美浦森半导体
M s e m i t e k

RoHS
LEAD FREE

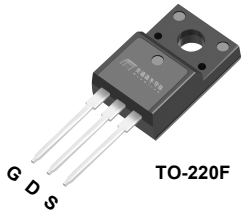
SLF18N50C
500V N-channel MOSFET

General Description

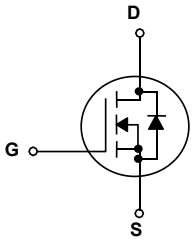
This Power MOSFET is produced using Msemitek's advanced planar stripe DMOS technology.
This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.
These devices are well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

Features

- 18A, 500V, $R_{DS(on)typ}$= 212mΩ@V_{GS} = 10 V
- Low gate charge (typical 87nC)
- Low Crss (typical 32pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



TO-220F



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter		SLF18N50C	Units
V_{DSS}	Drain-Source Voltage		500	V
I_D	Drain Current - Continuous (T_C = 25℃)		18	A
	- Continuous (T_C = 100℃)		11.7	A
I_{DM}	Drain Current - Pulsed	(Note 1)	72	A
V_{GSS}	Gate-Source Voltage		±30	V
EAS	Single Pulsed Avalanche Energy	(Note 2)	689	mJ
I_{AR}	Avalanche Current	(Note 1)	18	A
E_{AR}	Repetitive Avalanche Energy		65	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4..5	V/ns
P_D	Power Dissipation (T_C = 25℃)		41	W
	- Derate above 25℃		0.33	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	SLF18N50C	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.04	℃/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	63	℃/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 = 250 uA	500	--	--	V
$\triangle BV_{DSS}$ / $\triangle T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250 uA, Referenced to 25℃	--	0.59	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 400 V, T_C = 125℃	--	--	10	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 = 250 uA	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 9A	--	212	265	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 40 V, I_D =9A	--	12	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	3110	--	pF
C_{oss}	Output Capacitance		--	328	--	pF
C_{rss}	Reverse Transfer Capacitance		--	32	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250 V, I_D =18 A, R_G = 25 Ω (Note 4, 5)	--	65	--	ns
t_r	Turn-On Rise Time		--	40	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	245	--	ns
t_f	Turn-Off Fall Time		--	68	--	ns
Q_g	Total Gate Charge	V_{DS} = 250 V, I_D =18A, V_{GS} = 10 V (Note 4, 5)	--	116	--	nC
Q_{gs}	Gate-Source Charge		--	16	--	nC
Q_{gd}	Gate-Drain Charge		--	38	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	18	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	72	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 9A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 18A, dI_F / dt = 100 A/us (Note 4)	--	525	--	ns
Q_{rr}	Reverse Recovery Charge		--	6.2	--	uC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH,V_G =10V, V_{DD} =50V, Starting T_J = 25°C
3. $I_{SD} \leq$ 20A, di/dt ≤ 200A/us, $V_{DD} \leq BV_{DSS,}$ Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

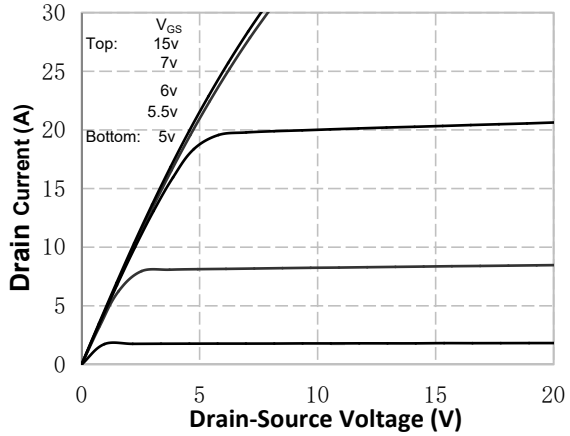


Figure 1. On-Region Characteristics

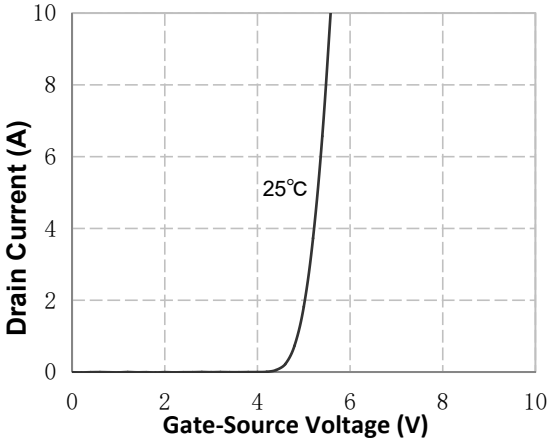


Figure 2. Transfer Characteristics

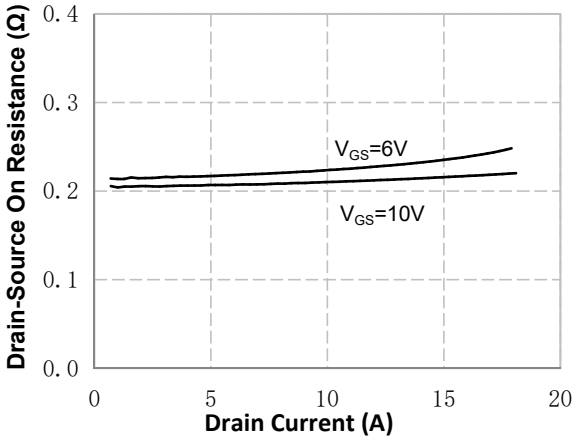


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

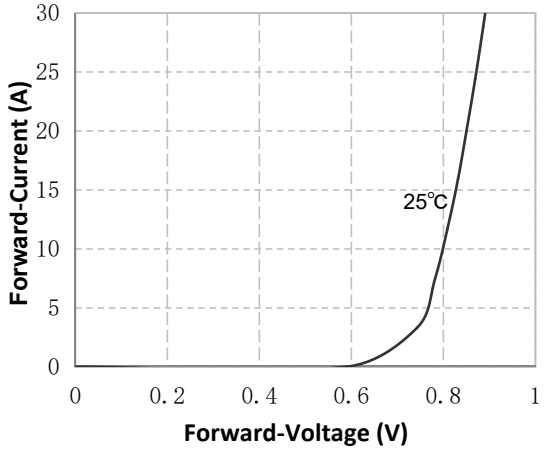


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

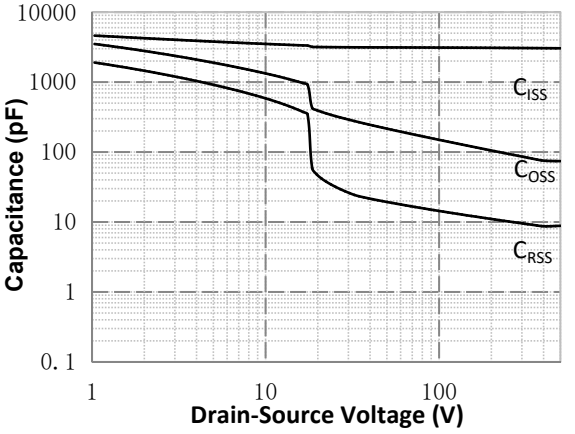


Figure 5. Capacitance Characteristics

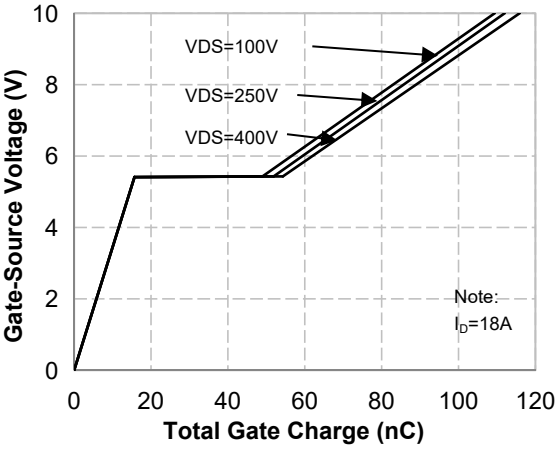


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

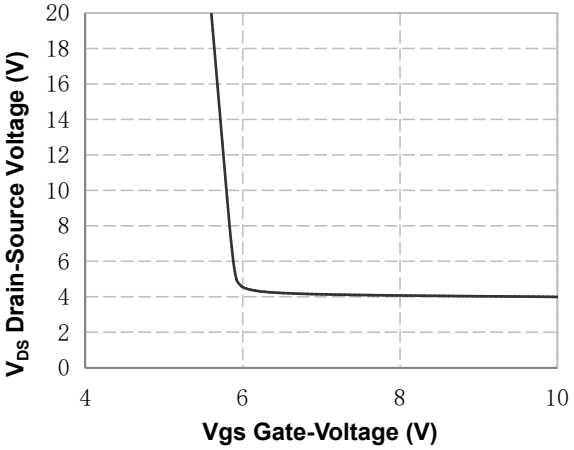


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

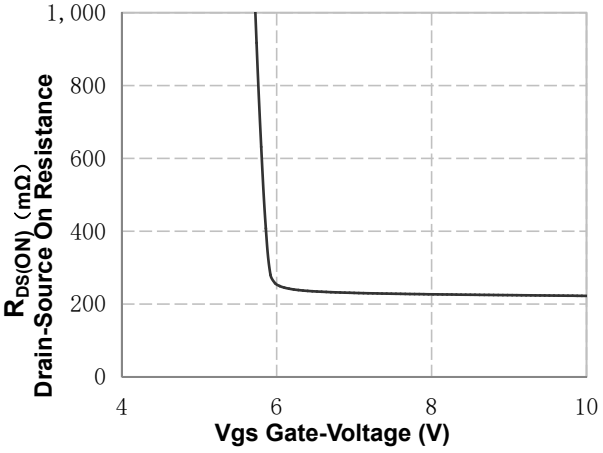


Figure 8. On-Resistance vs Gate Voltage

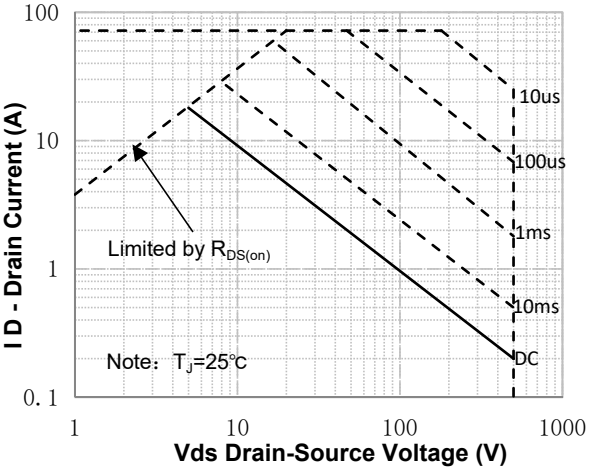


Figure 9. Maximum Safe Operating Area

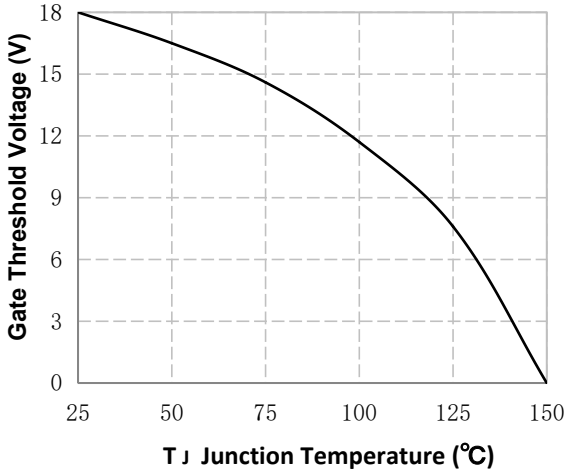


Figure 10. Maximum Drain Current vs Temperature

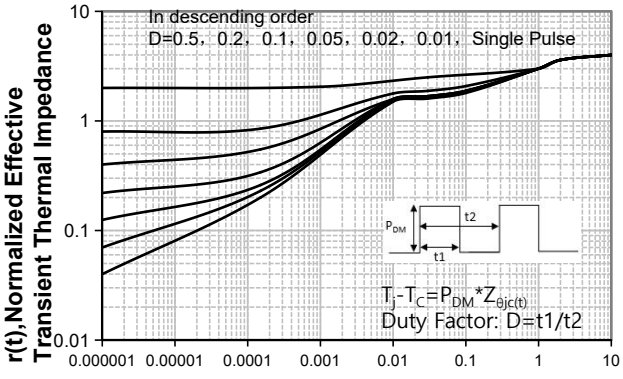
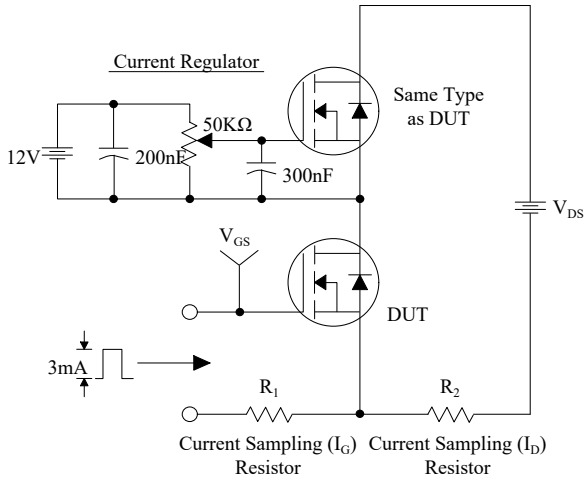
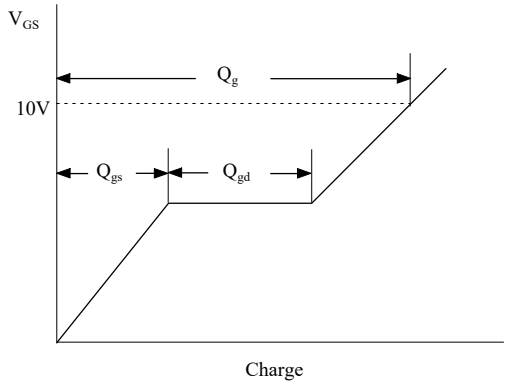


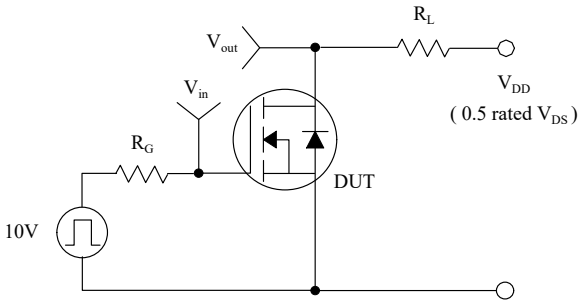
Figure 11. Transient Thermal Response Curve

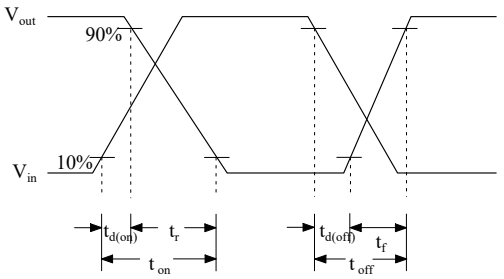
Gate Charge Test Circuit & Waveform



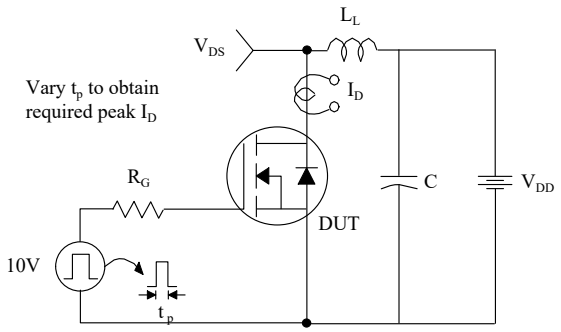


Resistive Switching Test Circuit & Waveforms

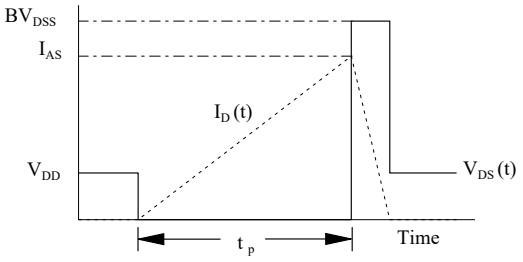




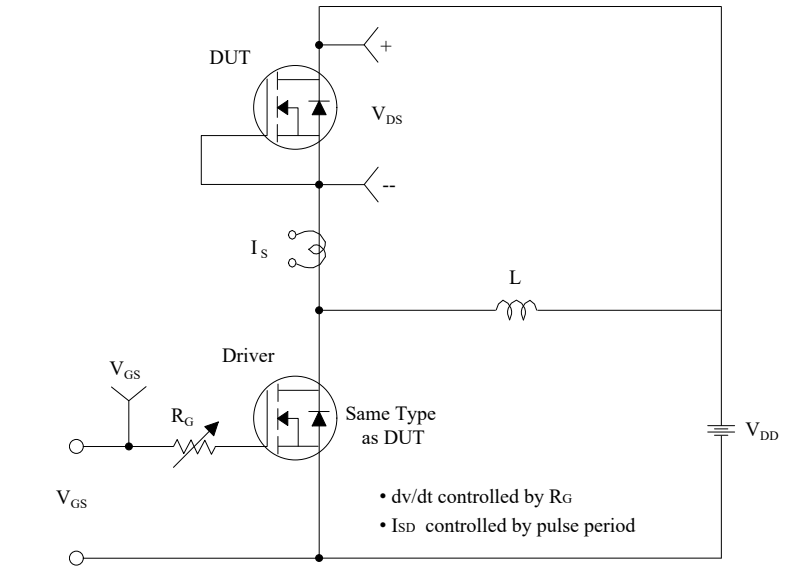
Unclamped Inductive Switching Test Circuit & Waveforms

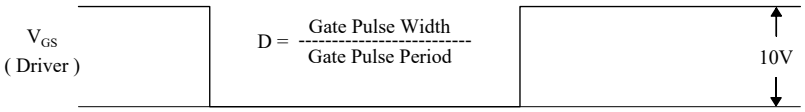


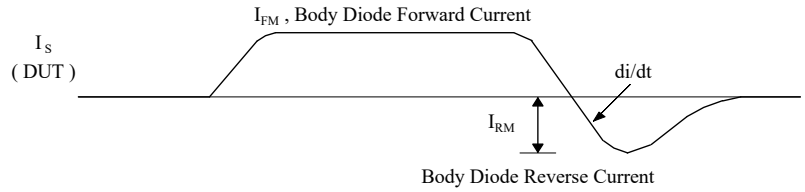
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

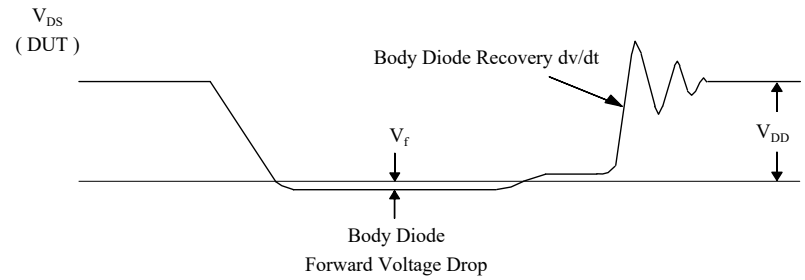


Peak Diode Recovery dv/dt Test Circuit & Waveforms

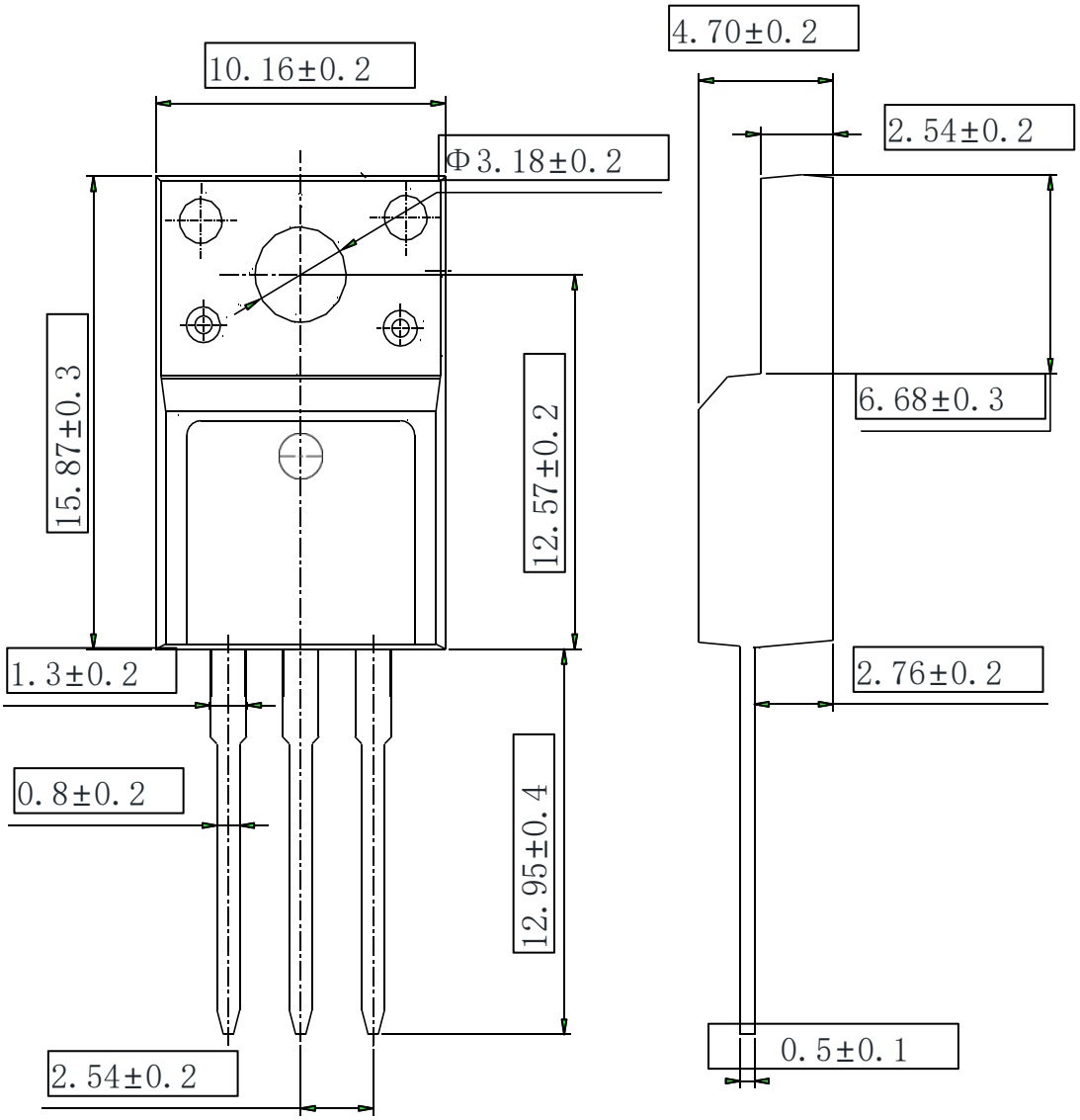








TO-220F OUTLINE



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

Disclaimer

The content specified herein is for the purpose of introducing Msemitek's products (here in after "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Msemitek does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). Msemitek shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although, Msemitek endeavors to improve the quality and reliability of it's products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions . Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Msemitek's product.

The content specified herein is subject to change for improvement without notice. When using a Msemitek's product, be sure to obtain the latest specifications.