

18A, 650V N-CHANNEL MOSFET

GENERAL DESCRIPTION

SVF18N65EFJH is an N-channel enhancement mode power MOS field effect transistor which is produced using Silan proprietary F-Cell™ high-voltage planar VDMOS technology. The improved process and cell structure have been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are widely used in AC-DC power supplies, DC-DC converters and H-bridge PWM motor drivers.

FEATURES

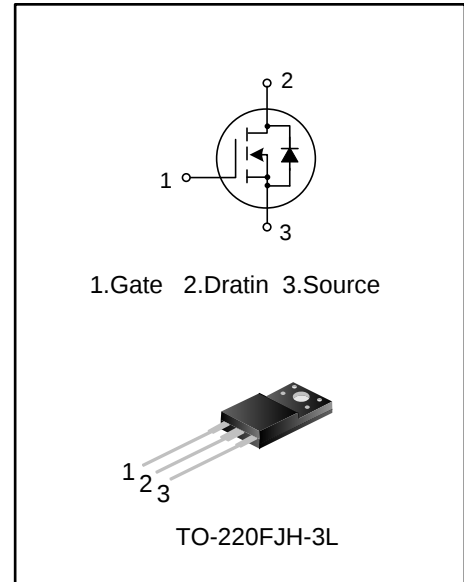
- 18A, 650V, $R_{DS(on)(typ.)}=0.48\Omega@V_{GS}=10V$
- Low gate charge
- Low C_{rss}
- Fast switching
- Improved dv/dt capability
- 100% avalanche tested
- Pb-free lead plating
- RoHS compliant

KEY PERFORMANCE PARAMETERS

Characteristics	Ratings	Unit
V_{DS}	650	V
$V_{GS(th)}$	2.0~4.0	V
$R_{DS(on), max.}$	0.55	Ω
$I_{D,pulse}$	72	A
$Q_{g,typ.}$	45	nC

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SVF18N65EFJH	TO-220FJH-3L	18N65EFJH	Halogen free	Tube



ABSOLUTE MAXIMUM RATINGS (T_A=25°C UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-Source Voltage	V _{DS}	--	650	--	--	V
Gate-source Voltage (Static)	V _{GS}	--	-20	--	20	V
Gate-source Voltage (Dynamic)	V _{GS}	AC(f>1Hz)	-30	--	30	V
Drain Current	I _D	T _C =25°C	--	--	18	A
		T _C =100°C	--	--	11	A
Drain Current Pulsed (Note 1)	I _{DM}	T _C =25°C	--	--	72	A
Power Dissipation (Note 2)	P _D	T _C =25°C	--	--	54	W
Single Pulsed Avalanche Energy	E _{AS}	L=30mH, V _{DD} =100V, R _G =25Ω, starting temperature T _J =25°C	--	--	1282	mJ
Single Pulsed Current	I _{AS}	--	--	--	8.6	A
Reverse Diode dv/dt	dv/dt	V _{DS} =0~400V, I _{SD} ≤I _S , T _J =25°C	--	--	4.5	V/ns
MOSFET dv/dt Ruggedness	dv/dt	V _{DS} =0~480V	--	--	50	V/ns
Operation Junction Temperature Range	T _J	--	-55	--	150	°C
Storage Temperature Range	T _{stg}	--	-55	--	150	°C
Continuous Diode Forward Current	I _S	T _C =25°C, integral reverse P-N junction diode in the MOSFET	--	--	18	A
Diode Pulse Current	I _{S,pulse}		--	--	72	A
Maximum Diode Commutation Speed	di/dt	V _{DS} =0~400V, I _{SD} ≤I _S , T _J =25°C	--	--	250	A/μs

THERMAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Thermal Resistance, Junction-case, Bottom	R _{θJC}	--	--	--	2.3	°C/W
Thermal Resistance, Junction-ambient	R _{θJA}	--	--	--	62.5	°C/W
Soldering Temperature (SMD)	T _{sold}	15 ⁺² ₋₀ sec, 1time	--	--	260	°C

ELECTRICAL CHARACTERISTICS (T_J=25°C UNLESS OTHERWISE NOTED)

Static characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Drain-source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	650	--	--	V
Drain-source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _J =25°C	--	--	1.0	μA
		V _{DS} =650V, V _{GS} =0V, T _J =125°C	--	2.0	--	μA
Gate-source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V	--	--	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250μA	2.0	--	4.0	V
Static Drain-source On State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =9.0A	--	0.48	0.55	Ω

Dynamic characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Input Capacitance	C _{iss}	f=1MHz, V _{GS} =0V, V _{DS} =25V	--	2338	--	pF
Output Capacitance	C _{oss}		--	238	--	
Reverse Transfer Capacitance	C _{rss}		--	7.0	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} =325V, V _{GS} =10V, R _G =25Ω, I _D =18A (Notes 3,4)	--	38	--	ns
Turn-on Rise Time	t _r		--	62	--	
Turn-off Delay Time	t _{d(off)}		--	143	--	
Turn-off Fall Time	t _f		--	67	--	
Total Gate Charge	Q _g	V _{DD} =520V, V _{GS} =10V, I _D =18A (Notes 3,4)	--	45	--	nC
Gate-source Charge	Q _{gs}		--	15	--	
Gate-drain Charge	Q _{gd}		--	14	--	
Gate-plateau Voltage	V _{plateau}		--	6.0	--	V

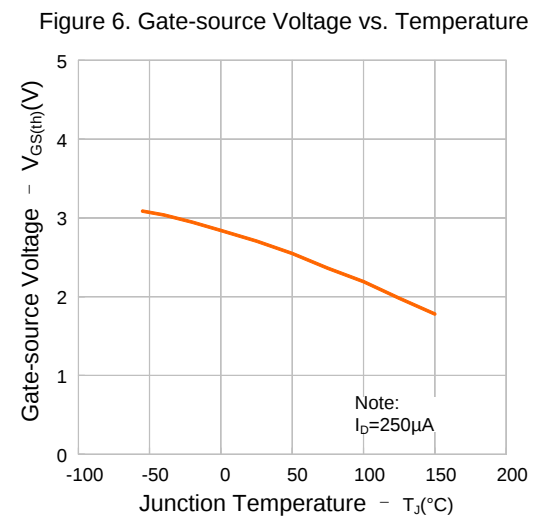
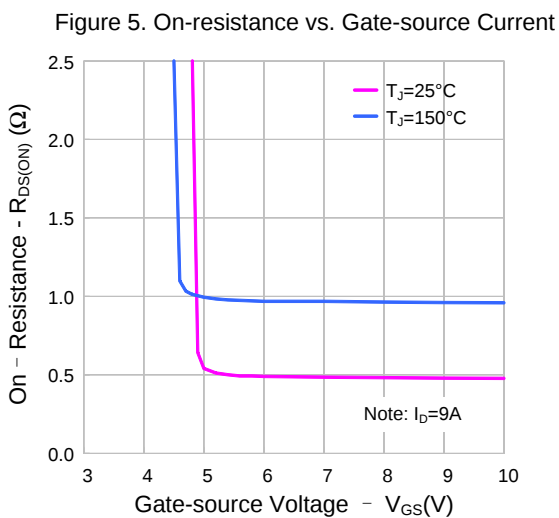
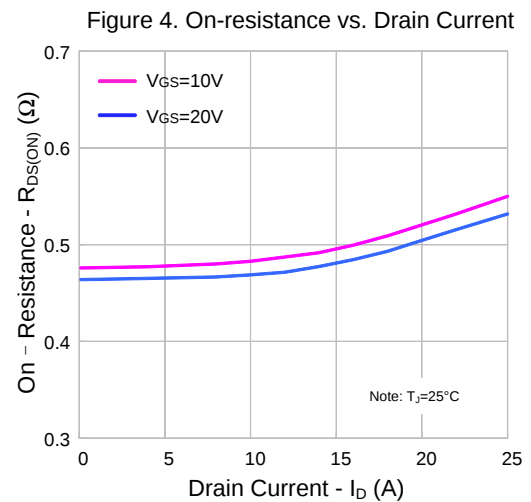
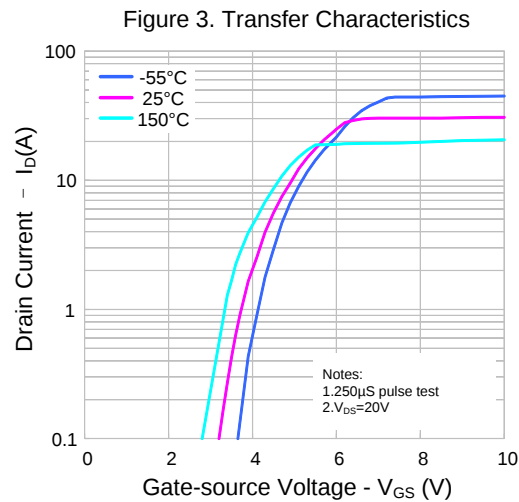
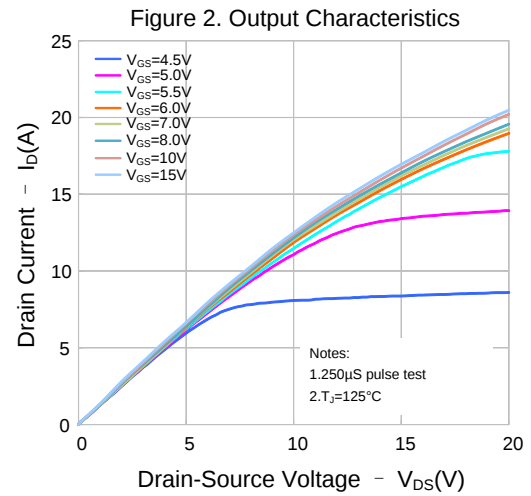
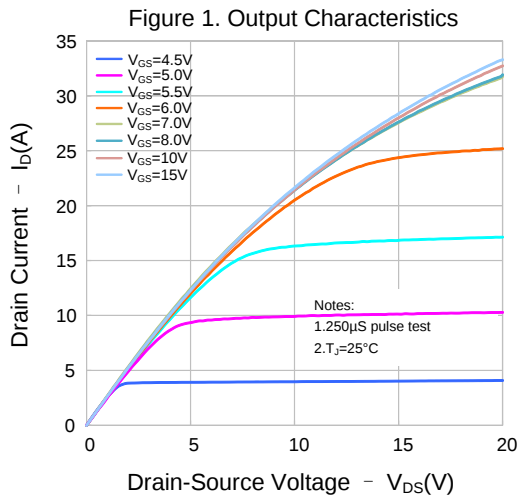
Reverse diode characteristics

Characteristics	Symbol	Test conditions	Ratings			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V _{SD}	I _S =18A, V _{GS} =0V	--	--	1.4	V
Reverse Recovery Time	T _{rr}	I _S =18A, V _{GS} =0V, dI _F /dt=100A/μs (Note 3)	--	573	--	ns
Reverse Recovery Charge	Q _{rr}		--	7.1	--	μC
Reverse Recovery Peak Current	I _{rrm}		--	26	--	A

Notes:

1. Pulse time 5μs;
2. The dissipation power will change with temperature, derating above 25°C: 0.43W/°C;
3. Pulse Test: Pulse width ≤300μs, Duty cycles≤2%;
4. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 7. Body Diode Forward Voltage Variation vs. Source Current and Temperature

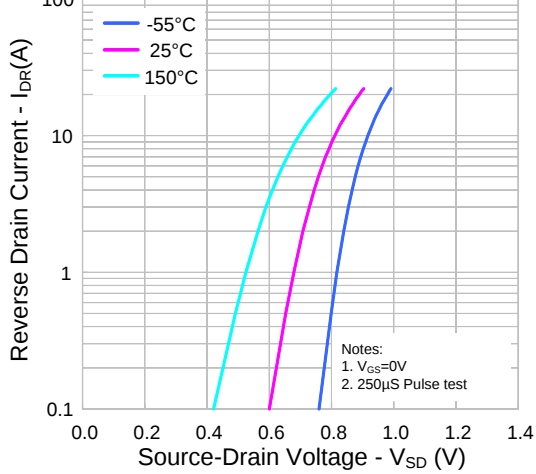


Figure 8. Capacitance Characteristics

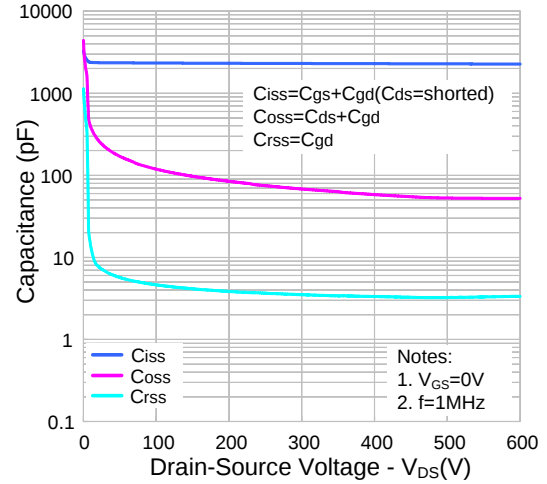


Figure 9. Gate Charge

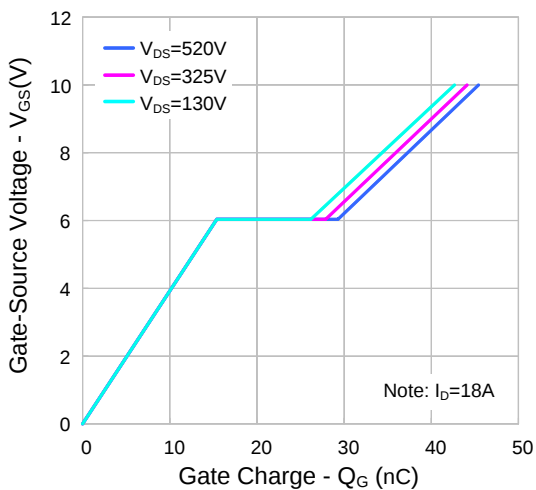


Figure 10. Breakdown Voltage Variation vs. Temperature

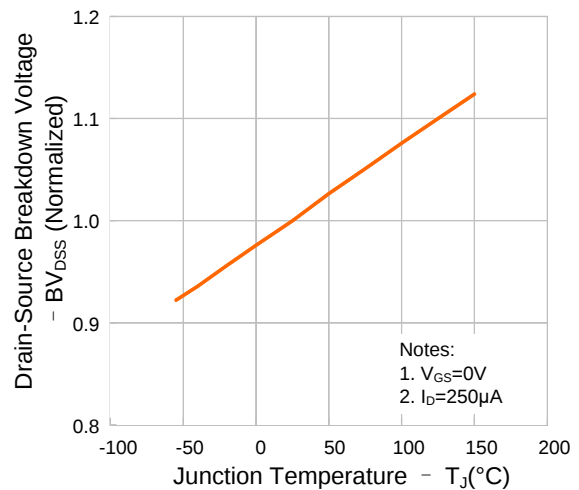


Figure 11. On-resistance Variation vs. Temperature

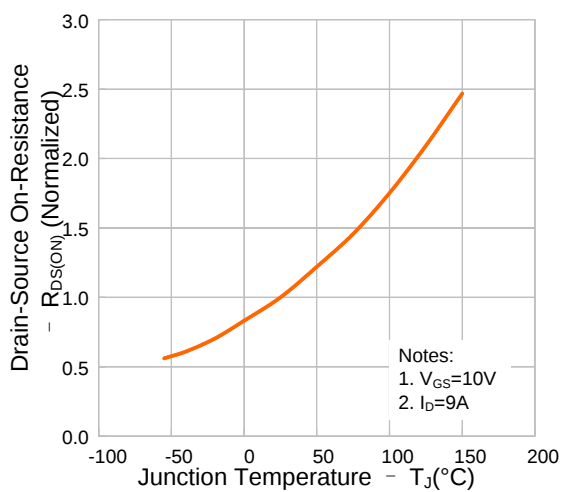
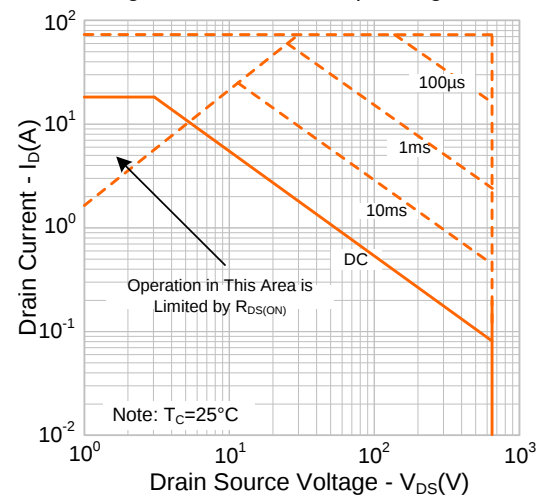
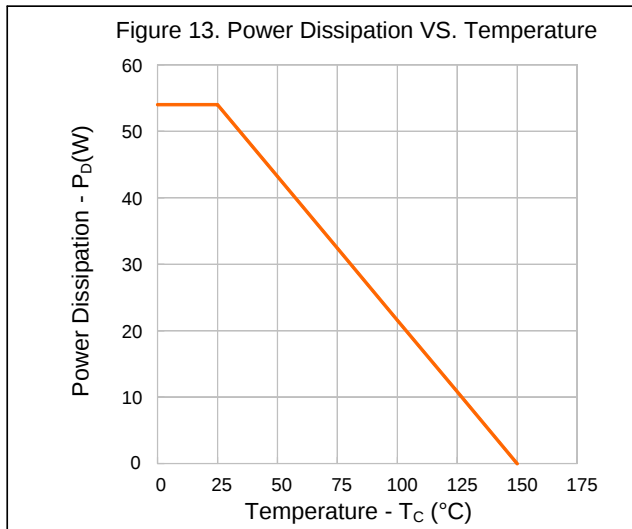


Figure 12. Max. Safe Operating Area

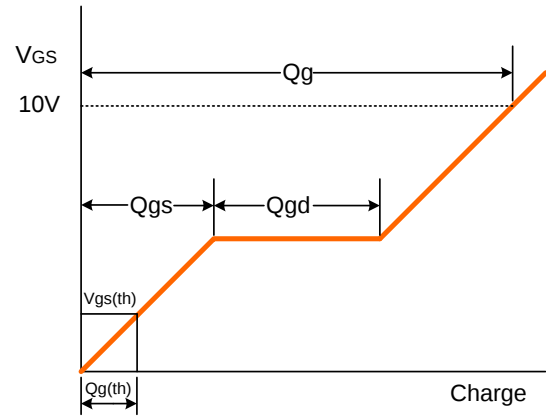
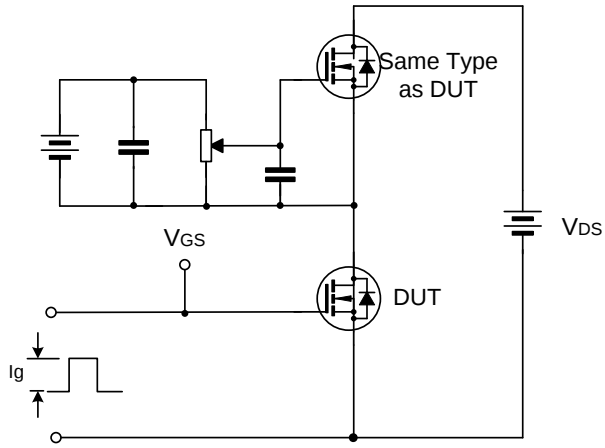


TYPICAL CHARACTERISTICS(CONTINUED)

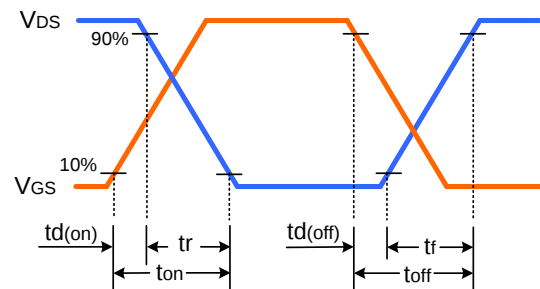
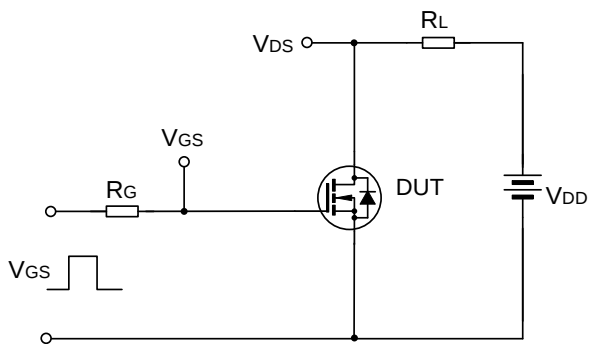


TYPICAL TEST CIRCUIT

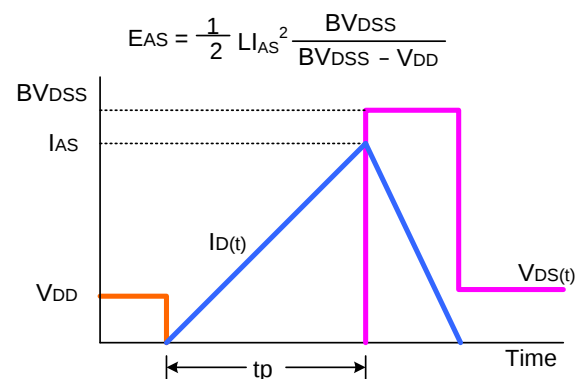
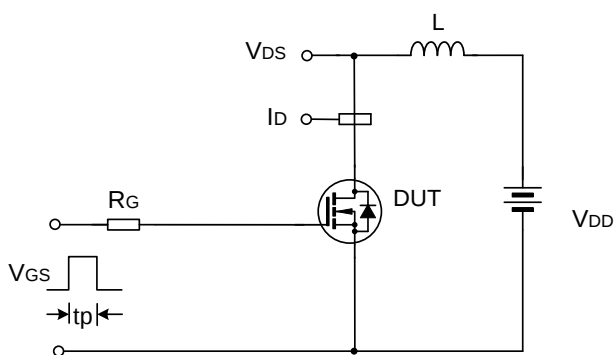
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



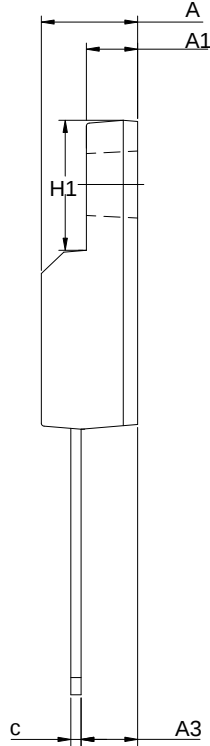
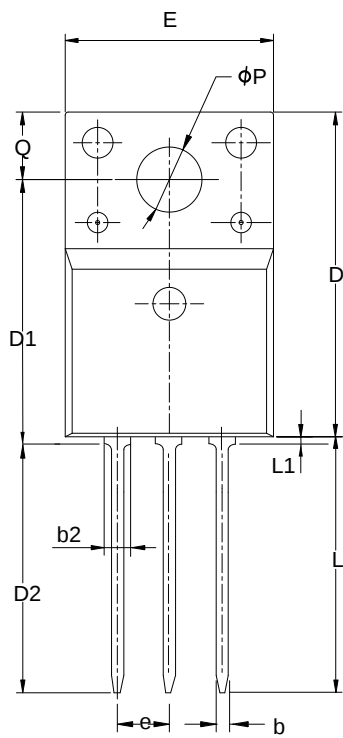
Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE

TO-220FJH-3L

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.42	4.70	5.02
A1	2.30	2.54	2.80
A3	2.50	2.76	3.10
b	0.55	0.70	0.80
b2	—	—	1.29
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	12.87	13.07	13.27
D2	12.28	12.48	12.68
E	9.73	10.16	10.36
e	2.54BCS		
H1	6.40	6.68	7.00
L	12.48	12.98	13.48
L1	—	—	0.85
ΦP	3.00	3.18	3.40
Q	3.05	3.30	3.55

Disclaimer :

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Rev.: 1.0

Revision History:

1. First release
