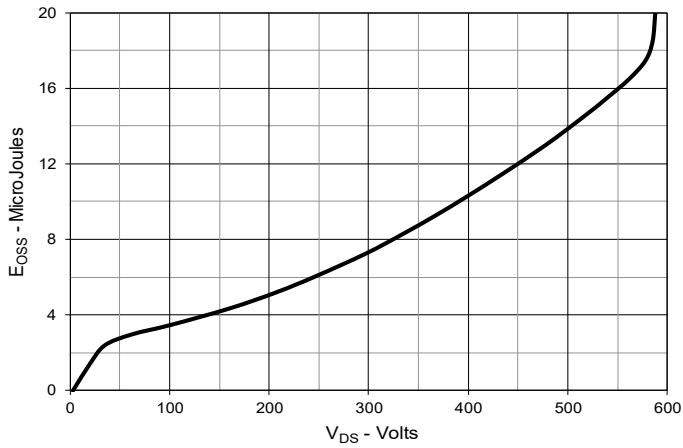


**Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature**

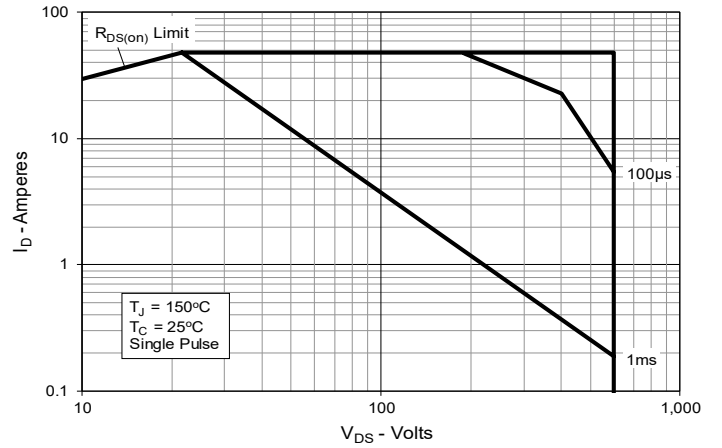


**Fig. 7. Maximum Drain Current vs. Case Temperature**

**Fig. 8. Input Admittance**

**Fig. 9. Transconductance**

**Fig. 10. Forward Voltage Drop of Intrinsic Diode**

**Fig. 11. Gate Charge**

**Fig. 12. Capacitance**


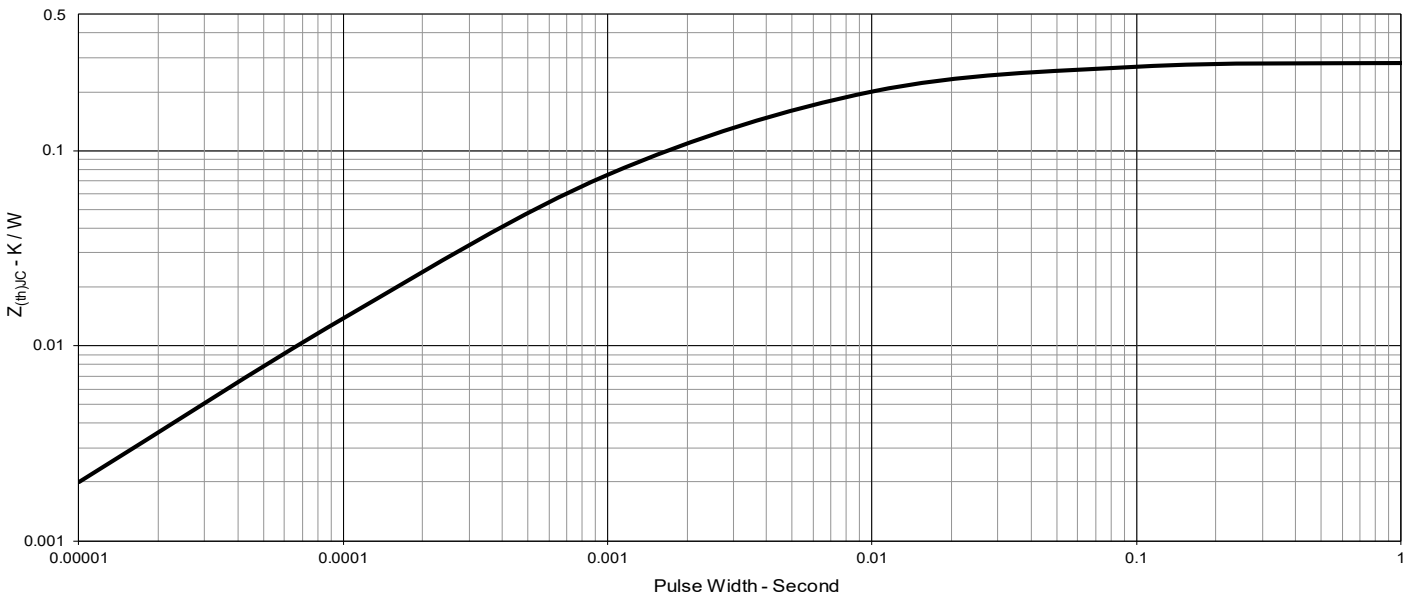
**Fig. 13. Output Capacitance Stored Energy**

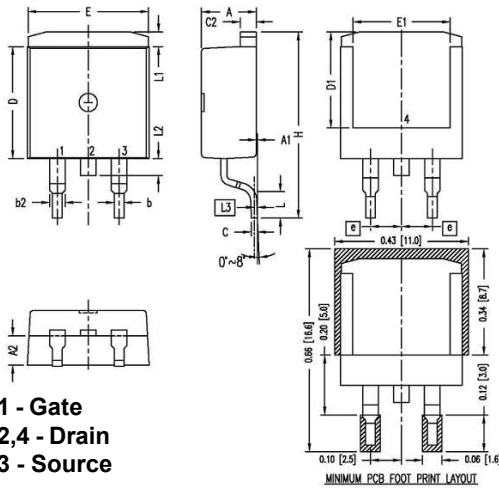


**Fig. 14. Forward-Bias Safe Operating Area**



**Fig. 15. Maximum Transient Thermal Impedance**



**TO-263 Outline**


- 1 - Gate
- 2,4 - Drain
- 3 - Source

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	.060	1.18	1.52
C	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
D	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
<b>(e)</b>	.100	BSC	2.54	BSC
H	.580	.620	14.73	15.75
L	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	—	.070	—	1.77
<b>(L3)</b>	.010	BSC	0.254	BSC

- NOTE:
1. This drawing meets all dimensions requirement of JEDEC outlines TO-263AB.
  2. All metal surface are matte pure tin plated except trimmed area.
  3. **(L3)** is Gauge plane to measure L.
  4. These dimension do not include mold flash and they will not exceed 0.005[0.13] per side.



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