N-Channel Enhancement Mode Power MOSFET **MXB6888**

DESCRIPTION

The MXB6888 is N-channel MOS Field Effect Transistor designed for high current switching applications. Rugged E_{AS} capability and ultra low $R_{DS(ON)}$ is suitable for PWM, load switching especially for E-Bike controller applications.

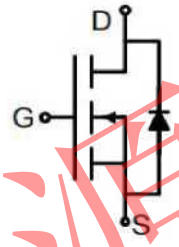
GENERAL FEATURES

- V_{DS}=68V, I_D=80A @ V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=6.8mΩ @ V_{GS}=10V
- Special Designed for E-Bike Controller Application
- Ultra Low On-Resistance
- High UIS and UIS 100% Test

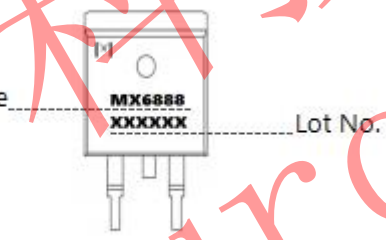
APPLICATION

- 48V E-Bike Controller Applications
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

PINOUT



Schematic diagram



Marking and pin Assignment


TO-263 top view

KEY PERFORMANCE PARAMETERS(T_A=25°C unless otherwise noted)

Parameter	Value	Unit
V_{DS} @ T_C=25°C	68	V
$R_{DS(ON)}$(Typ.) @ V_{GS}=10V	6.8	mΩ
Q_g(Typ.)	56	nC
I_D @ T_C=25°C	80	A
P_D @ T_C=25°C	75	W
T_J, TSTG	-55 to 175	°C

PACKAGE INFORMATION

Package	TO-263

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N-Channel Enhancement Mode Power MOSFET **MXB6888**

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage (V_{GS}=0V)	V_{DS}	68	V
Gate-Source Voltage (V_{DS}=0V)	V_{GS}	±20	V
Drain Current (DC) at T_C=25°C	$I_{D(DC)}$	80	A
Drain Current (DC) at T_C=100°C	$I_{D(DC)}$	45	A
Drain Current-Continuous@ Current-Pulsed (Note1)	$I_{DM(pluse)}$	260	A
Peak Diode Recovery Voltage	dv/dt	8	V/ns
Maximum Power Dissipation(T_C=25°C)	P_D	75	W
Derating Factor		0. 5	W/°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	300	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C

Notes 1 . Repetitive Rating: Pulse width limited by maximum junction temperature
2. E_{AS} condition: T_J=25°C, V_{DD}=33V, V_G=10V

THERMAL RESISTANCE

Parameter	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.34	°C/W

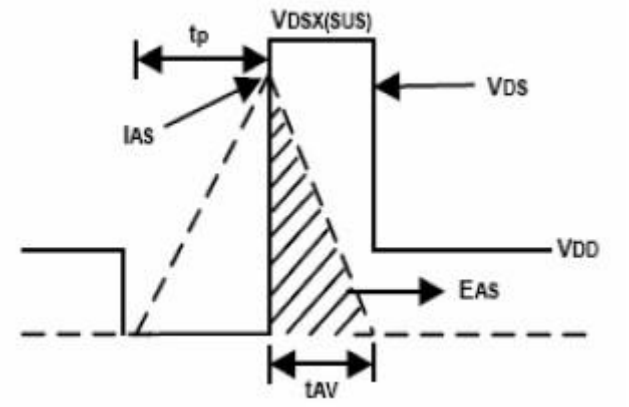
ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

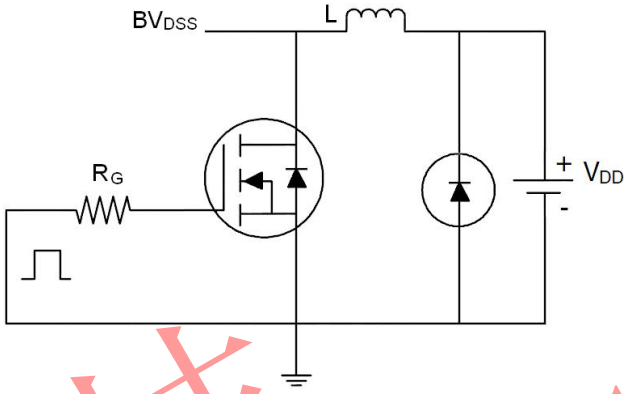
Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	68	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=64V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	-	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A	-	6.8	8.2	mΩ
Dynamic Characteristics						
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=15A	15	-	-	S
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, F=1.0MHz	-	2873	-	pF
Output Capacitance	C_{oss}		-	252	-	pF
Reverse Transfer Capacitance	C_{rss}		-	205	-	pF
Total Gate Charge	Q_g	V_{DS}=50V, I_D=40A, V_{GS}=10V	-	56	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	nC
Gate-Drain Charge	Q_{gd}		-	16	-	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, I_D=2A, R_L=15Ω V_{GS}=10V,R_{GEN}=2.5Ω	-	14.5	-	nS
Turn-on Rise Time	t_r		-	24	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	nS
Turn-Off Fall Time	t_f		-	22	-	nS
Source-Drain Diode Characteristics						
Forward On Voltage(Note1)	V_{SD}	T_J=25°C, V_{GS}=0V, I_S=40A	-	0.89	0.99	V
Source-Drain Current(Body Diode)	I_{SD}		-	65	-	A
Pulsed Source-Drain Current(Body Diode)			-	260	-	A
Reverse Recovery Time(Note1)	t_{rr}	T_J=25°C, I_F=75A, di/dt=100A/μs	-	22	-	nS
Reverse Recovery Charge(Note1)	Q_{rr}		-	27	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R_G = 25Ω, Starting T_J = 25°C

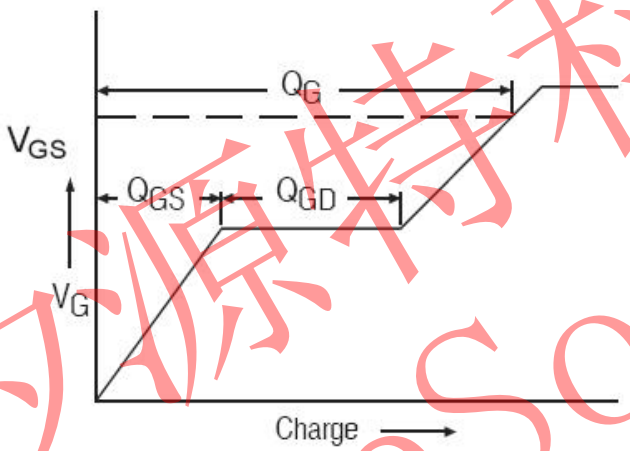
TYPICAL PERFORMANCE CHARACTERISTICS

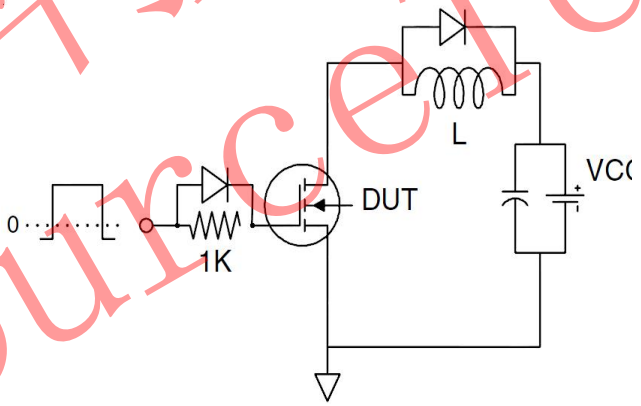
1) E_{AS} Test Circuits



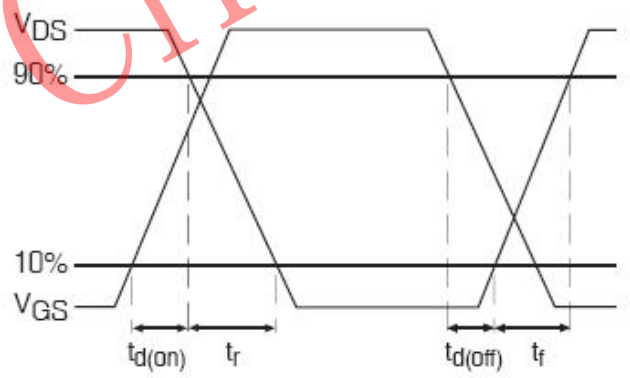


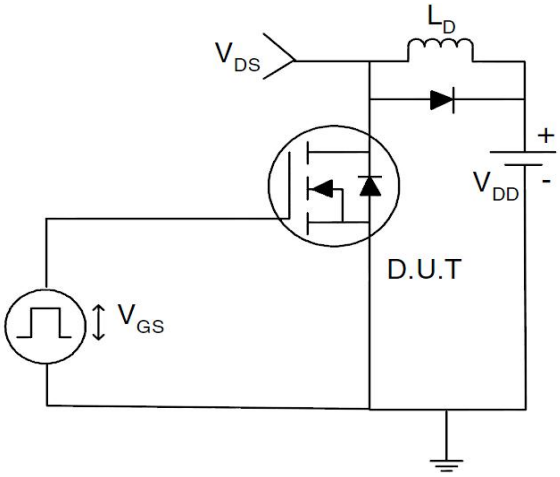
2) Gate Charge Test Circuit:





3) Switch Time Test Circuit:





TYPICAL PERFORMANCE CHARACTERISTICS

Figure1. Output Characteristics

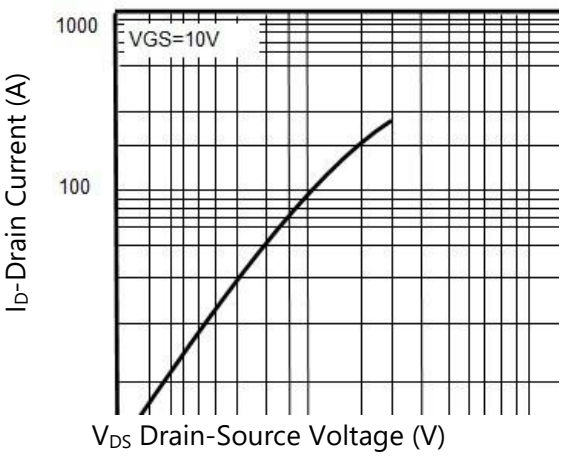


Figure2. Transfer Characteristics

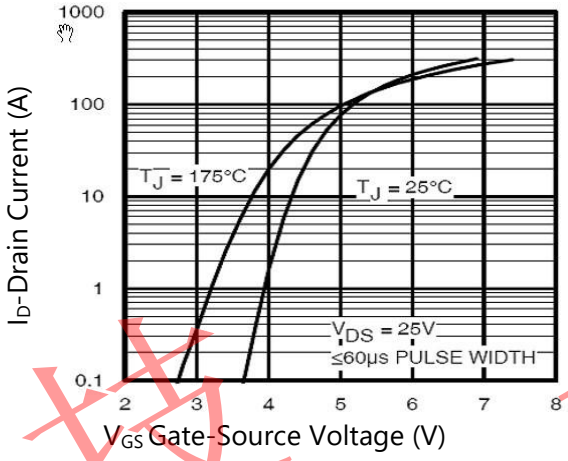


Figure3. BV_{DSS} vs Junction Temperature

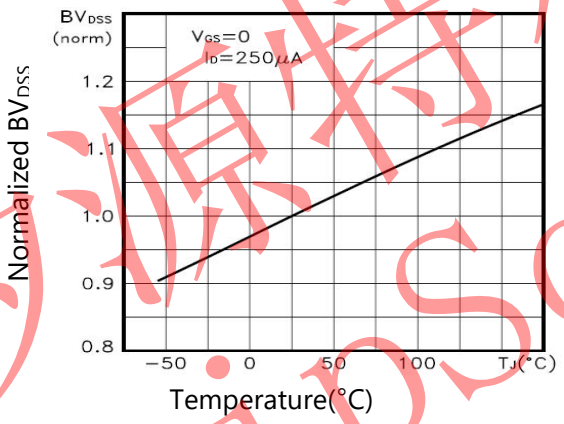


Figure4. I_D vs Junction Temperature

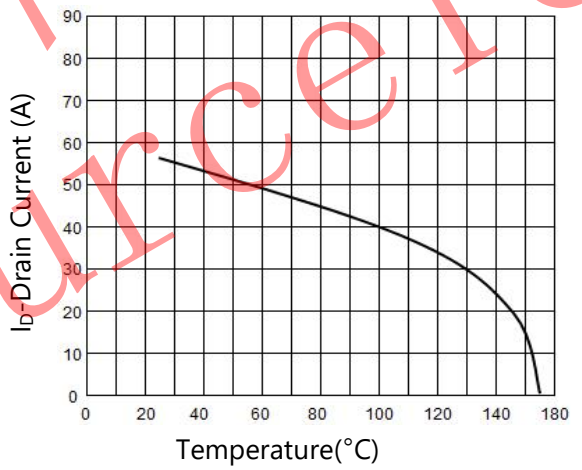


Figure5. $V_{GS(th)}$ vs Junction Temperature

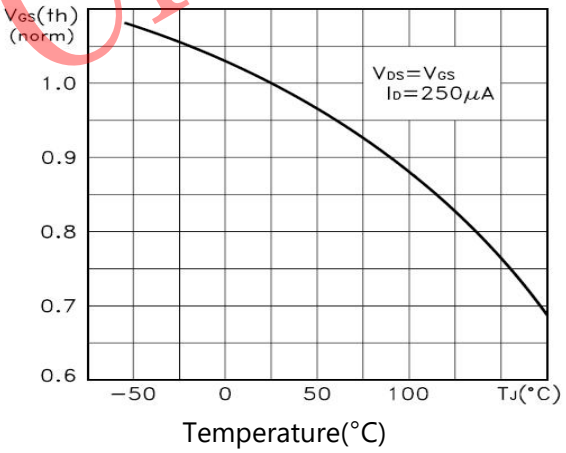
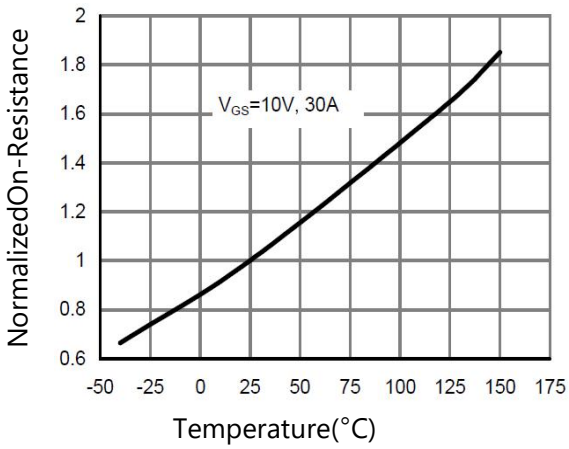


Figure6. R_{dson} Vs Junction Temperature



TYPICAL PERFORMANCE CHARACTERISTICS

Figure7. Gate Charge

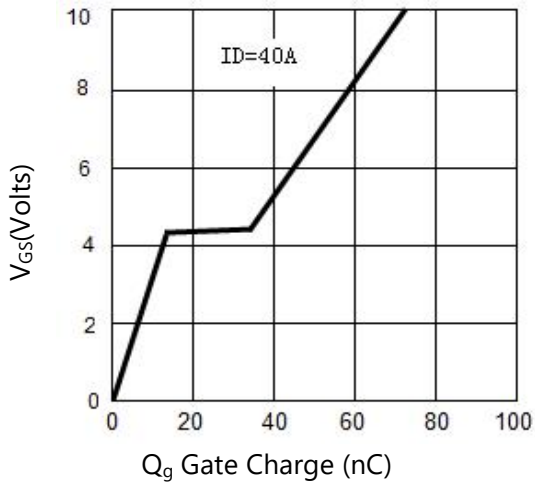


Figure8. Capacitance vs V_{DS}

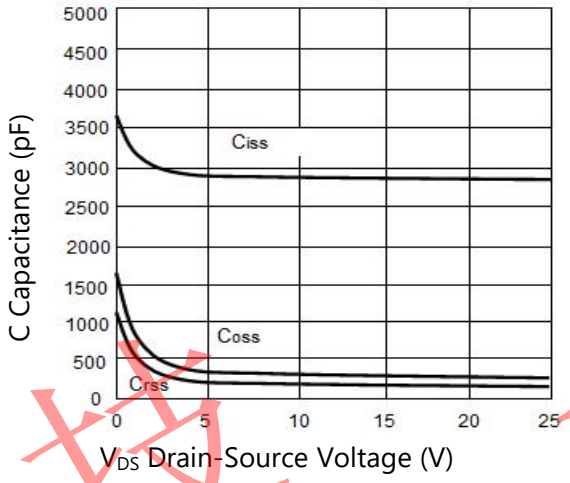


Figure9. Source- Drain Diode Forward

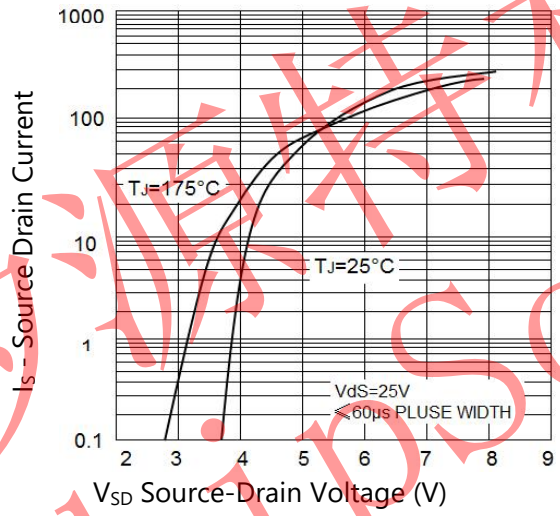


Figure10. Safe Operation Area

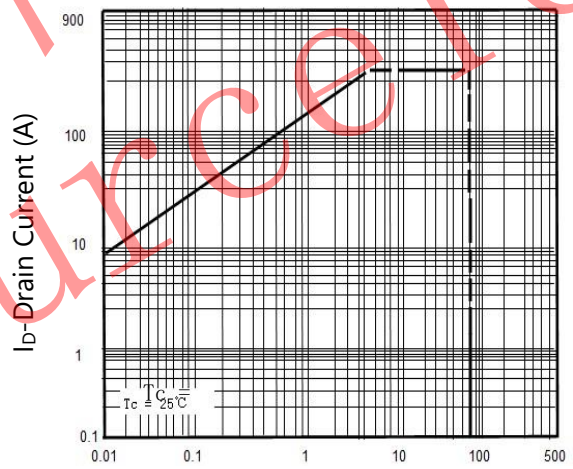
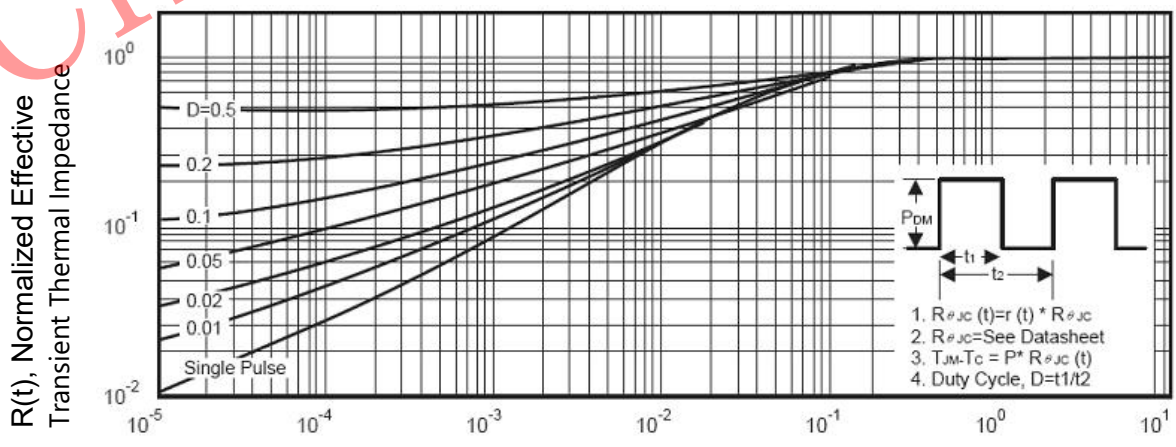


Figure11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

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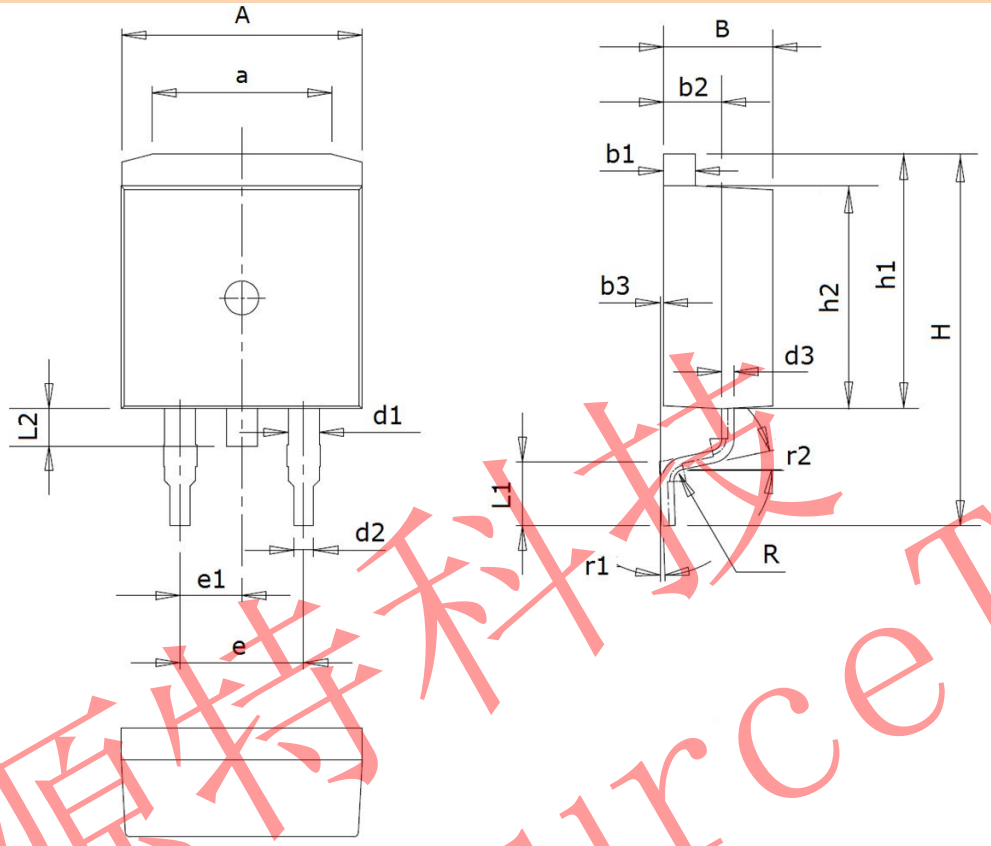

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.60	10.0	0.378	0.394
a	7.00	7.80	0.276	0.307
B	4.30	4.70	0.169	0.185
b1	1.25	1.35	0.049	0.053
b2	2.20	2.60	0.087	0.102
b3	0.00	0.20	0.000	0.008
d1	1.20	1.40	0.047	0.055
d2	0.70	0.90	0.028	0.035
d3	0.40	0.60	0.016	0.024
e	5.08(typ.)		0.200(typ.)	
e1	2.54(typ.)		0.100(typ.)	
H	15.20	15.80	0.598	0.622
h1	10.30	10.70	0.406	0.421
h2	9.10	9.40	0.358	0.370
L1	2.40	2.90	0.094	0.114
L2	1.30	1.80	0.051	0.071
R	0.5(typ.)		0.020(typ.)	
r1	0°	8°	0°	8°
r2	12°(typ.)		12°(typ.)	