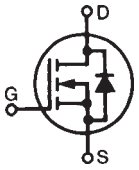
IXYS

X-Class HiPerFET™ Power MOSFET

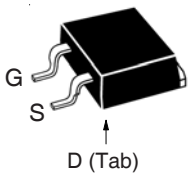
IXFA20N85XHV

V_{DSS} = 850V
I_{D25} = 20A
$R_{DS(on)}$ ≤ 330mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-263HV



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	850	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	850	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	20	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	50	A
I_A	T_C = 25°C	10	A
E_{AS}	T_C = 25°C	800	mJ
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	540	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
dT/dt	Heating / Cooling rate, 175°C - 210°C	50	°C/min
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight		2.5	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	850			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 2.5mA	3.5		5.5	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			25	μA
	T_J = 125°C			1.5	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			330	mΩ

Features

- International Standard Package
- 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

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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	6	10		S
R_{Gi}	Gate Input Resistance		0.8		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1660		pF
C_{oss}			1730		pF
C_{rss}			24		pF
	Effective Output Capacitance				
$C_{o(er)}$	Energy related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		67		pF
$C_{o(tr)}$	Time related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		270		pF
$t_{d(on)}$	**Resistive Switching Times**		20		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		28		ns
$t_{d(off)}$	R_G = 5Ω (External)		44		ns
t_f			20		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		63		nC
Q_{gs}			12		nC
Q_{gd}			26		nC
R_{thJC}				0.23	°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			20	A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			80	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 20A, -di/dt = 100A/μs		190		ns
Q_{RM}	V_R = 100V		1.6		μC
I_{RM}			16.5		A

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

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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 = 25°C

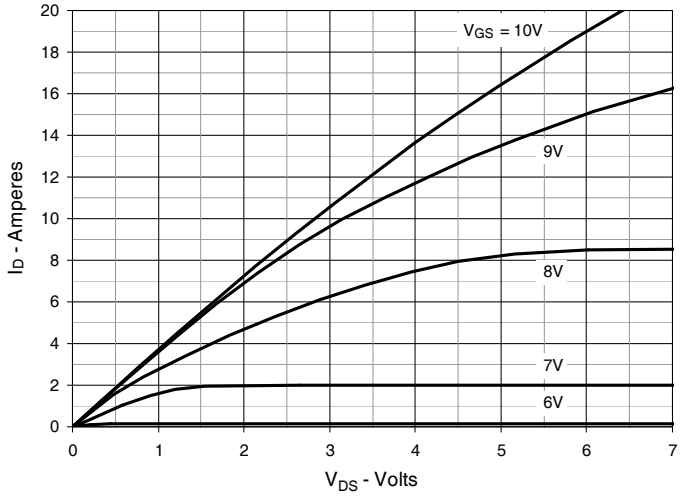


Fig. 2. Extended Output Characteristics @ T_J = 25°C

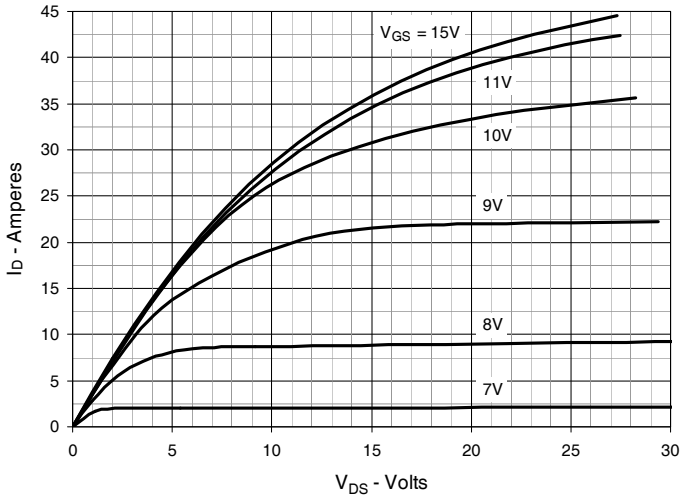


Fig. 3. Output Characteristics @ T_J = 125°C

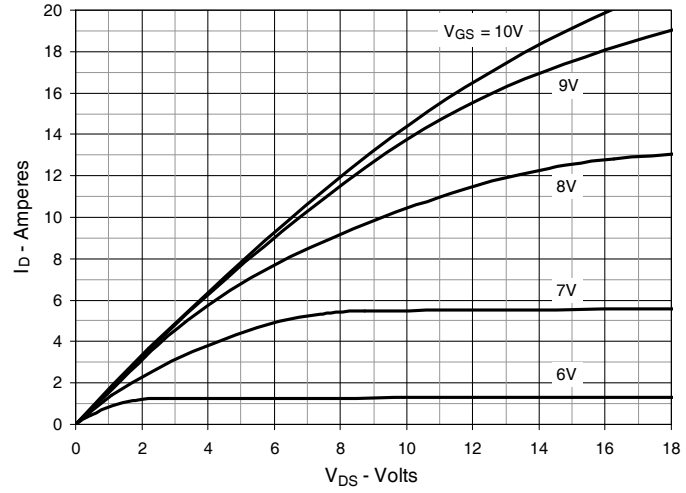


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Junction Temperature

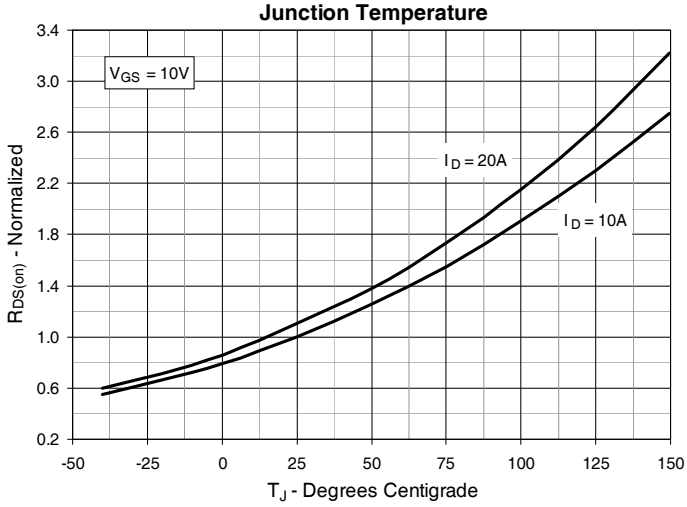


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Drain Current

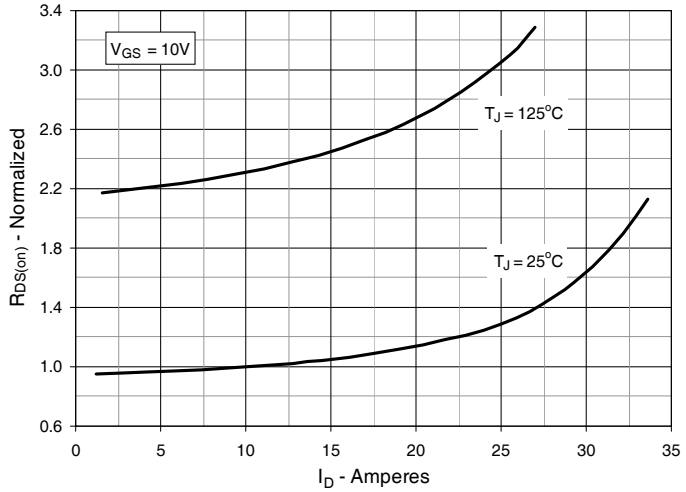
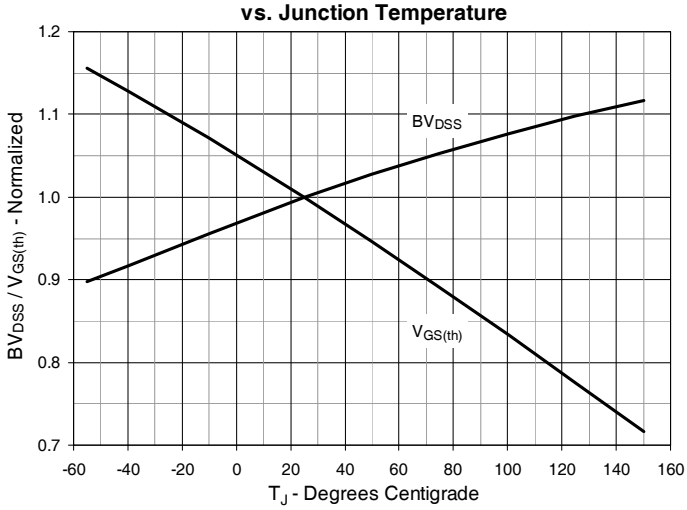


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature



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Fig. 7. Maximum Drain Current vs. Case Temperature

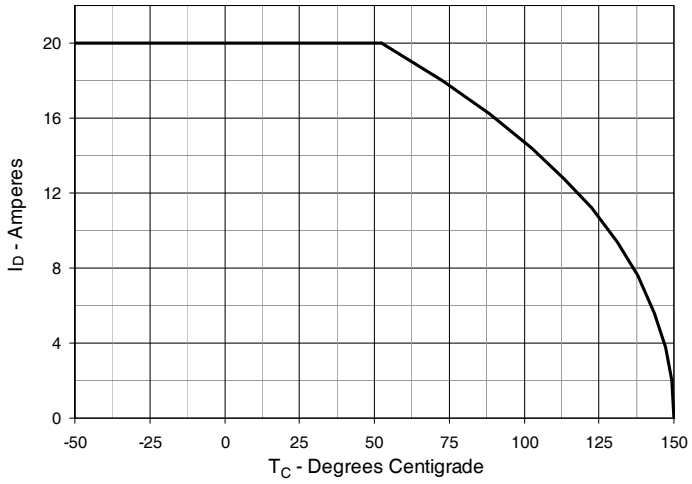


Fig. 8. Input Admittance

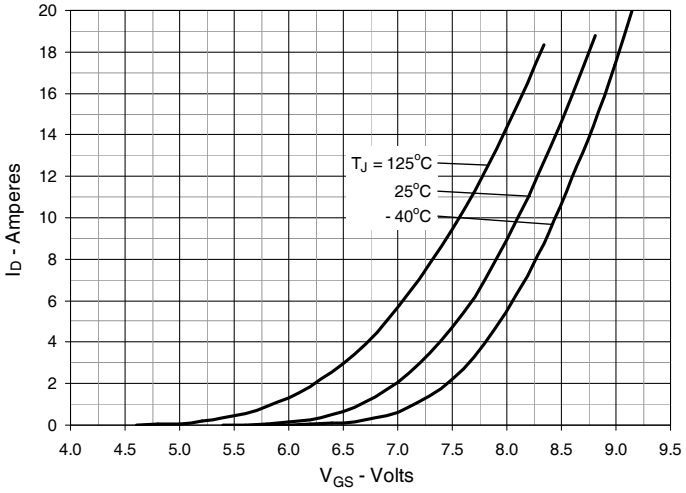


Fig. 9. Transconductance

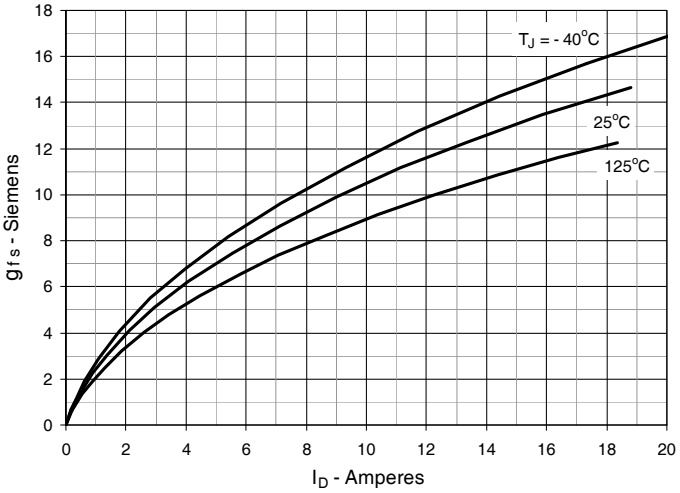


Fig. 10. Forward Voltage Drop of Intrinsic Diode

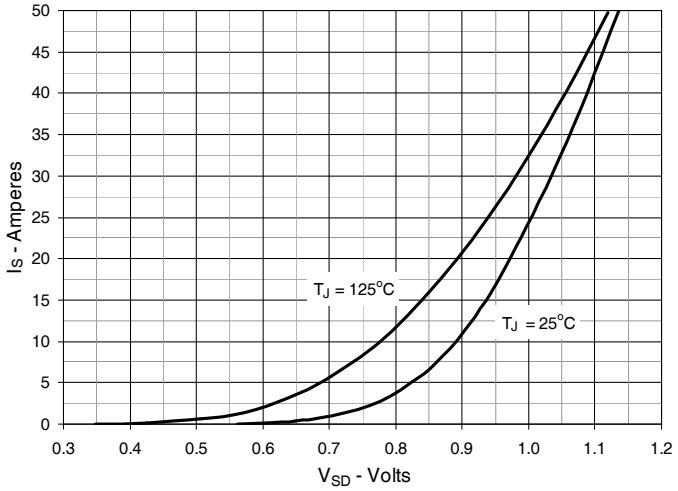


Fig. 11. Gate Charge

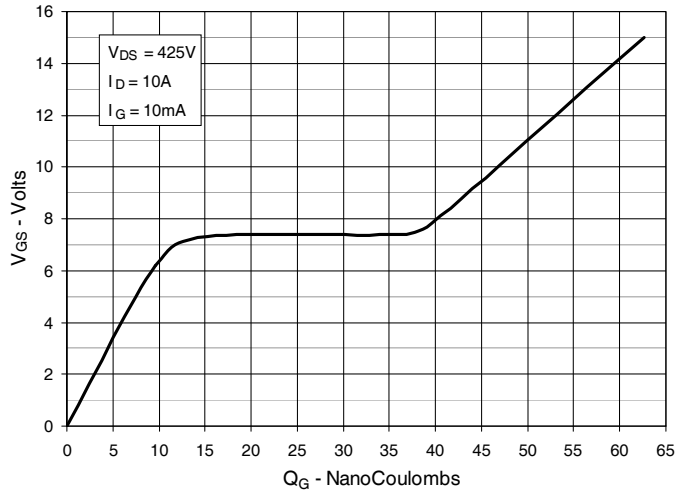
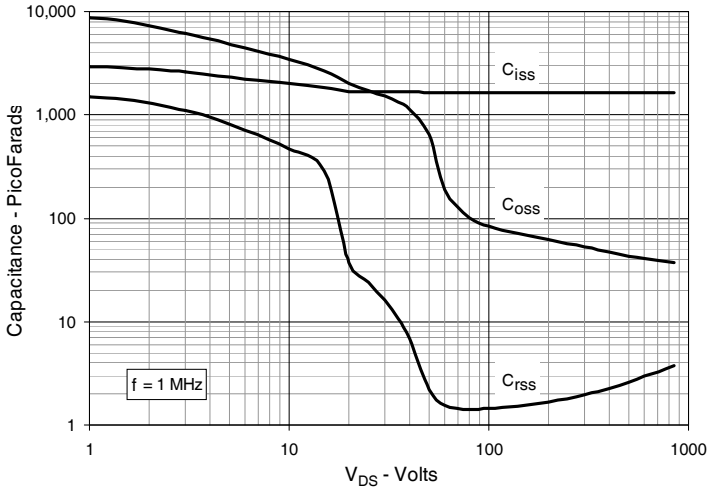


Fig. 12. Capacitance



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Fig. 13. Output Capacitance Stored Energy

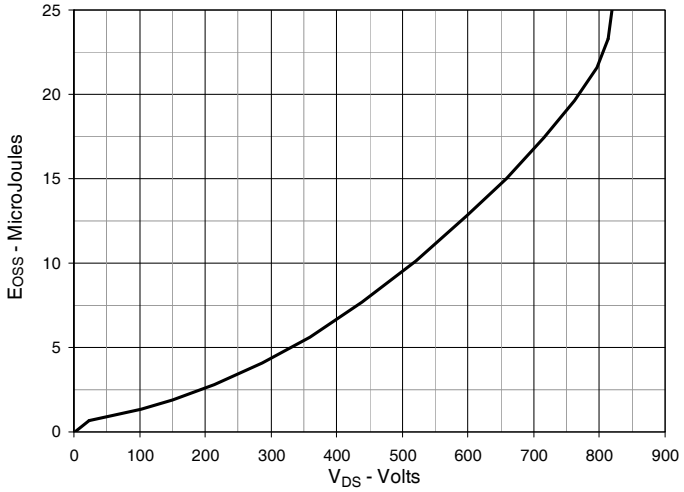


Fig. 14. Forward-Bias Safe Operating Area

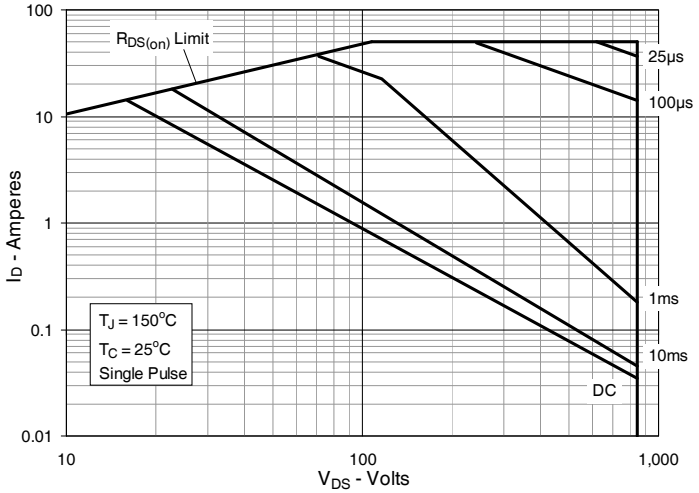
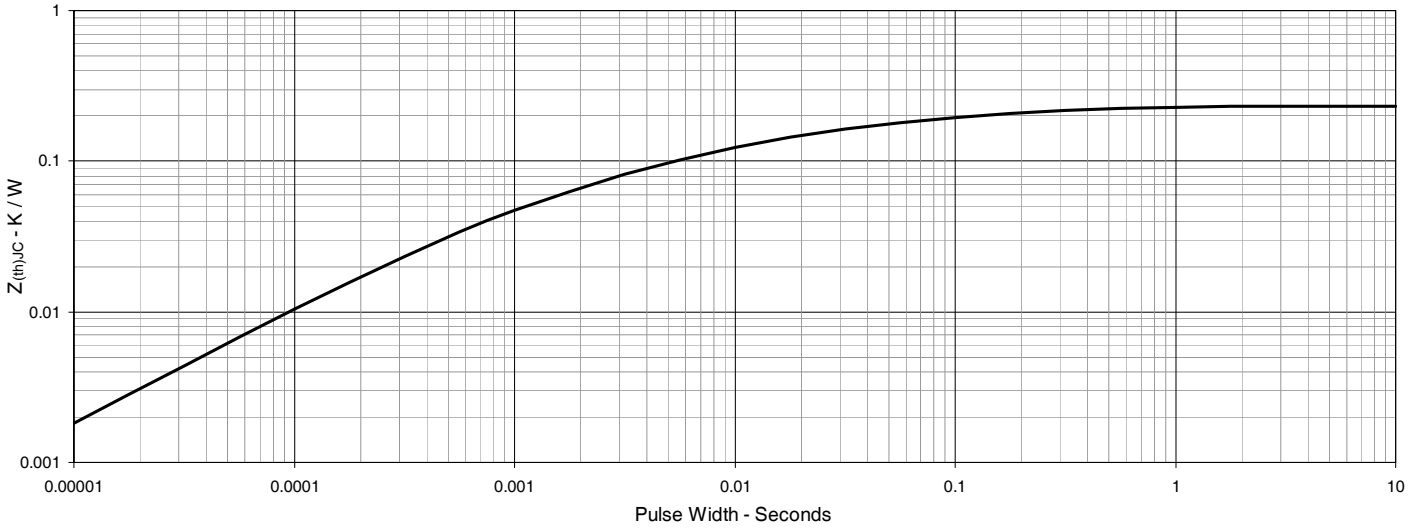
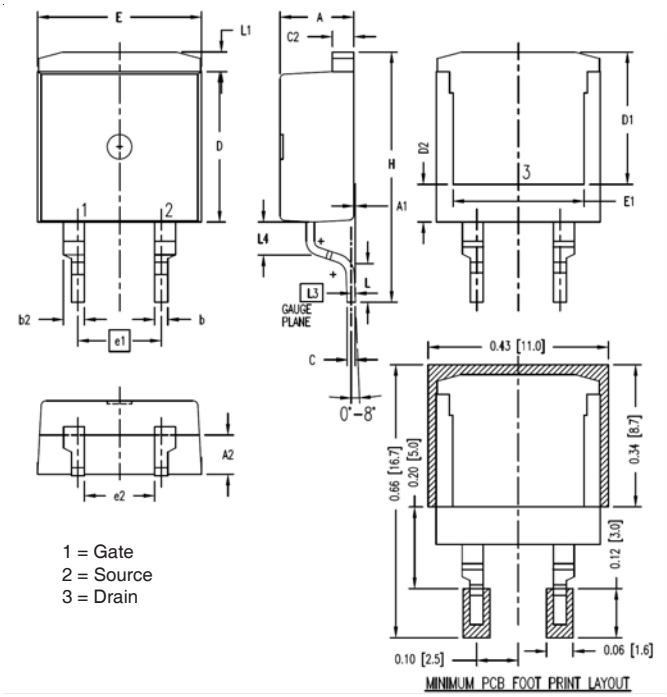


Fig. 15. Maximum Transient Thermal Impedance



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TO-263HV Outline



1 = Gate
2 = Source
3 = Drain

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

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