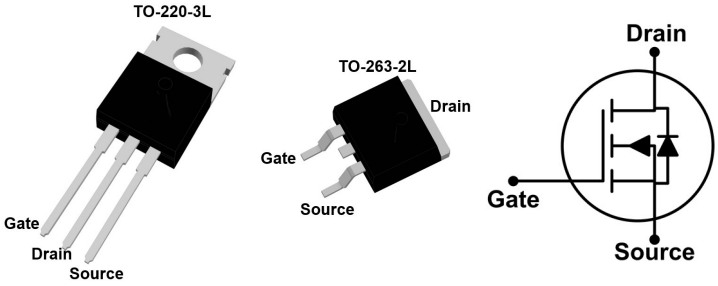
150V N-ch Power MOSFET

General Features

- Proprietary New Trench Technology
- $R_{DS(ON),typ.}$=29mΩ@V_{GS}=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

BV_{DSS}	$R_{DS(ON),max.}$	I_D
150V	38mΩ	46A



Applications

- High efficiency DC/DC Converters
- Synchronous Rectification
- UPS Inverter

Ordering Information

Part Number	Package	Marking
FTP150N38	TO-220-3L	150N38
FTB150N38	TO-263-2L	150N38

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage[1]	150	V
V_{GSS}	Gate-to-Source Voltage	±20	
I_D	Continuous Drain Current	46	A
	Continuous Drain Current at T_C=100℃	33	
I_{DM}	Pulsed Drain Current at V_{GS}=10V[2]	185	
E_{AS}	Single Pulse Avalanche Energy (V_{DD}=50V,V_{GS}=10V,R_G=25Ω,L=1mH)	156	mJ
P_D	Power Dissipation	208	W
	Derating Factor above 25℃	1.4	W/℃
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	℃
T_J & T_{STG}	Operating and Storage Temperature Range	-55 to 175	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case			0.72	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient			63	

Electrical Characteristics

OFF Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	150			V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current			1	uA	V_{DS}=120V, V_{GS}=0V
I_{GSS}	Gate-to-Source Leakage Current			±100	nA	V_{GS}=±20V, V_{DS}=0V

ON Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	29	38	mΩ	V_{GS}=10V, I_D=46A[3]
$V_{GS(TH)}$	Gate Threshold Voltage	3.0	--	5.0	V	V_{DS}=V_{GS}, I_D=250uA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance		2.2		nF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{rss}	Reverse Transfer Capacitance		0.07			
C_{oss}	Output Capacitance		0.26			
R_g	Gate Series Resistance		4.6		Ω	f=1.0MHz
Q_g	Total Gate Charge		40		nC	V_{DD}=75V, I_D=46A, V_{GS}=10V
Q_{gs}	Gate-to-Source Charge		15			
Q_{gd}	Gate-to-Drain (Miller) Charge		11			

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time		55		ns	V_{DD}=75V I_D=46A V_{GS}=10V R_G=2.5Ω
t_{rise}	Rise Time		5.6			
$t_{d(off)}$	Turn-off Delay Time		35			
t_{fall}	Fall Time		12			

Source-Drain Body Diode Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current			46	A	Maximum Ratings
V_{SD}	Diode Forward Voltage		0.9	1.2	V	I_S=46A, V_{GS}=0V
t_{rr}	Reverse Recovery Time		89		ns	V_{GS}=0V I_F=46A,di/dt=100A/μs
Q_{rr}	Reverse Recovery Charge		265		nC	

Note:

[1] T_J=25℃ to 175℃
[2] Repetitive rating, pulse width limited by maximum junction temperature
[3] Pulse width≤380μs; duty cycle≤2%

Typical Characteristics

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

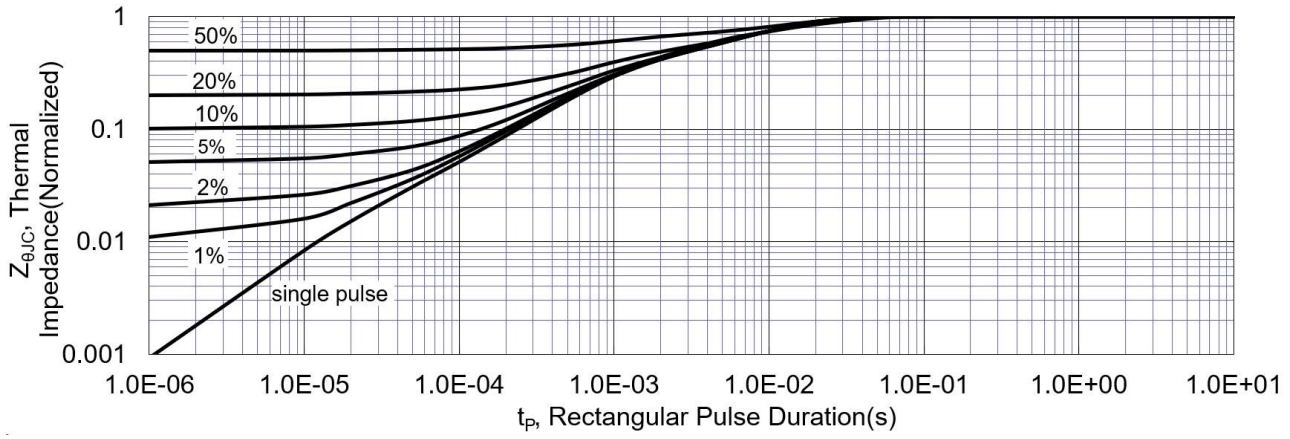


Figure 2. Maximum Power Dissipation vs. Case Temperature

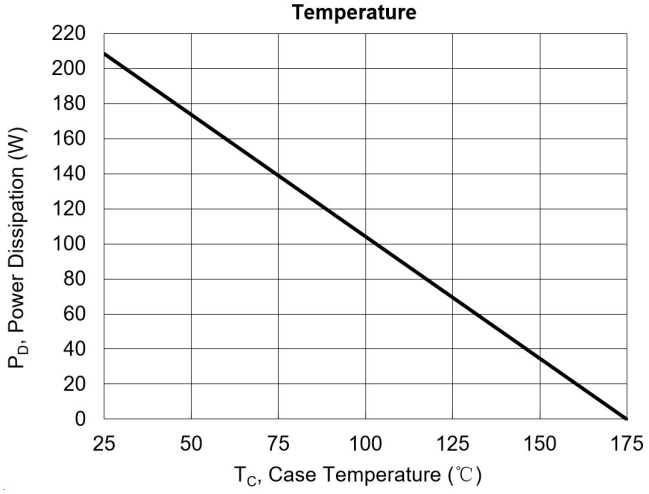


Figure 3. Maximum Continuous Drain Current vs Case Temperature

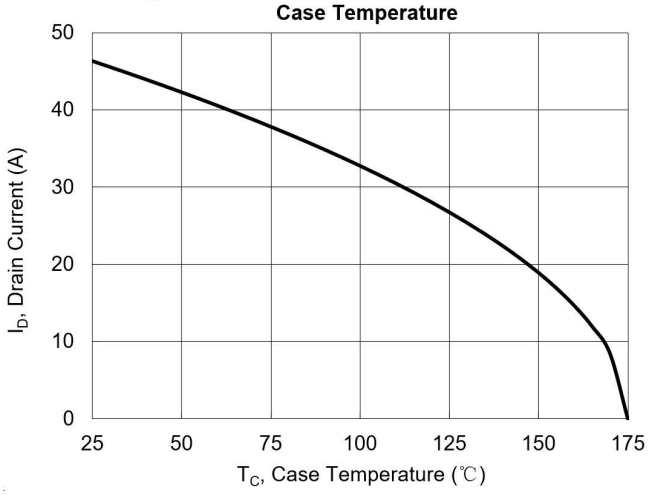


Figure 4. Typical Output Characteristics

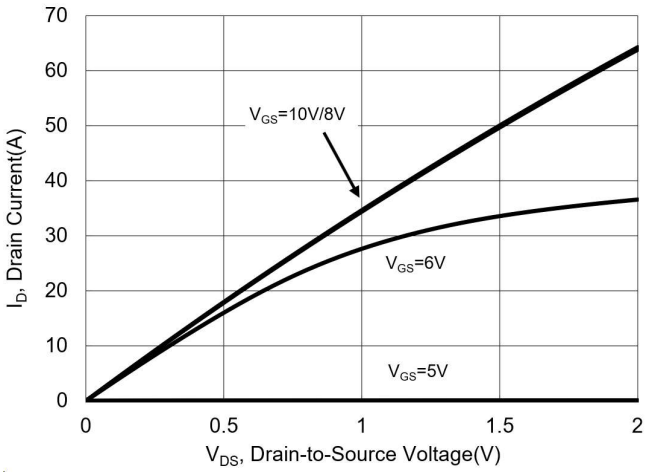


Figure 5. Typical Drain-to-Source ON Resistance vs. Gate Voltage

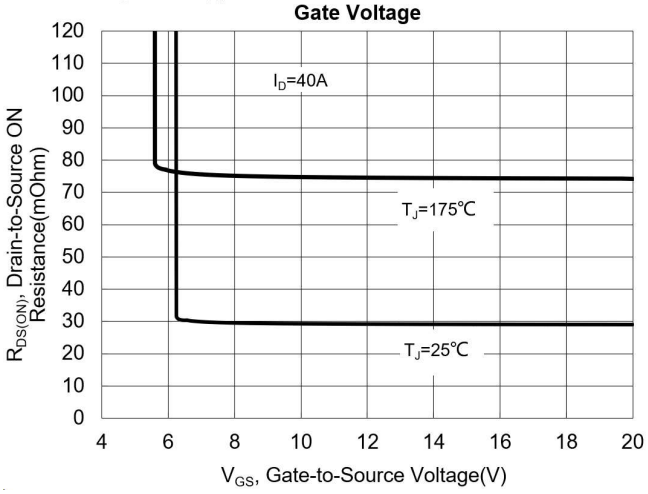


Figure 6. Maximum Peak Current Capability

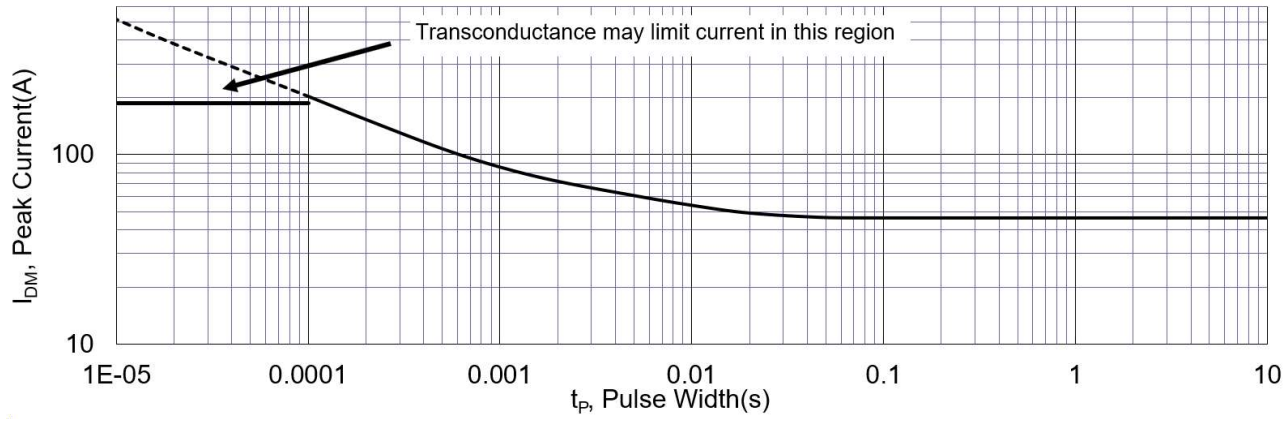


Figure 7. Typical Transfer Characteristics

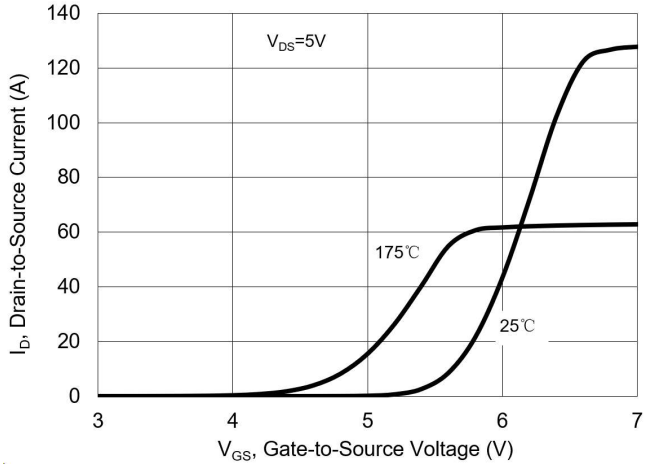


Figure 8. Unclamped Inductive Switching Capability

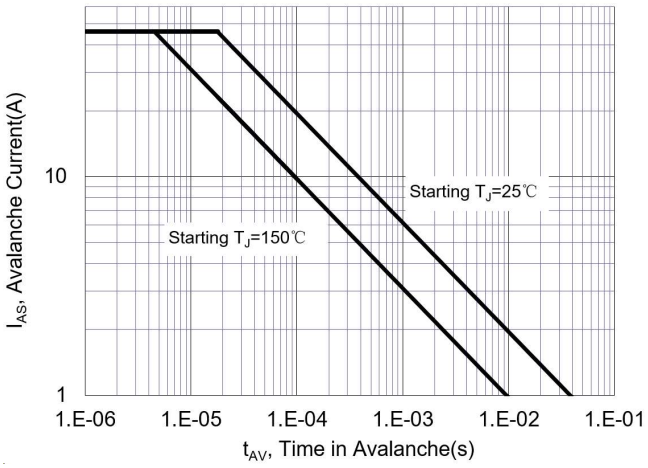


Figure 9. Typical Drain-to-Source ON Resistance

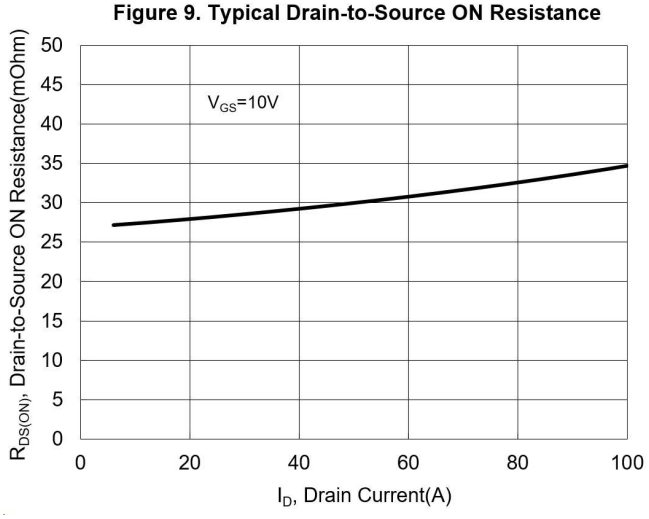


Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

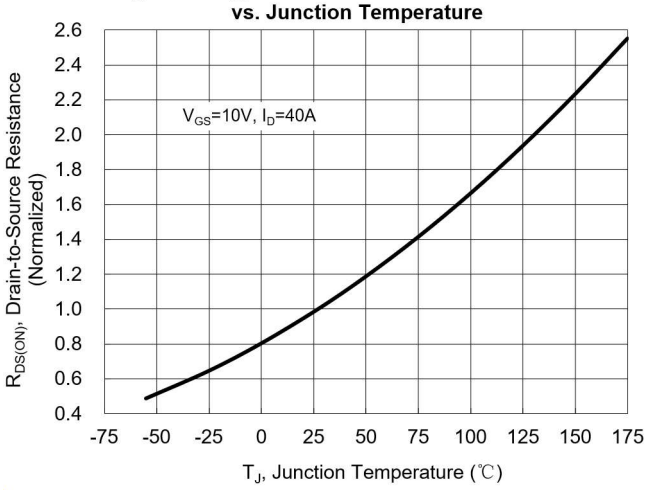


Figure 11.Typical Breakdown Voltage vs. Junction Temperature

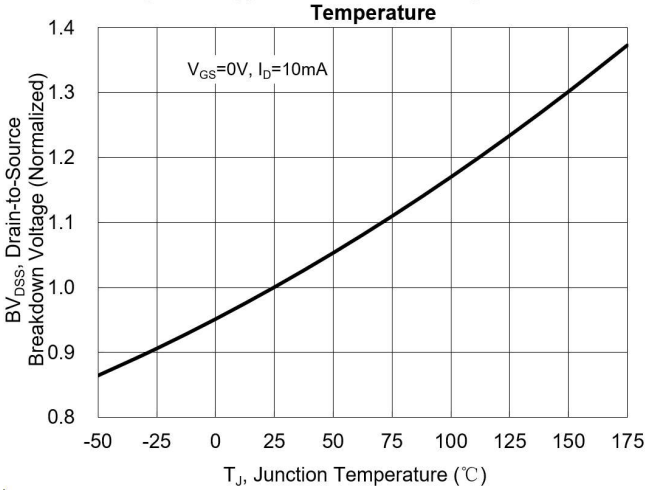


Figure 12.Typical Threshold Voltage vs. Junction Temperature

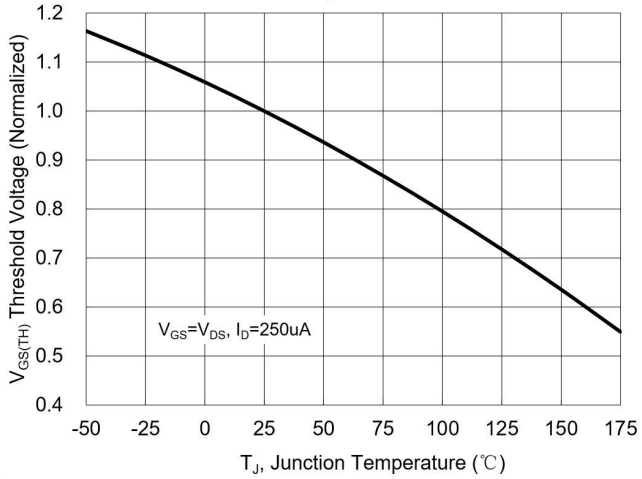


Figure 13. Maximum Forward Safe Operation Area

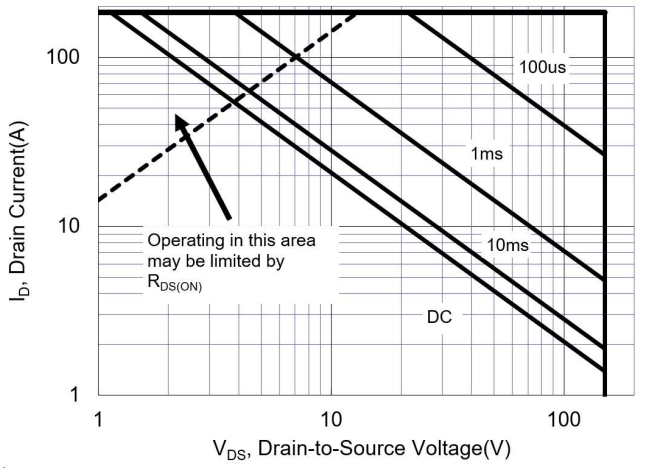


Figure 14. Typical Capacitance vs. Drain-to-Source Voltage

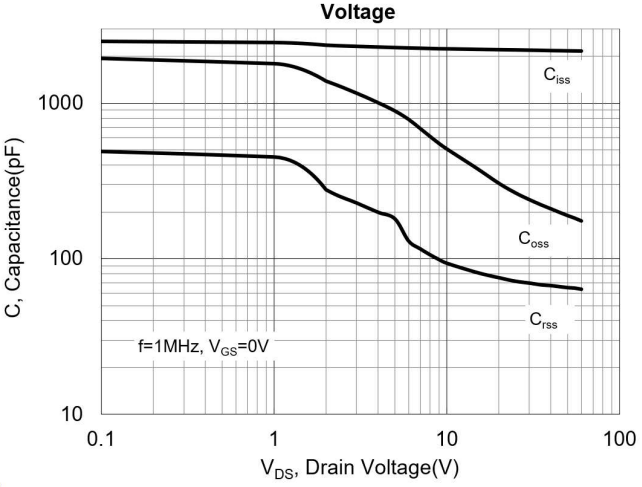


Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

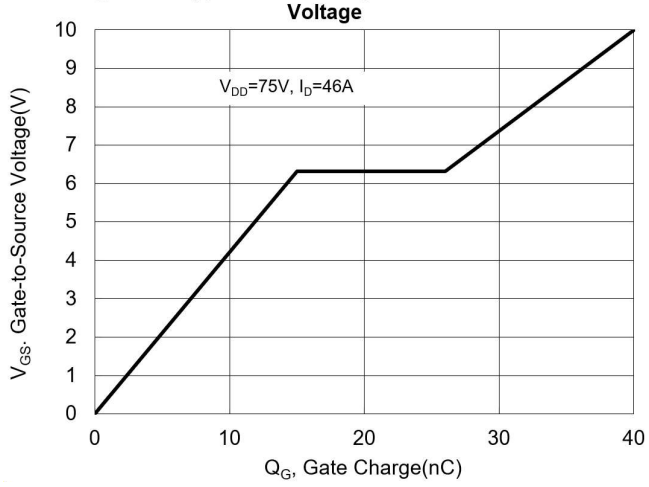
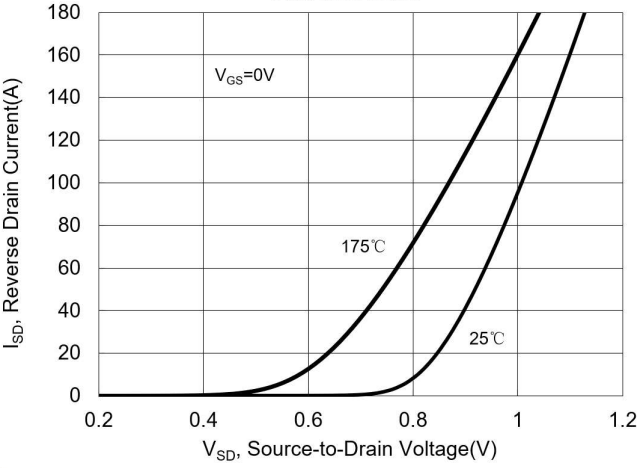
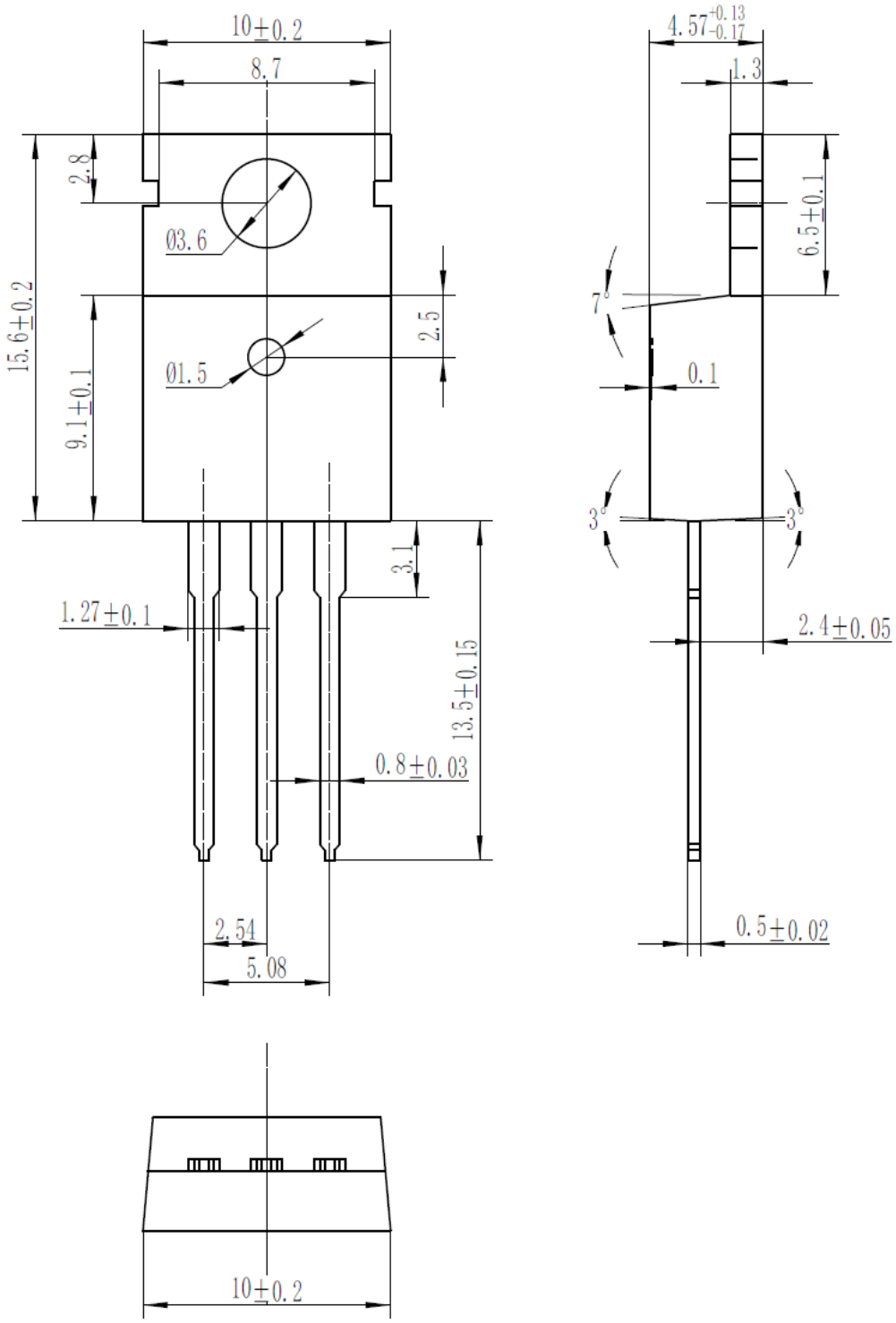


Figure 16. Typical Body Diode Transfer Characteristics

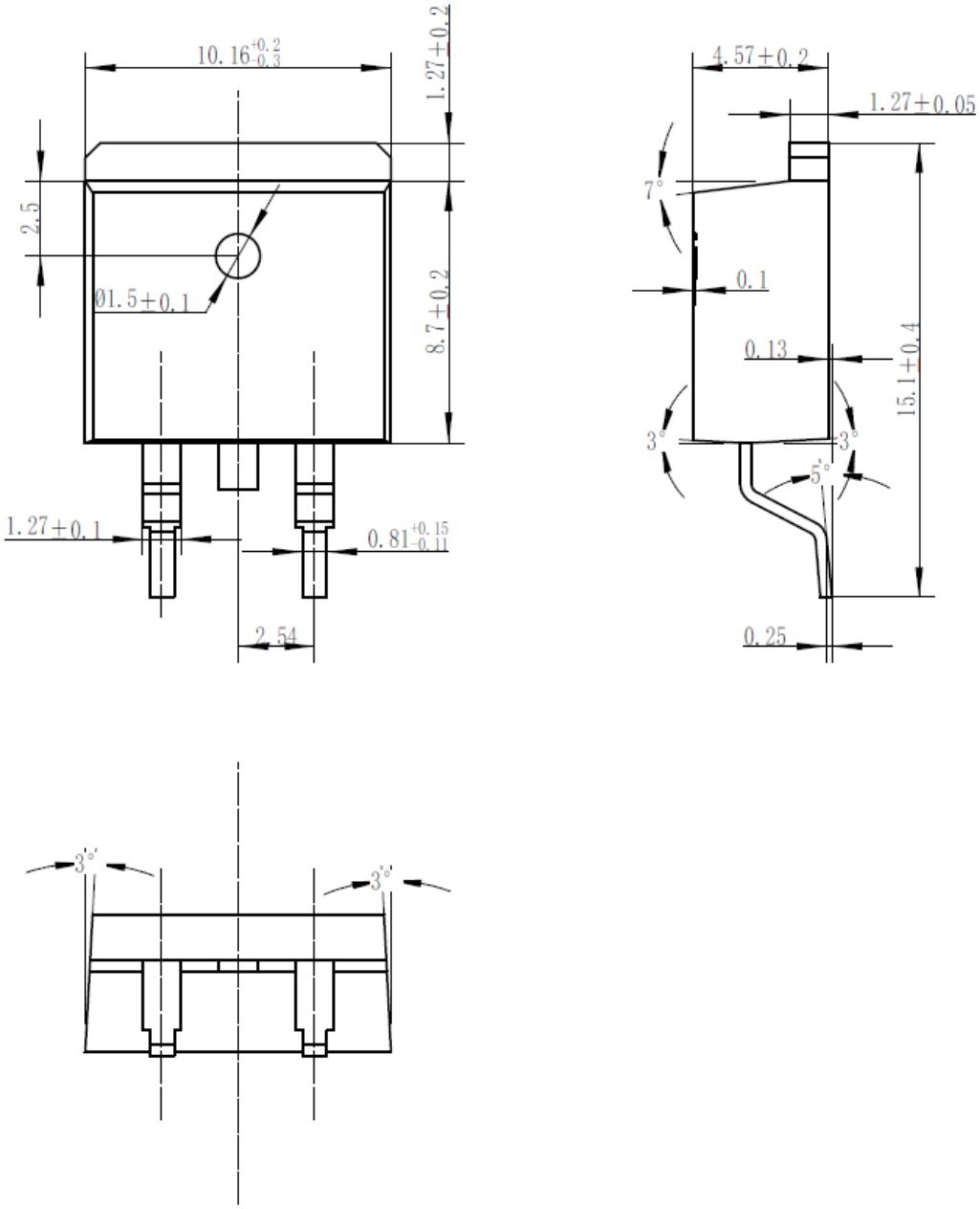


Package Dimensions

TO-220-3L



TO-263-2L


10.16+0.2 -0.3
1.27±0.2
2.5
Ø1.5±0.1
8.7±0.2
1.27±0.1
0.81+0.15 -0.11
2.54
4.57±0.2
1.27±0.05
7°
0.1
0.13
15.1±0.4
3°
3°
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0.25
3°
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