S15N60CF

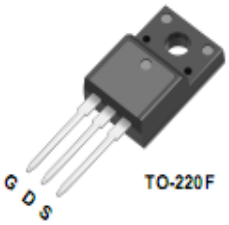
650V N-Channel Multi-EPI Super-JMOSFET

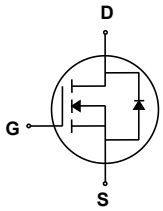
General Description

This Power MOSFET is produced using Slkor's Advanced Super-Junction technology.
This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.
These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

Features

- 15A, 650V, $R_{DS(on)max}$= 0.28Ω@V_{GS} = 10 V
- Low gate charge (typical 19.6nC)
- Lower Gate Resistance
- 100% Avalanche Tested
- Pb-free and RoHS Compliant





Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter		SL15N60CF	Units
V_{DSS}	Drain-Source Voltage		650	V
I_D	Drain Current - Continuous (T_C = 25℃)		15	A
	- Continuous (T_C = 100℃)		8	A
I_{DM}	Drain Current - Pulsed	(Note 1)	45	A
V_{GSS}	Gate-Source Voltage		±30	V
EAS	Single Pulsed Avalanche Energy	(Note 2)	710	mJ
I_{AR}	Avalanche Current	(Note 1)	3.0	A
E_{AR}	Repetitive Avalanche Energy		1.11	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	20	V/ns
	MOSFET dv/dt		100	
P_D	Power Dissipation (T_C = 25℃)		30	W
	- Derate above 25℃		0.24	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	℃

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	SL15N60CF	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.1	℃/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	℃/W

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250mA	650	--	--	V
		V_{GS} = 0 V, I_D = 0.25uA,T_J = 150℃	650	--	--	
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 480 V, T_C = 125℃	--	2	--	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250uA	2.5	--	4.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 7.5 A	--	238	280	mΩ
R_g	Gate resistance	F=1MHZ	--	1.1	--	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 400 V, V_{GS} = 0V, f = 1MHz	--	780	--	pF
C_{oss}	Output Capacitance		--	23	--	pF
$C_{o(tr)}$	Time Related Output Capacitance	V_{DS} = 0V to 400 V, V_{GS} = 0 V		300		pF
$C_{o(er)}$	Energy Related Output Capacitance		--	37	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 400 V, I_D = 5.3A V_{GS} = 10 V, R_G = 10 Ω See Figure 13	--	7.6	--	ns
t_r	Turn-On Rise Time		--	6.7	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	38.2	--	ns
t_f	Turn-Off Fall Time		--	8.4	--	ns
Q_g	Total Gate Charge	V_{DS} =400 V, I_D = 5.3A, V_{GS} = 10 V	--	19.6	--	nC
Q_{gs}	Gate-Source Charge		--	3.7	--	nC
Q_{gd}	Gate-Drain Charge		--	9.7	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	15	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	45	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 5.3A	--	--	1.2	V
t_{rr}	Reverse Recovery Time	V_{DD} = 400 V, I_S = 5.3A, dI_F / dt = 100 A/us	--	234	--	ns
Q_{rr}	Reverse Recovery Charge		--	2.2	--	uC

※Notes:

1. Repetitive rating: pulse-width limited by maximum junction temperature.
2. L=79mH,I_{AS} = 3 A, R_G = 25 Ω, starting T_J = 25℃.
3. I_{SD} ≤ 5.3 A, di/dt ≤ 100 A/μs, V_{DD} ≤ 400 V, starting T_J = 25℃.

Typical Characteristics

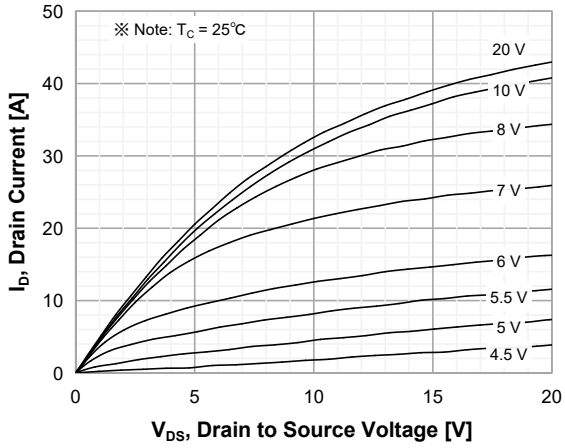


Figure 1. On-Region Characteristics

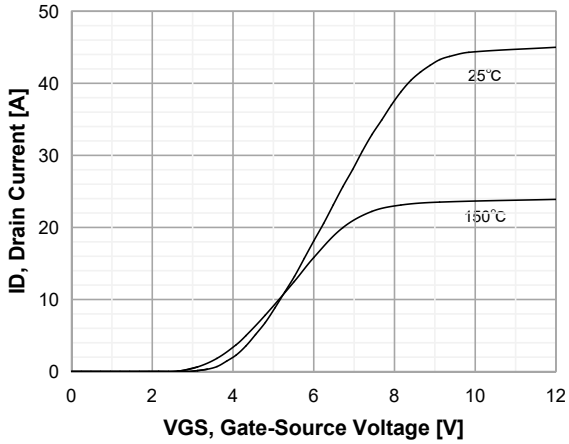


Figure 2. Transfer Characteristics

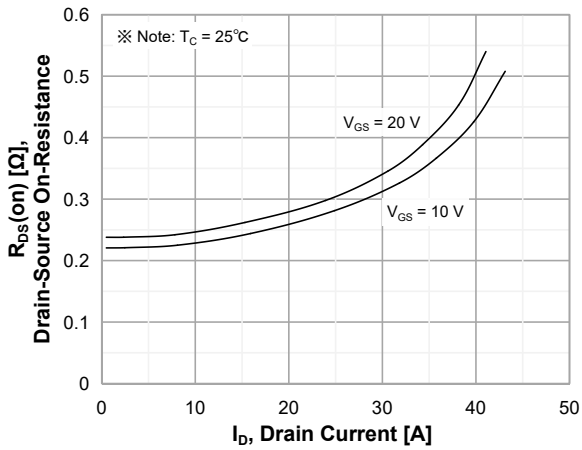


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

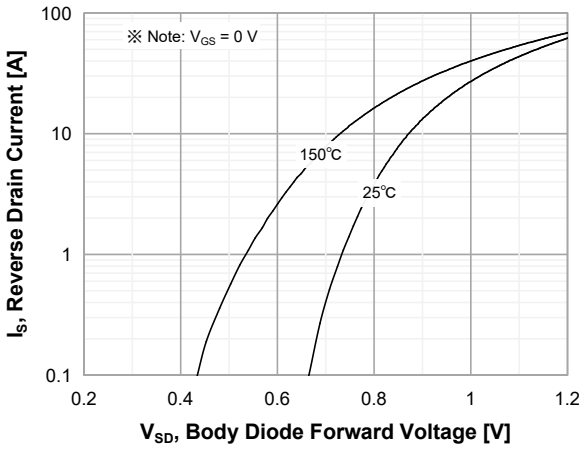


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

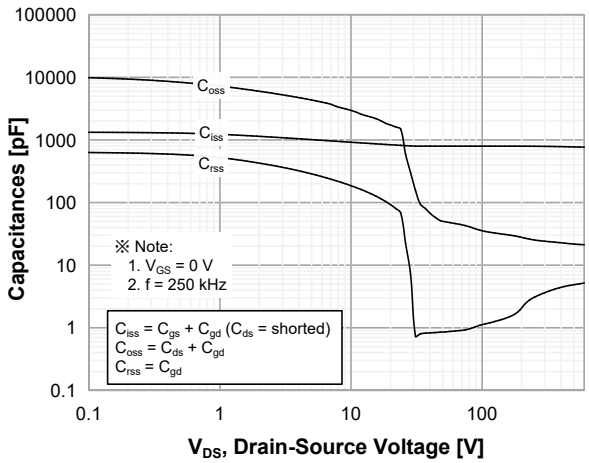


Figure 5. Capacitance Characteristics

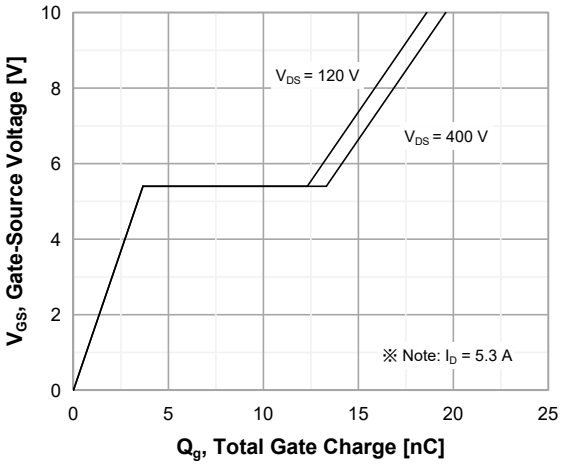


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

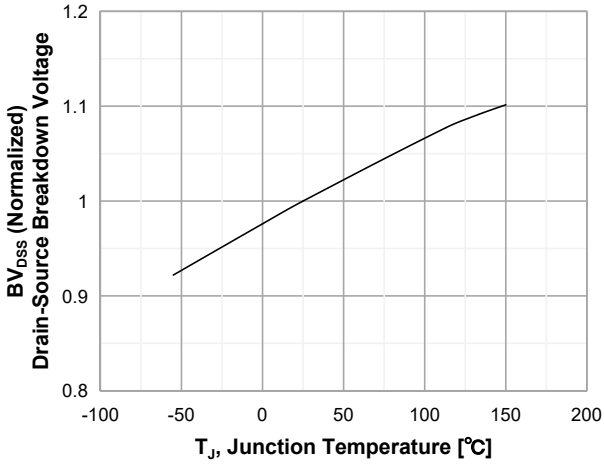


Figure 7. Breakdown Voltage Variation vs Temperature

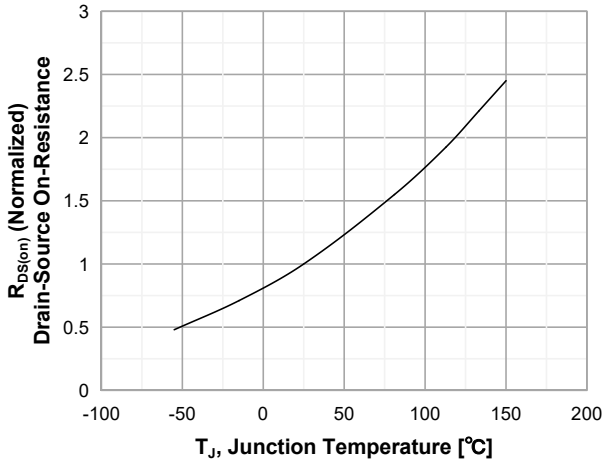


Figure 8. On-Resistance Variation vs Temperature

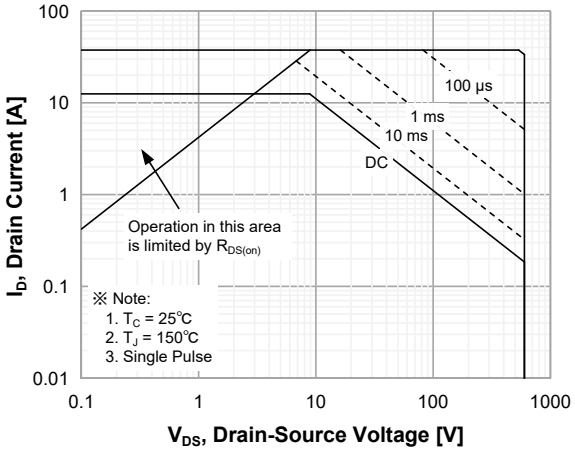


Figure 9. Maximum Safe Operating Area

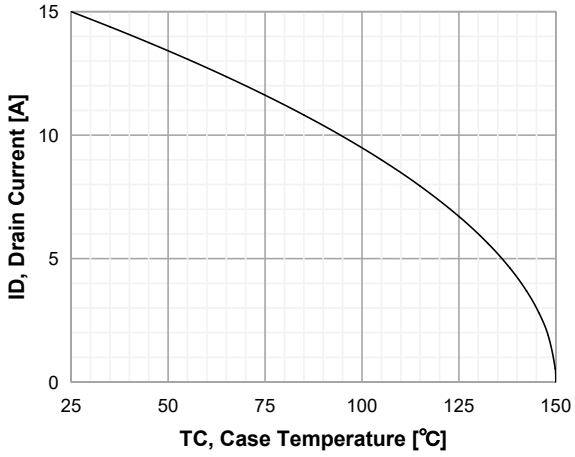


Figure 10. Maximum Drain Current vs Case Temperature

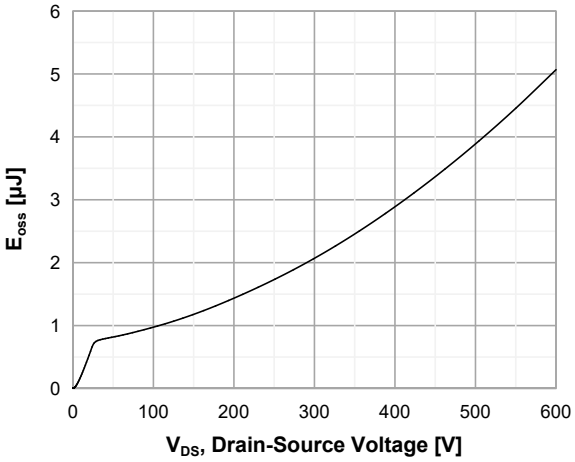


Figure 11. E_{oss} vs. Drain to Source Voltage

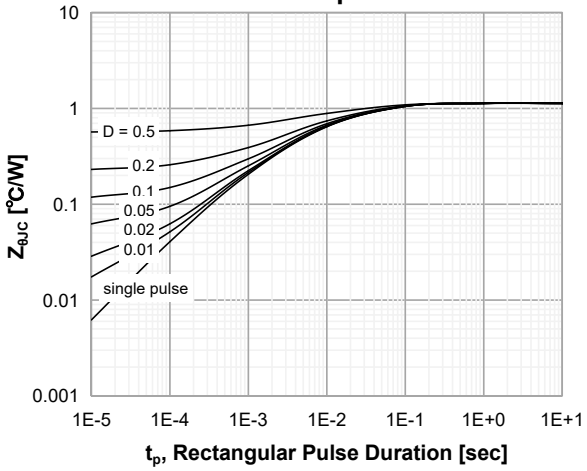
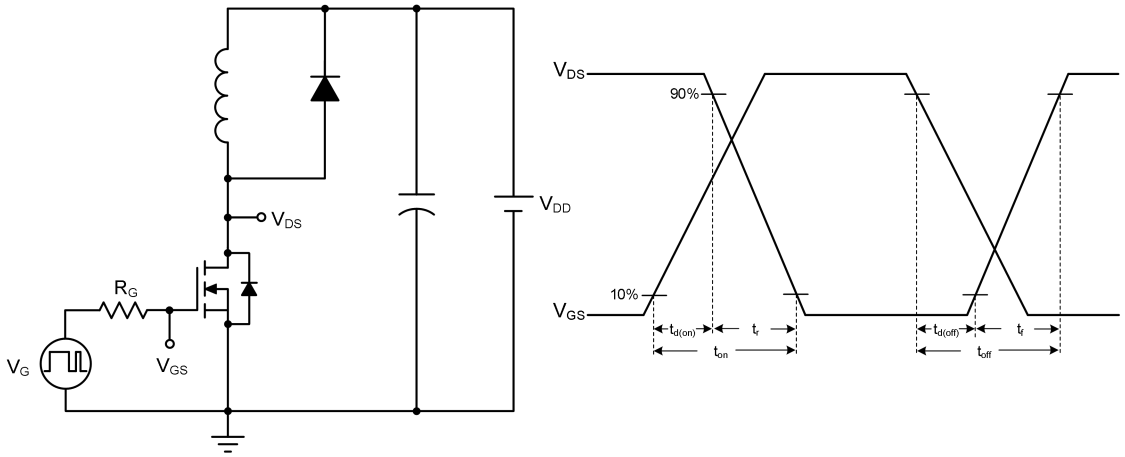
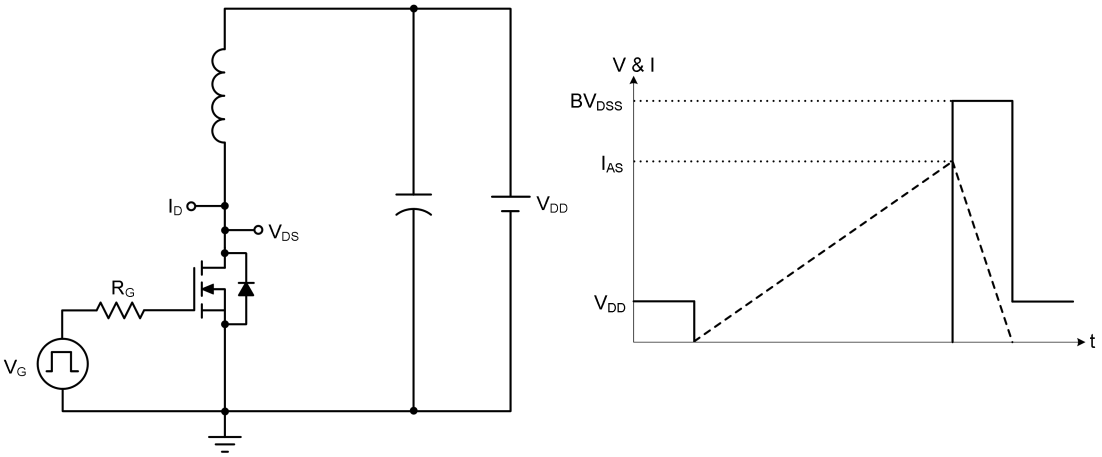


Figure 12. Transient Thermal Response Curve

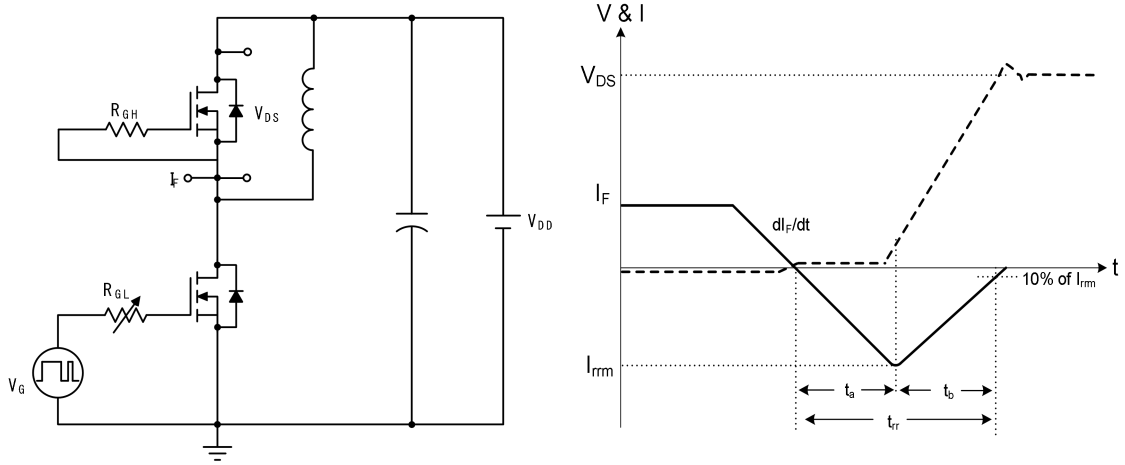
Inductive Load Switching Test Circuit and Waveforms



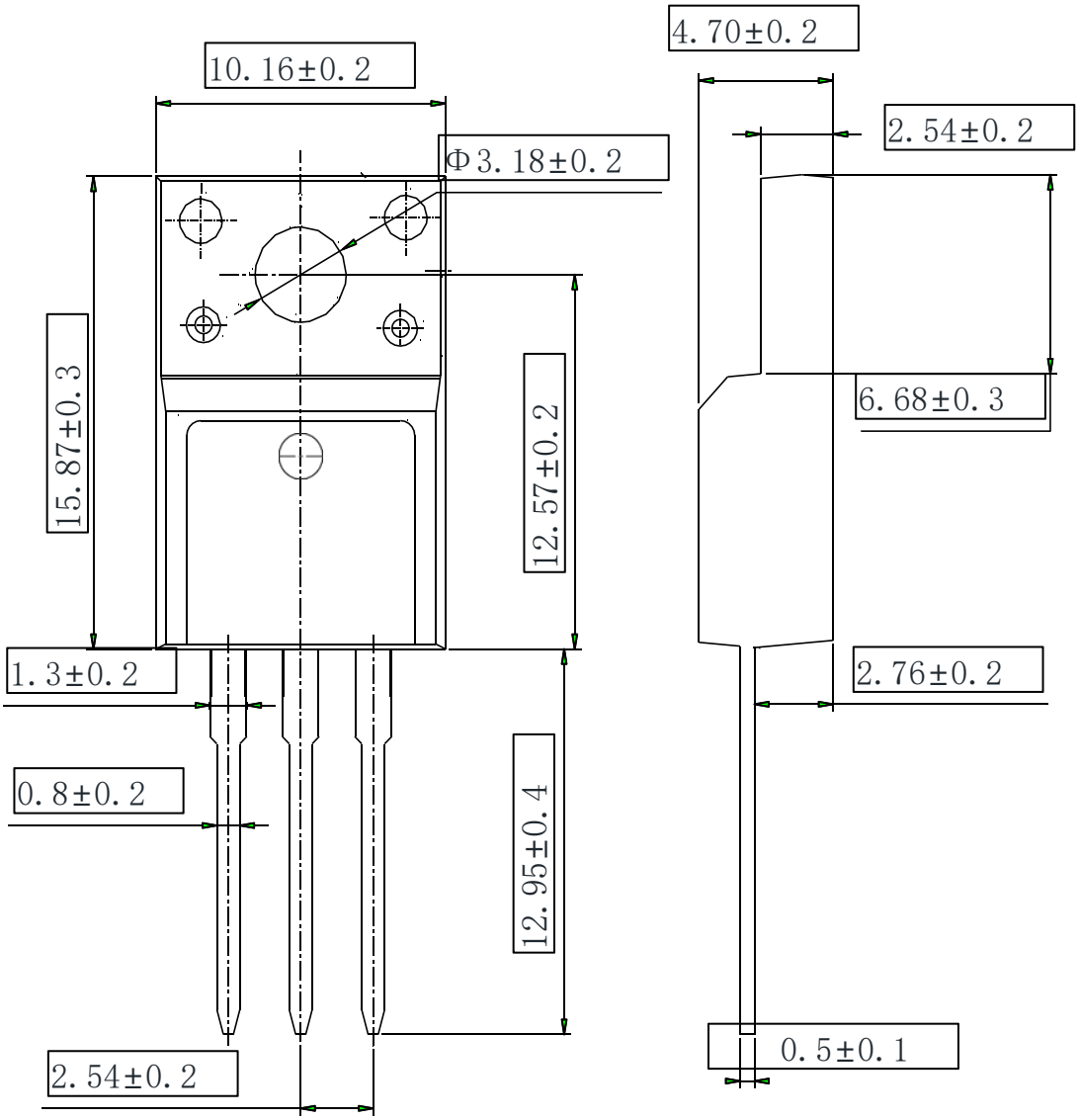
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit and Waveforms



TO-220F OUTLINE



NOTE：
1The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
2.Undeclared tolerance±0.15,Unmarked filletRmax=0.25