EVVOSEMI®
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ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

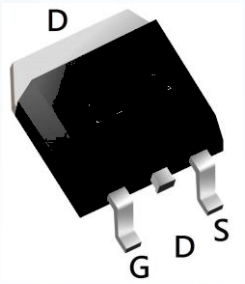
Domestic Part Number	IRFS23N20D
Overseas Part Number	IRFS23N20D
Equivalent Part Number	IRFS23N20D

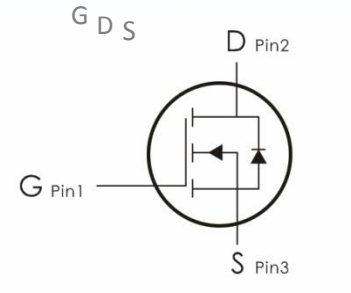
Description：

This N-Channel MOSFET uses advanced Planar technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

TO263 Pin Configuration





Features：

1) V_{DS}=200V,I_D=52A,$R_{DS(ON)}$<60m Ω @V_{GS}=10V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

Absolute Maximum Ratings： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage[1]	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Curren	52	A
	Continuous Drain Current-T_C=100℃	28	
I_{DM}	Pulsed Drain Current[2]	70	
P_D	Power Dissipation	125	W
E_{AS}	Single pulse avalanche energy	1200	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	1.0	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	62	℃/W

Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=200V	---	---	1	μA
		V_{GS}=0V, V_{DS}=160V,T_J=125℃	---	---	100	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	2	---	4	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=10V,I_D=20A	---	50	60	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	2799	3699	pF
C_{oss}	Output Capacitance		---	304	399	
C_{rss}	Reverse Transfer Capacitance		---	109	149	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=100V, I_D=20A, R_G=3.9Ω ,V_{GS}=10V	---	19	---	ns
t_r	Rise Time		---	29	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	64	---	ns
t_f	Fall Time		---	24	---	ns
Q_g	Total Gate Charge	V_{DD}=100V, I_D=20A V_{GS}=0 to 10V	---	96	120	nc
Q_{gs}	Gate-Source Charge		---	13	---	nc
Q_{gd}	Gate-Drain “Miller” Charge		---	38	---	nc
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_S=40A	---	---	1.5	V
I_S	Continuous Drain Curren[4]	VD=VG=0V	---	---	52	A
I_{SM}	Pulsed Drain Current[4]		---	---	70	A
Trr	Reverse Recovery Time	I_F=20A,V_{GS}=0V,dI/dt=100A/us	---	280	---	ns
Qrr	Reverse Recovery Charge	I_F=20A,V_{GS}=0V,dI/dt=100A/us	---	420	---	nc

Notes:

1. T_J=+25℃ to +150℃
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{SD}= 20A di/dt < 100 A/μs, V_{DD} < BV_{DSS}, T_J=+150℃.
4. Pulse width≤380μs; duty cycle≤2%

Typical Characteristics: (T_C=25℃ unless otherwise noted)

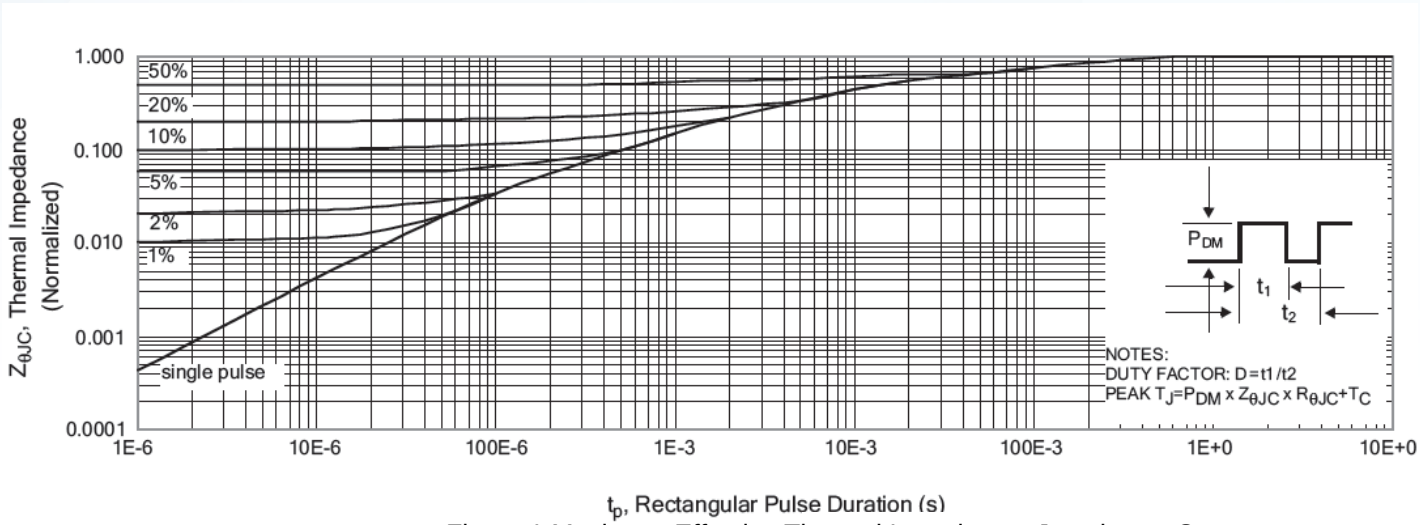


Figure 1.Maximum Effective Thermal Impedance, Junction-to-Case

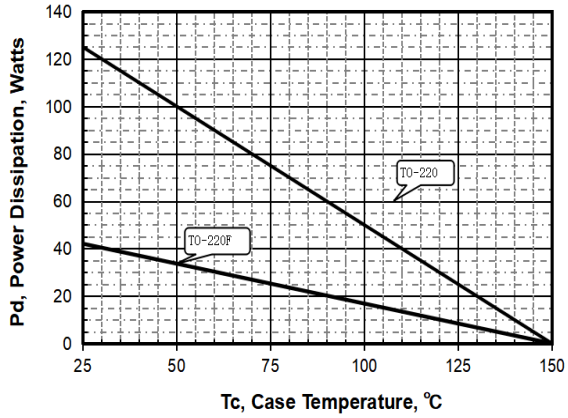


Figure 2. Max. Power Dissipation vsCase Temperature

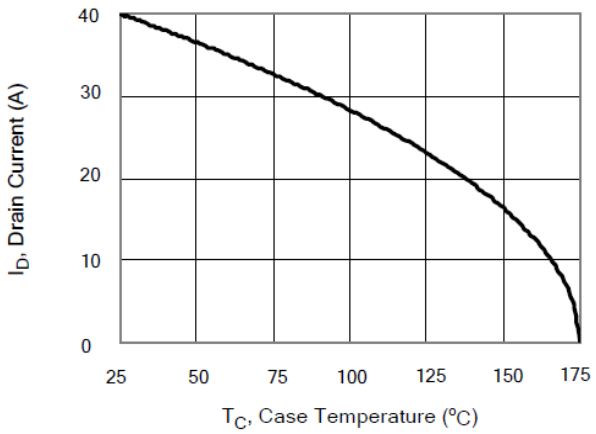


Figure3.Maximum Continuous Drain Currentvs Case Temperature

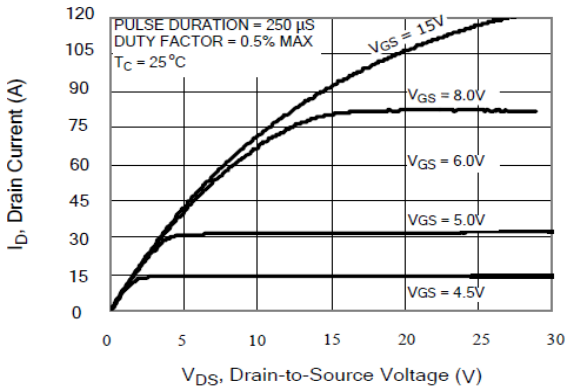


Figure 4. Typical Output Characteristics

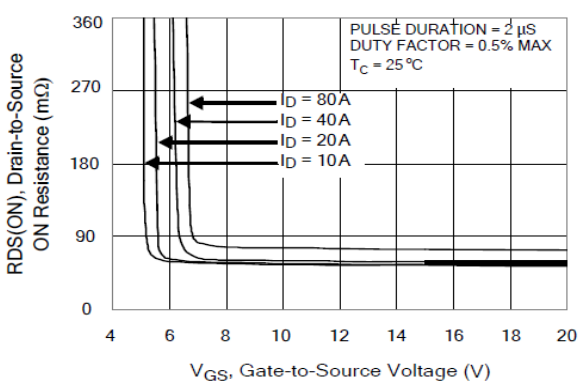


Figure5.Typical Drain-to-Source ON Resistancevs Gate Voltage and Drain Curre

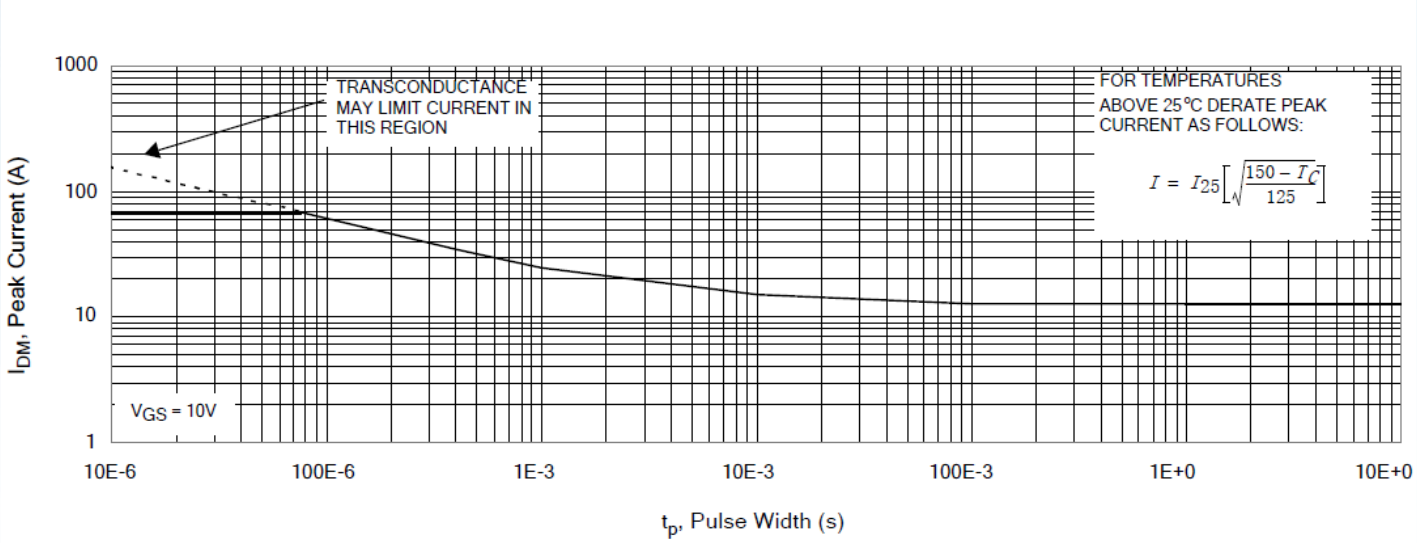


Figure 6. Maximum Peak Current Capability

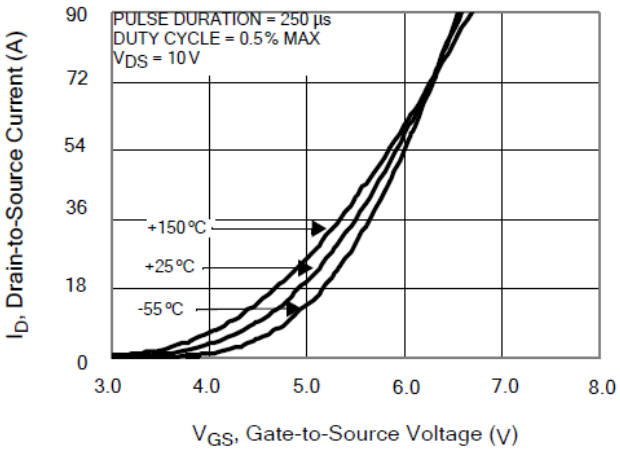


Figure 7. Typical Transfer Characteristics

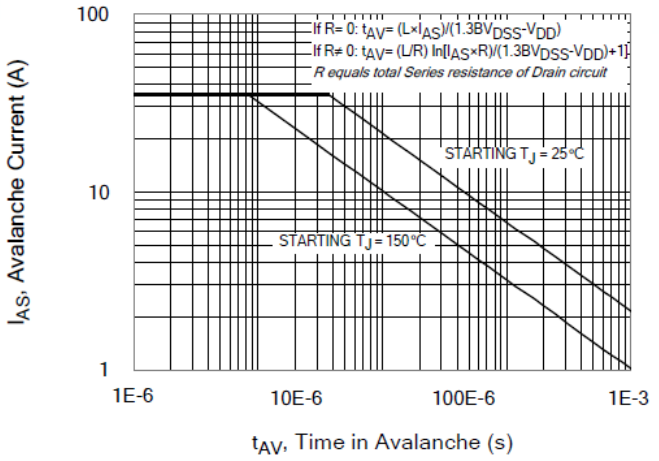


Figure8. Unclamped InductiveSwitching Capability

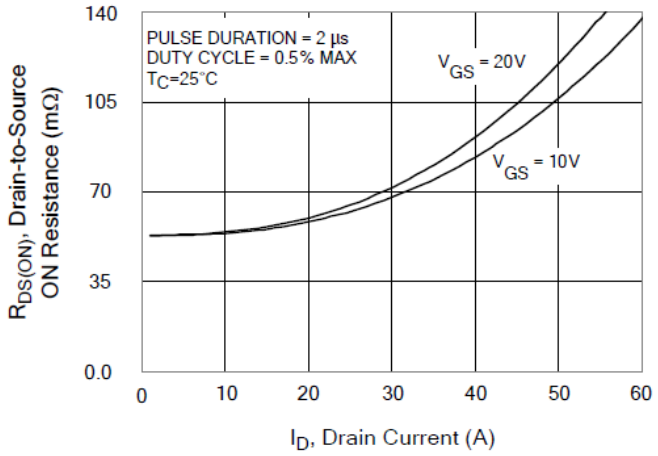


Figure 9.Typical Drain-to-Source ONResistance vs Drain Current

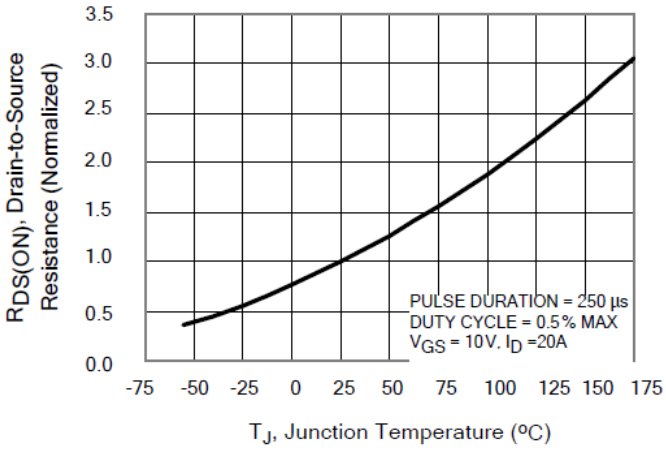


Figure 10. Typical Drain-to-Source ON Resistancevs Junction Temperature

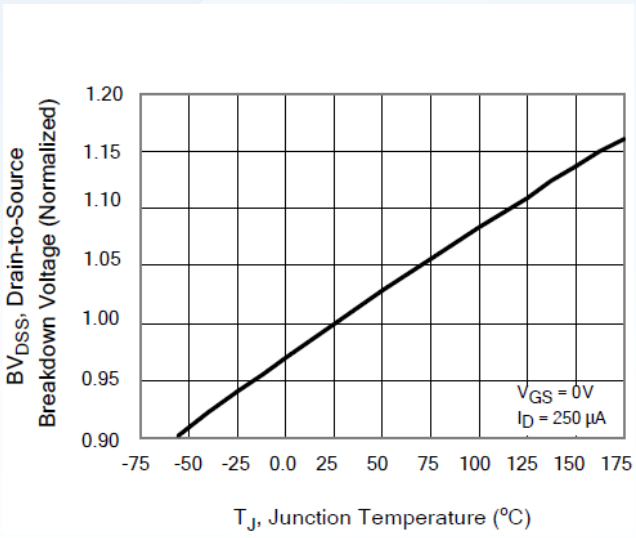


Figure 11. Typical Breakdown Voltage vsJunction Temperature

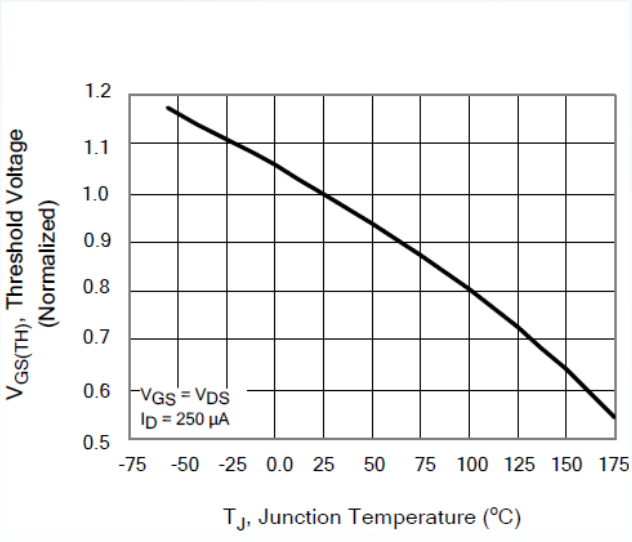


Figure 12. Typical Threshold Voltage vsJunction Temperature

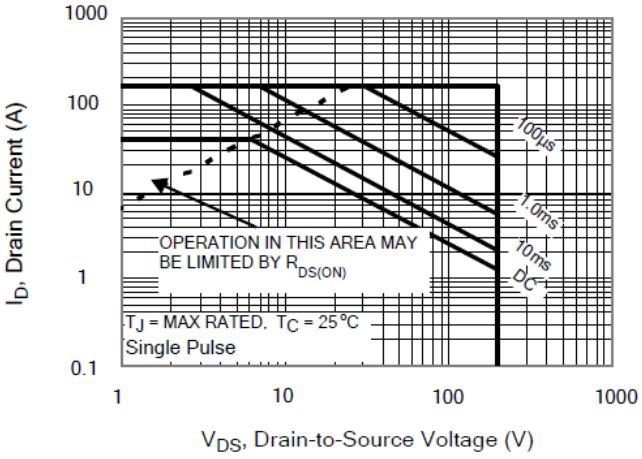


Figure 13.Maximum Forward Bias SafeOperating Area

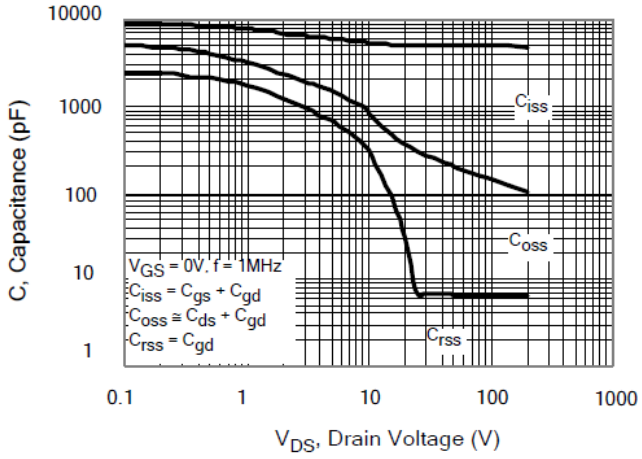


Figure 14. Typical Capacitance vsDrain-to-Source Voltage

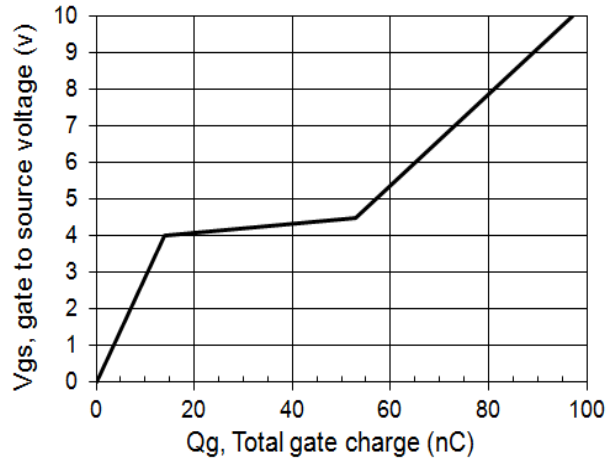


Figure 15.Typical Gate Charge

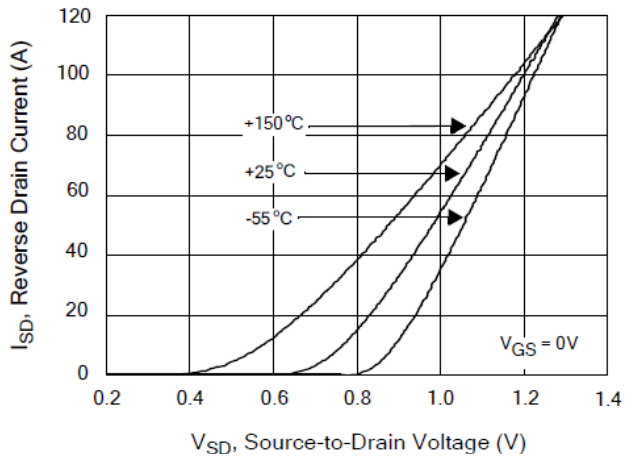
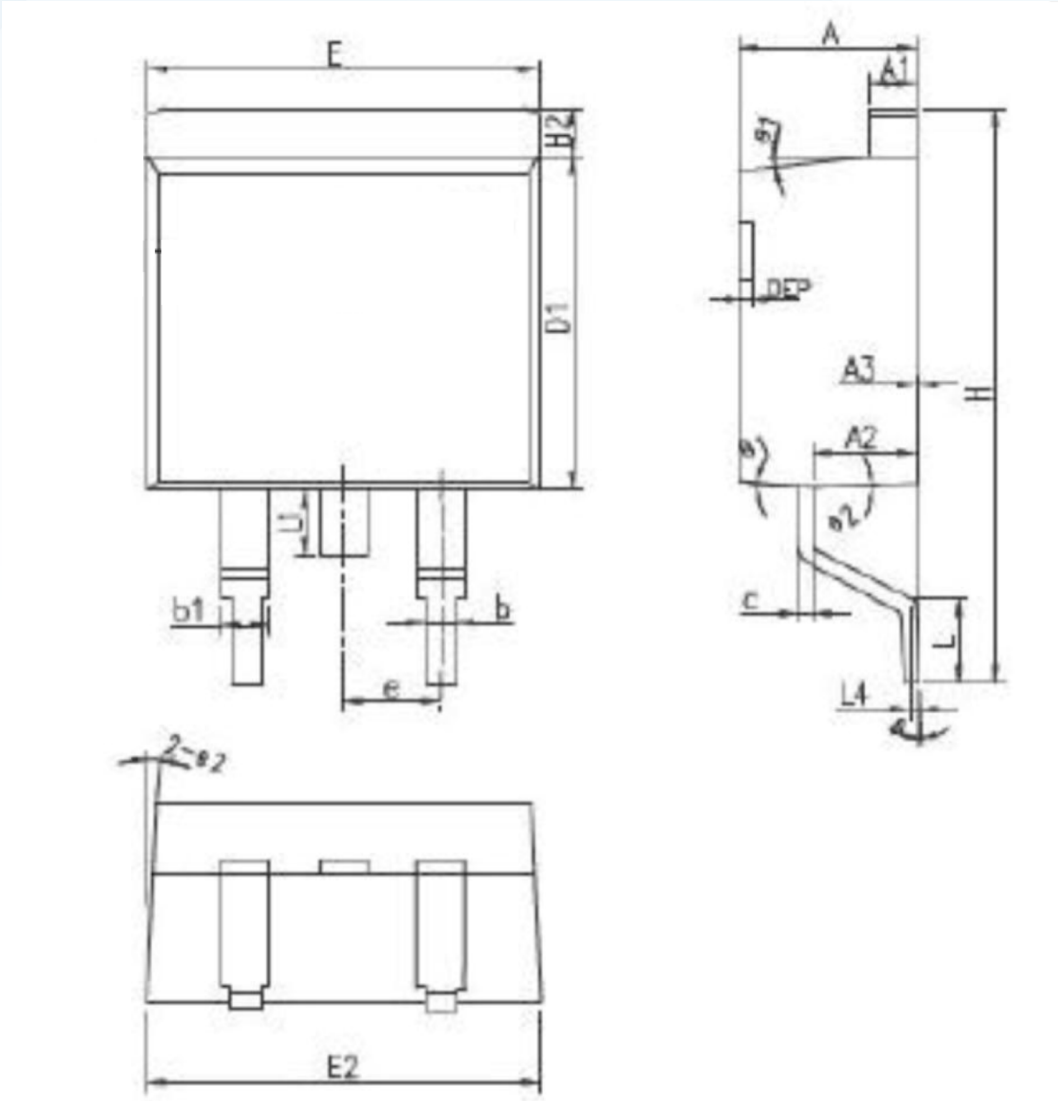


Figure 16. Typical Body Diode TransferCharacteristics

Package Mechanical Data TO-263



Symbol	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	4.40	4.57	4.57	0.173	0.180	0.185
A1	1.22	1.27	1.27	0.048	0.050	0.052
A2	2.59	2.69	2.69	0.102	0.106	0.110
A3	0.00	0.10	0.10	0.000	0.004	0.008
b	0.77	0.813	0.813	0.030	0.032	0.035
b1	1.20	1.270	1.270	0.047	0.050	0.054
c	0.34	0.381	0.381	0.013	0.015	0.019
D1	8.60	8.70	8.99	0.339	0.343	0.354
E	10.00	10.16	10.16	0.394	0.400	0.404
E2	10.00	10.10	10.10	0.394	0.398	0.402
e	2.54BSC			0.100BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L4	0.25BSC			0.010BSC		
θ	0°	5°	8°	0°	5°	8°
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
DEP	0.05	0.10	0.20	0.002	0.004	0.008

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