

30V N-ch Power MOSFET

General Features

- Proprietary New Trench Technology
- $R_{DS(ON),typ.}=1.8m\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

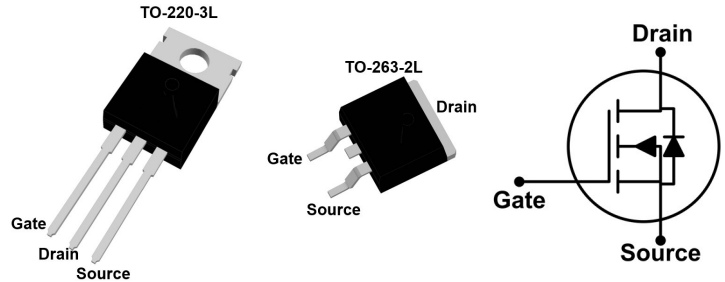
BV_{DSS}	$R_{DS(ON),max.}$	$I_D^{[2]}$
30V	2.4m Ω	212A

Applications

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

Ordering Information

Part Number	Package	Marking
FTP30N2P4L	TO-220-3L	30N2P4L
FTB30N2P4L	TO-263-2L	30N2P4L



Absolute Maximum Ratings

$T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage ^[1]	30	V
V_{GSS}	Gate-to-Source Voltage	± 20	
I_D	Continuous Drain Current ^[2]	212	A
	Continuous Drain Current ^[3]	130	
	Continuous Drain Current at $T_C=100^{\circ}C$ ^[2]	150	
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$ ^[2,4]	847	
E_{AS}	Single Pulse Avalanche Energy ($V_{DD}=15V, V_{GS}=10V, R_G=25\Omega, L=1mH$)	338	mJ
P_D	Power Dissipation	192	W
	Derating Factor above $25^{\circ}C$	1.3	W/ $^{\circ}C$
T_L	Soldering Temperature	300	$^{\circ}C$
	Distance of 1.6mm from case for 10 seconds		
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			0.78	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient			63	

Electrical Characteristics

OFF Characteristics

 $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30			V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current			1	μA	$V_{DS}=24V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Leakage Current			± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$

ON Characteristics

 $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	1.8	2.4	m Ω	$V_{GS}=10V, I_D=80A^{[5]}$
			2.4	3.3	m Ω	$V_{GS}=4.5V, I_D=80A^{[5]}$
$V_{GS(TH)}$	Gate Threshold Voltage	1.0	--	3.0	V	$V_{DS} = V_{GS}, I_D=250\mu A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance		3.6		nF	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$
C_{rss}	Reverse Transfer Capacitance		0.34			
C_{oss}	Output Capacitance		0.75			
R_g	Gate Series Resistance		1.6		Ω	$f=1.0MHz$
Q_g	Total Gate Charge		36		nC	$V_{DD}=15V, I_D=80A, V_{GS}=4.5V$
			72			
Q_{gs}	Gate-to-Source Charge		12			$V_{DD}=15V, I_D=80A, V_{GS}=10V$
Q_{gd}	Gate-to-Drain (Miller) Charge		14			

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time		18		ns	$V_{DD}=15V, I_D=80A, V_{GS}=4.5V, R_G=2.5\Omega$
t_{rise}	Rise Time		5.0			
$t_{d(off)}$	Turn-off Delay Time		69			
t_{fall}	Fall Time		13			

Source-Drain Body Diode Characteristics

 $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current ^[2]			212	A	Maximum Ratings
V_{SD}	Diode Forward Voltage		0.9	1.2	V	$I_S=80A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time		42		ns	$V_{GS}=0V, I_F=20A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge		4.6		nC	

Note:

 [1] $T_J=25^{\circ}\text{C}$ to 175°C

[2] Silicon limited current only

[3] Package limited current

[4] Repetitive rating, pulse width limited by maximum junction temperature.

 [5] Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$.

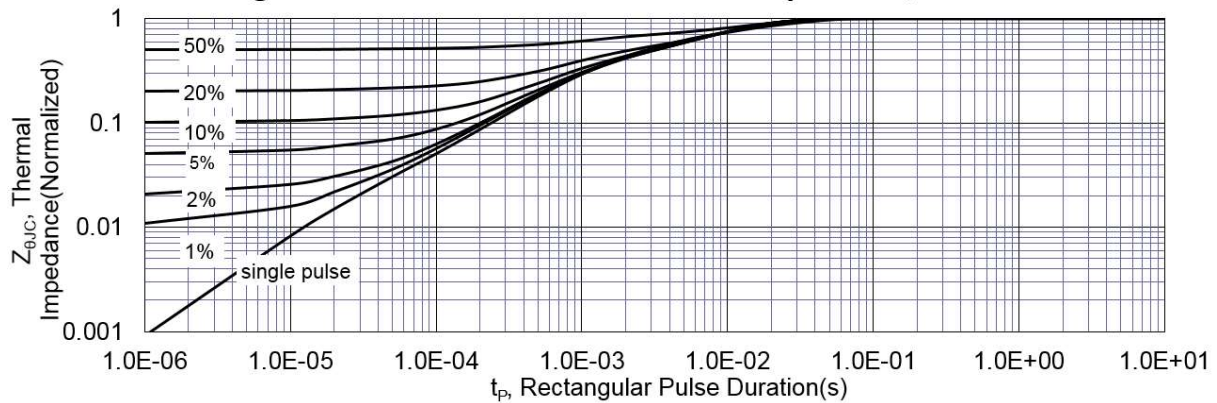
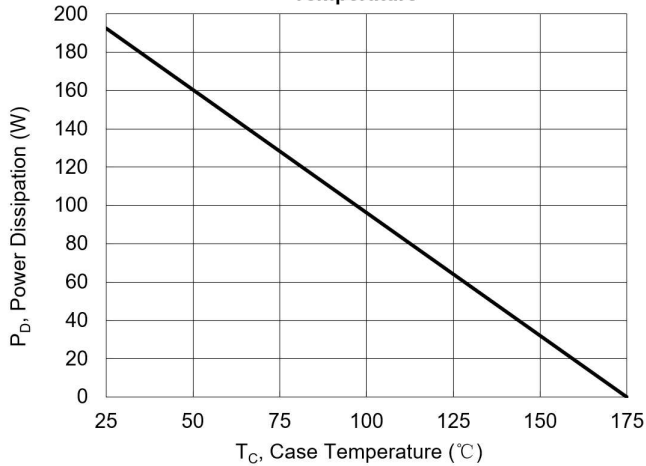
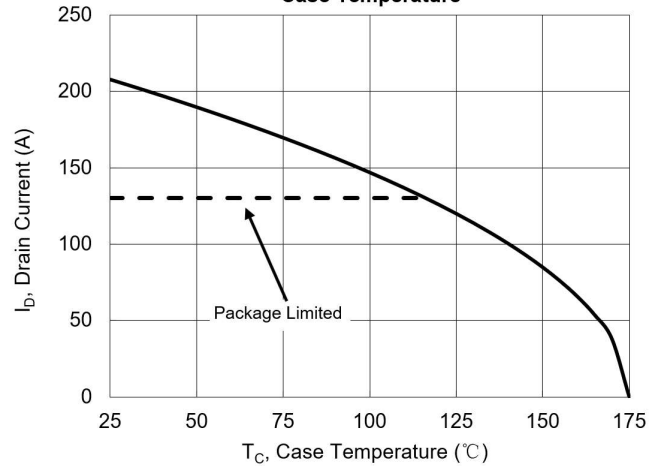
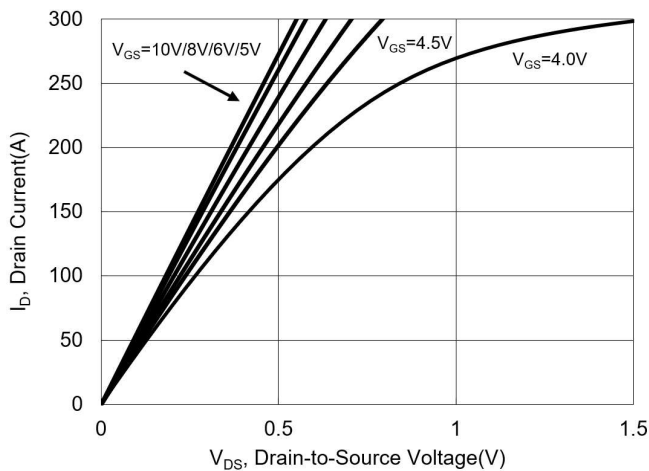
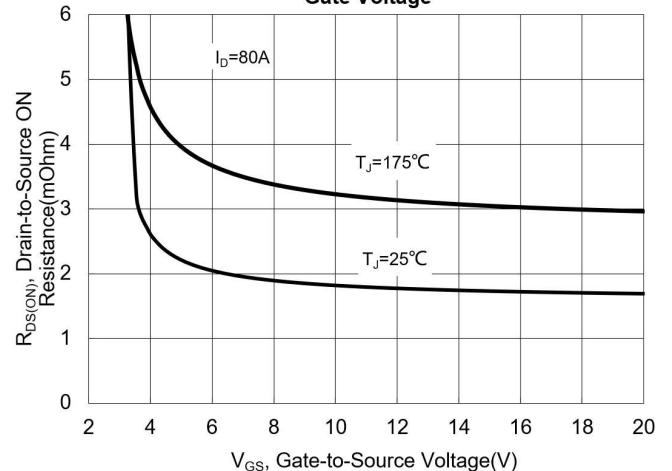
Typical Characteristics
Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

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


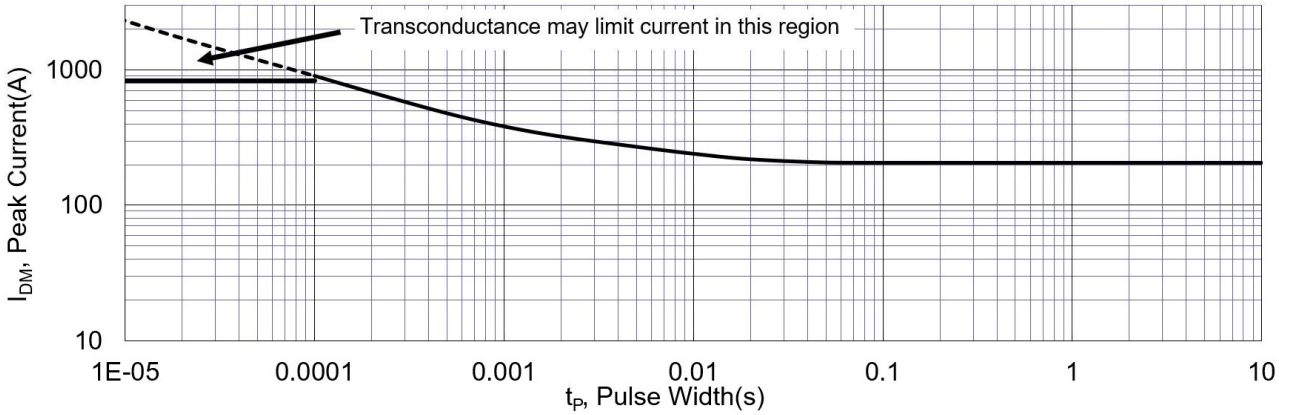
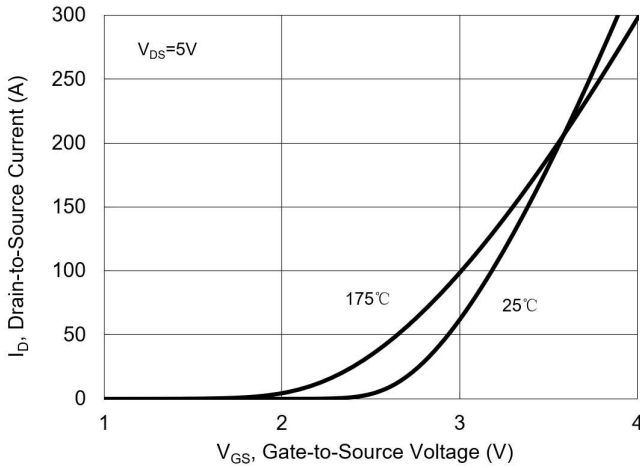
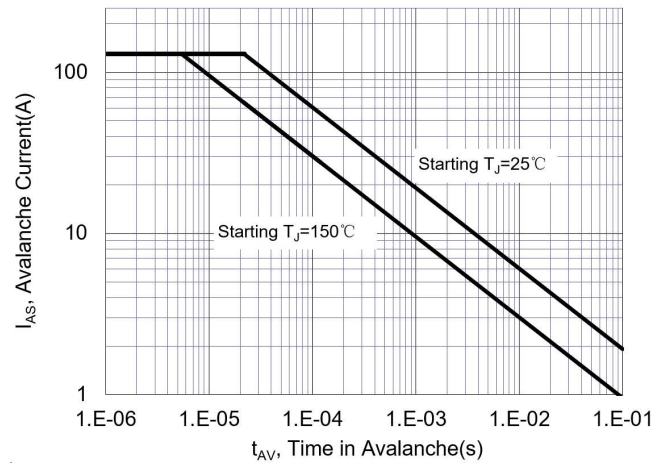
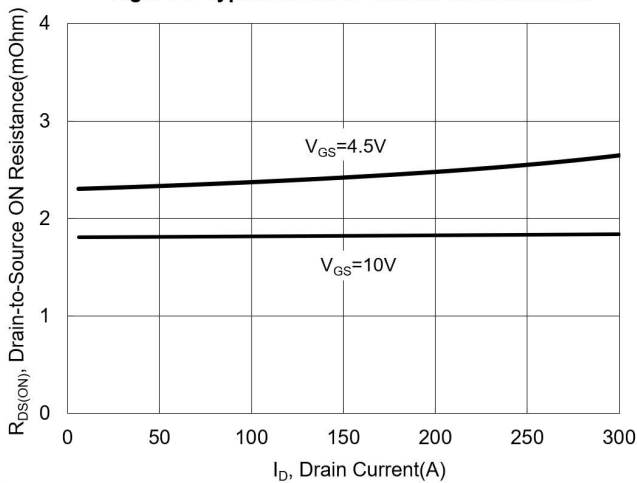
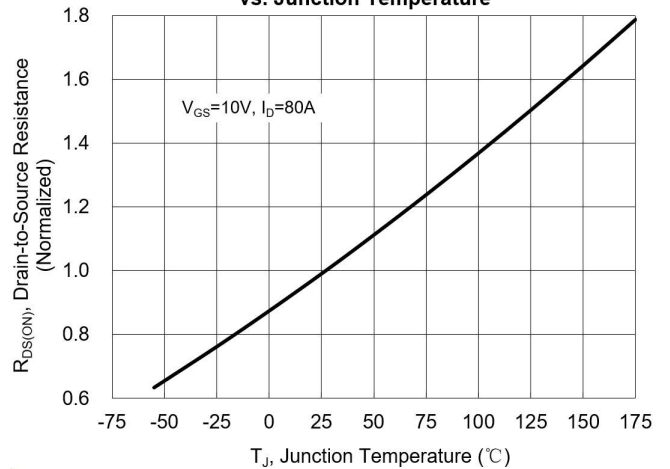
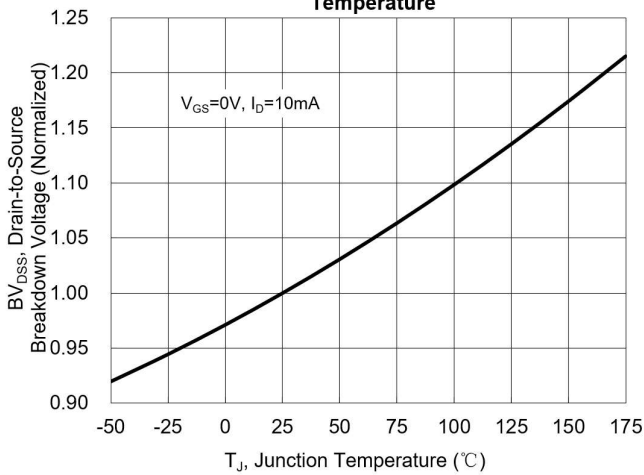
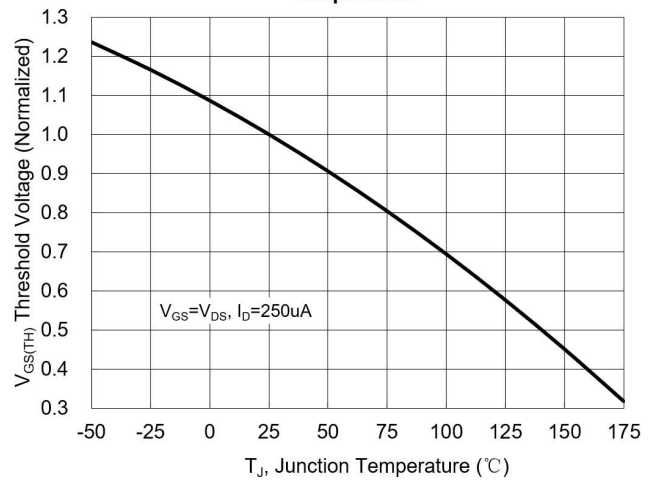
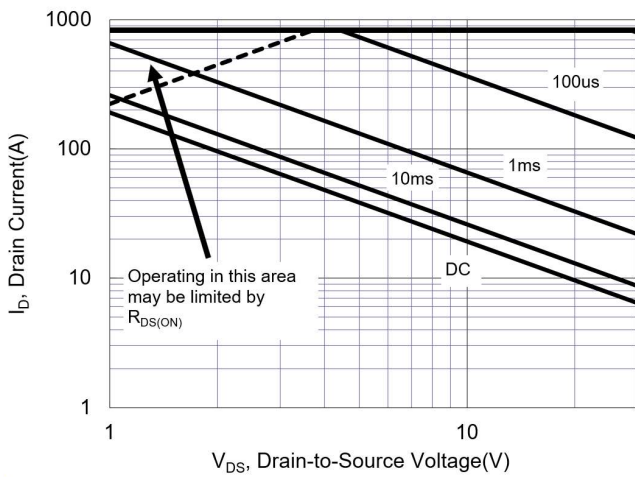
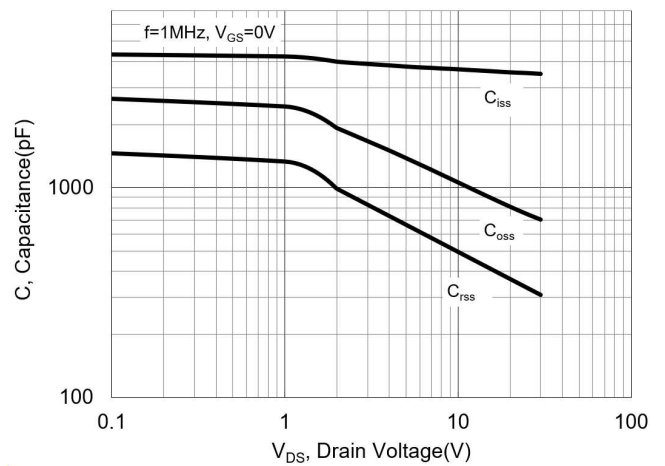
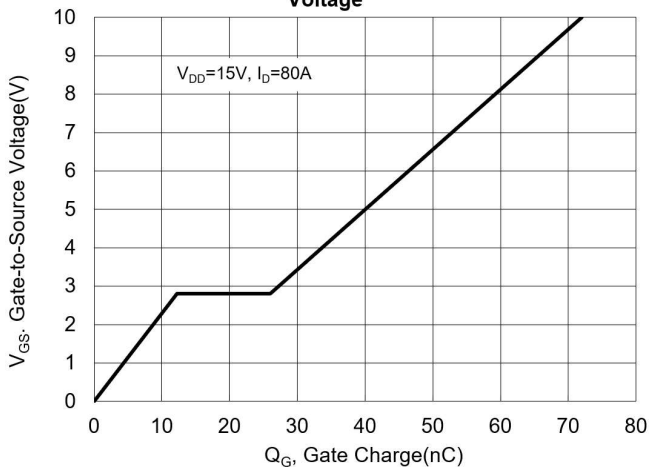
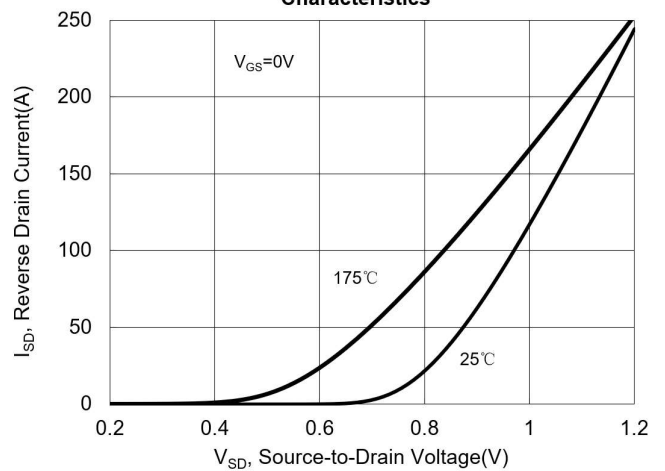
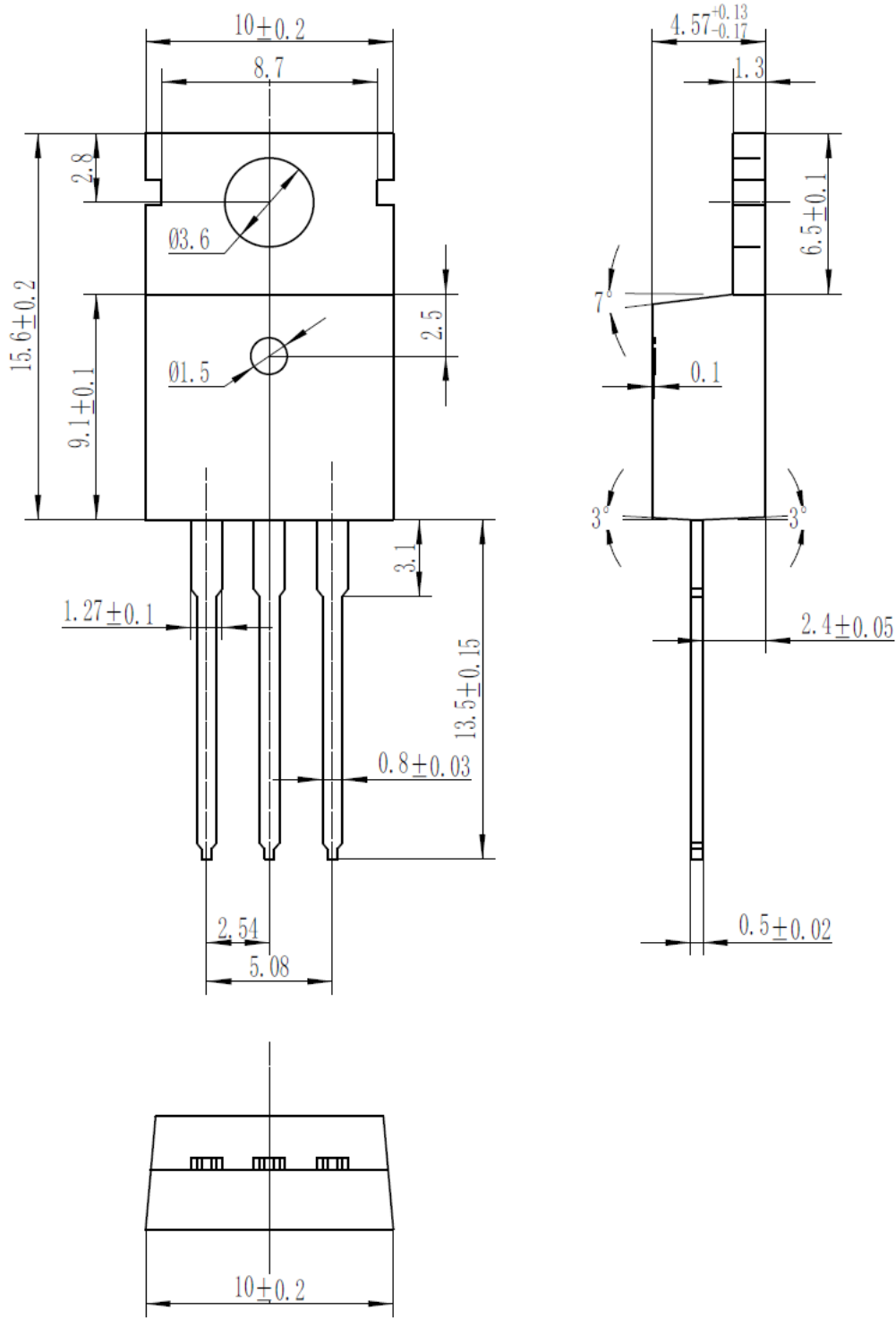
Figure 6. Maximum Peak Current Capability

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


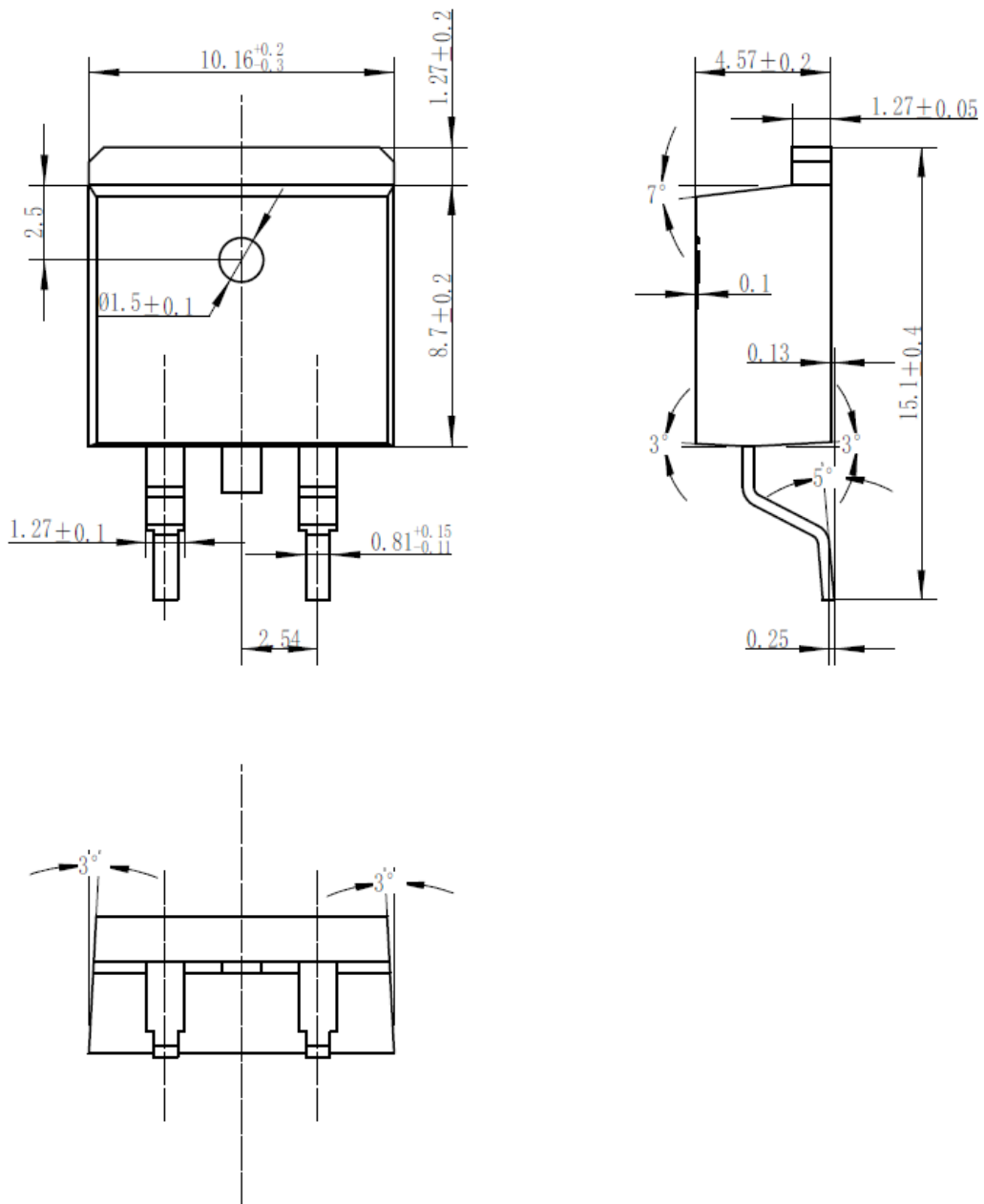
Figure 11. Typical Breakdown Voltage vs. Junction Temperature

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



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