

SK12N65C-TF

12A, 650V N-CHANNEL POWER MOSFET

TO-220F-3L

DESCRIPTION

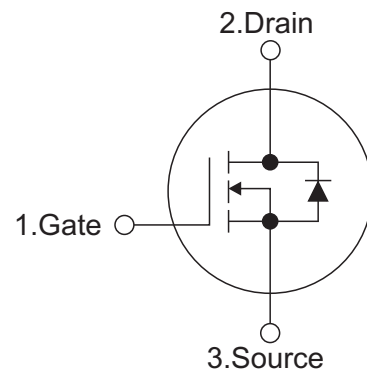
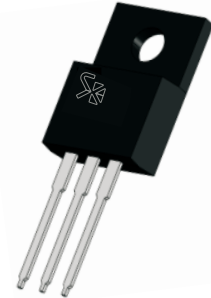
The SK12N65C-TF is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.

Features

- $R_{DS(ON)} \leq 0.85 \Omega$ @ $V_{GS}=10V$, $I_D=12A$
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Mechanical data

- Case: TO-220F-3L
- Approx. Weight: 2.1g (0.07oz)
- Lead free finish, RoHS compliant
- Case Material: "Green" molding compound, UL flammability classification 94V-0, "Halogen-free".



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$, unless otherwise specified)

PARAMETER		Symbols	RATINGS	Units
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	12	A
	$T_C=100^\circ C$		7.8	A
Pulsed Drain Current (Note 2)		I_{DM}	48	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	576	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	50	V/ns
Power Dissipation		P_D	51	W
Operation Junction Temperature and Storage Temperature		T_j, T_{stg}	-55 ~ +150	$^\circ C$

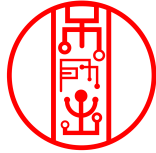
Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L = 10mH$, $I_{AS} = 6.2A$, $V_{DD} = 50V$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ C$

4. $ISD \leq 12A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BVDSS$, Starting $T_J = 25^\circ C$



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THERMAL DATA

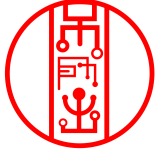
PARAMETER	Symbols	RATINGS	Units
Junction to Ambient	R_{thJA}	62.5	°C/W
Junction to Case	R_{thJC}	2.44	°C/W

ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER		Symbols	TEST CONDITIONS	Min	Typ	Max	Units
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250uA	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V,V _{GS} =0V			1	uA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =30V,V _{DS} =0V			100	nA
	Reverse		V _{GS} =-30V,V _{DS} =0V			-100	
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250uA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =6.0A		0.62	0.85	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2000		pF
Output Capacitance		C _{OSS}			160		pF
Reverse Transfer Capacitance		C _{RSS}			5		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =520V,V _{GS} =10V, I _D =12A,I _G =1mA (NOTE1,2)		36		nC
Gate-Source Charge		Q _{GS}			8.6		nC
Gate-Drain Charge		Q _{GD}			10		nC
Turn-On Delay Time (Note 1)		t _{D(ON)}	V _{DS} =325V,V _{GS} =10V, I _D =12A,R _G =25Ω (NOTE1,2)		22		ns
Turn-On Rise Time		t _R			23		ns
Turn-Off Delay Time		t _{D(OFF)}			115		ns
Turn-Off Fall Time		t _F			32		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				12	A
Maximum Body-Diode Pulsed Current		I _{SM}				48	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =12A,V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		trr	I _S =12A,V _{GS} =0V,		470		ns
Reverse Recovery Charge		Q _{rr}	di/dt=100A/us		12		uC

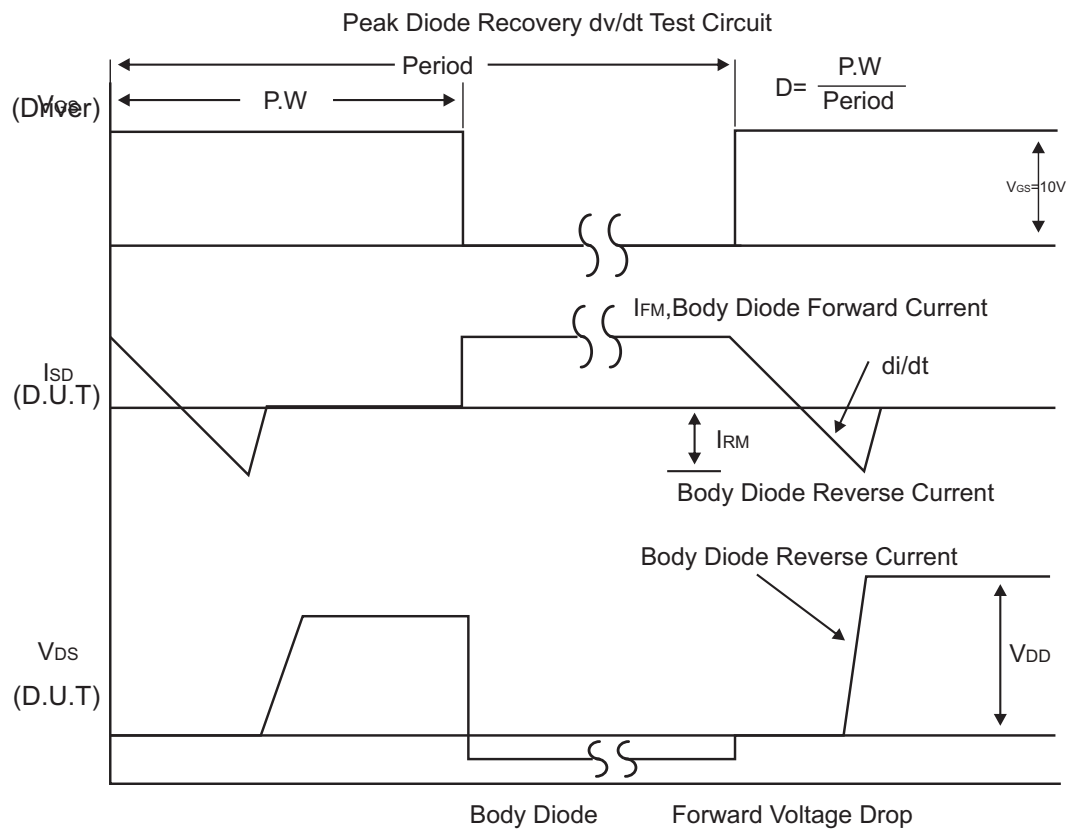
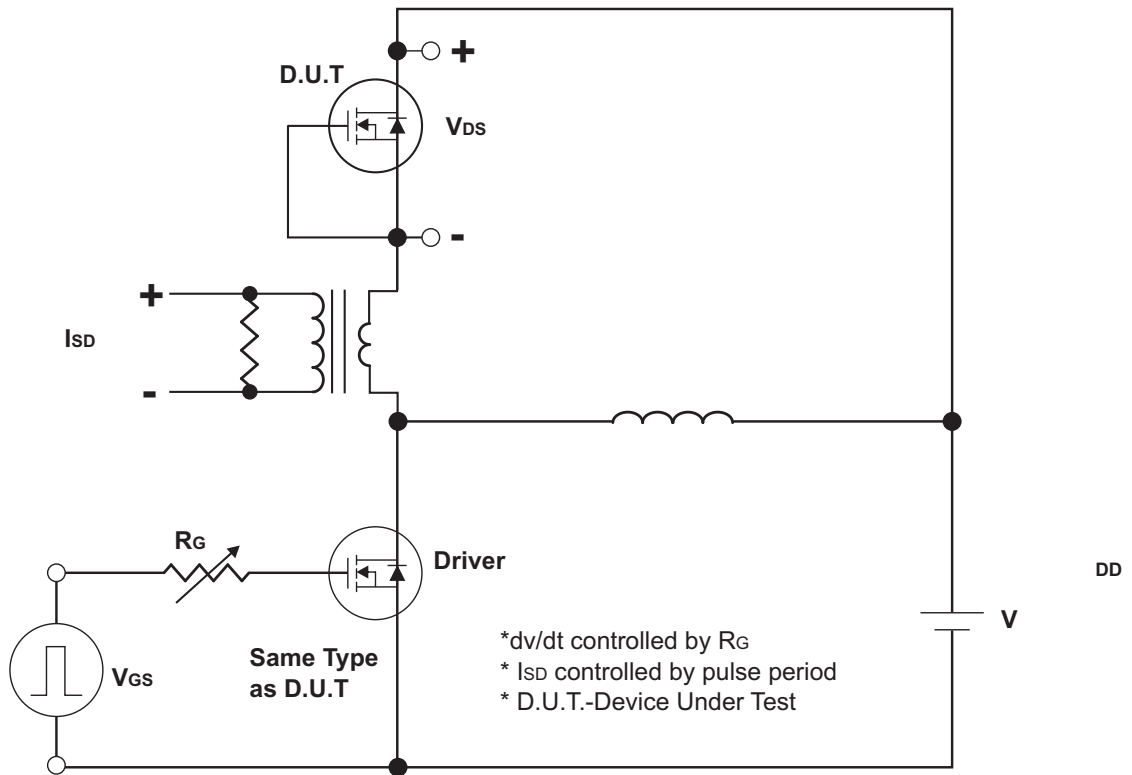
Notes:

1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.

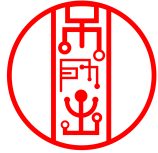


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est Circuits and waveforms

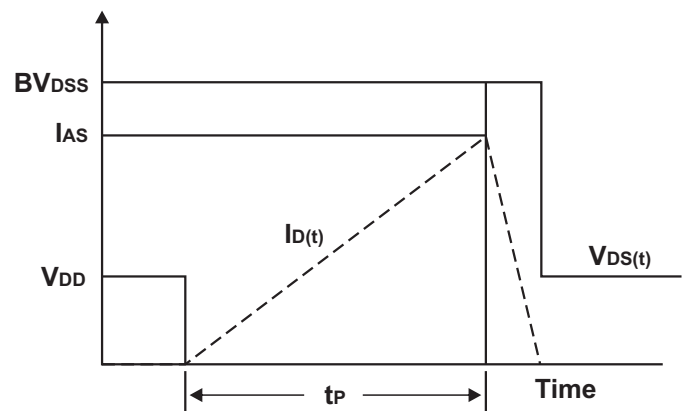
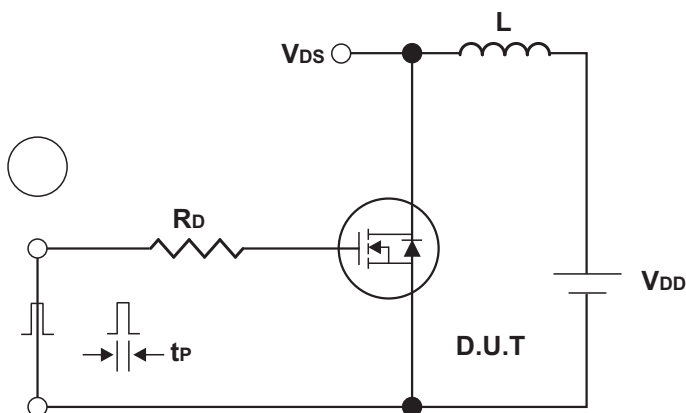
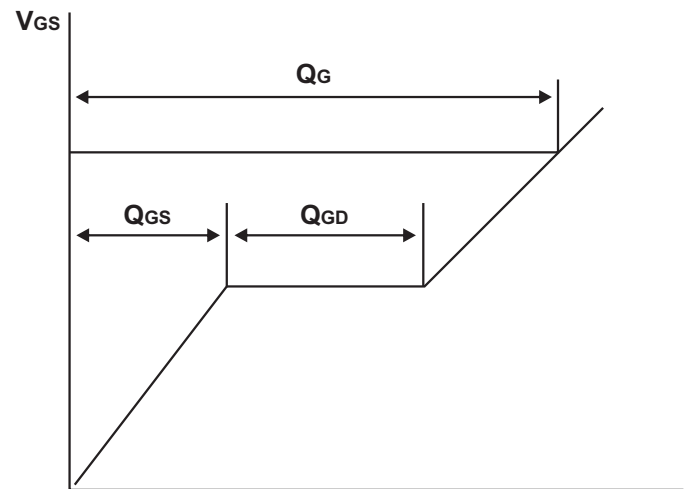
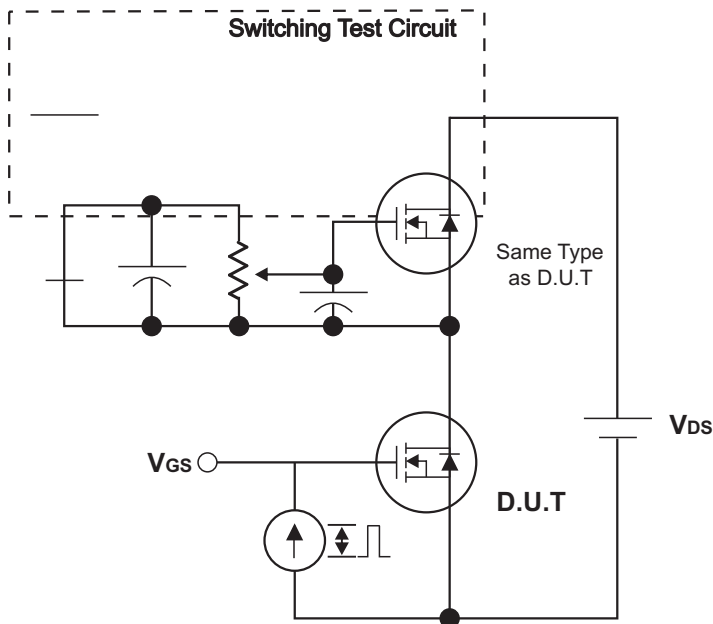
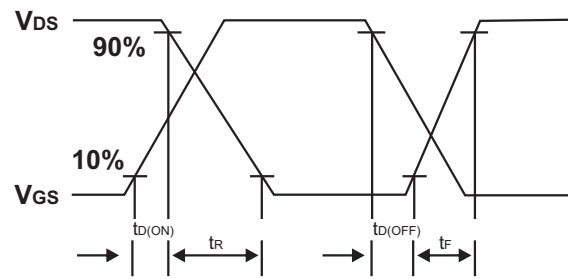
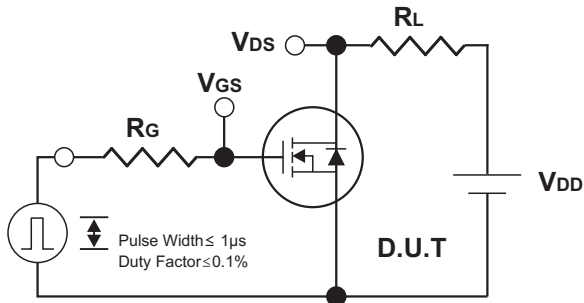


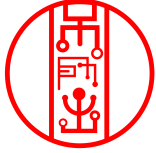
Peak Diode Recovery dv/dt Waveforms



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est Circuits and waveforms





Typical Characteristics

Fig.1 Drain Current vs. Gate-Source Voltage

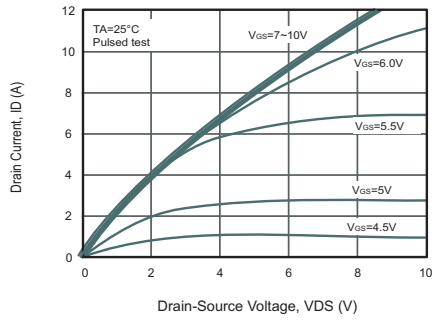


Fig.2 Drain-Source On-Resistance vs. Gate-Source Voltage

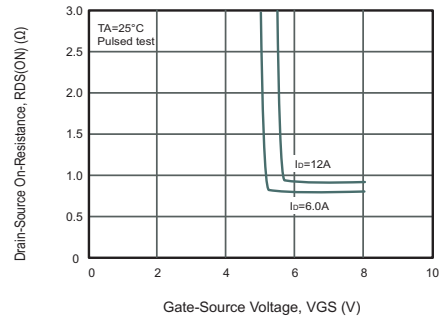


Fig.3 Gate Charge Characteristics

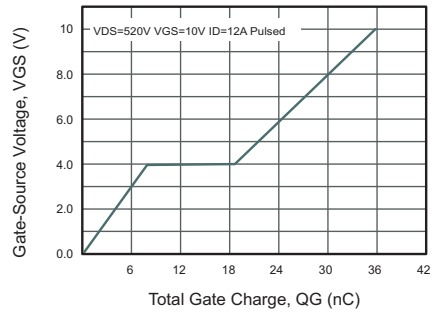


Fig.4 Capacitance Characteristics

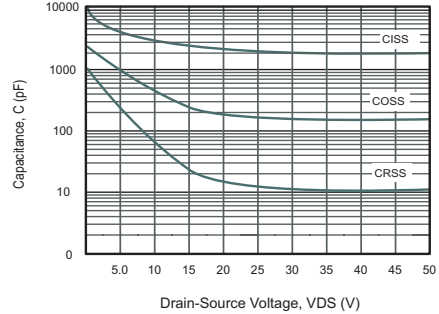


Fig.5 Drain-Source On-Resistance vs. Junction Temperature

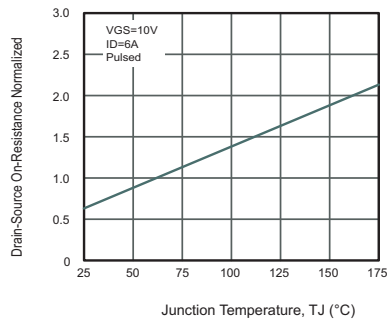


Fig.6 Breakdown Voltage vs. Junction Temperature

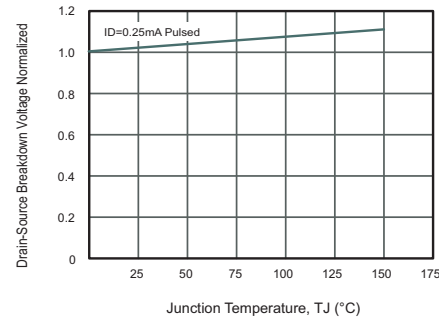


Fig.7 Gate Threshold Voltage vs. Junction Temperature

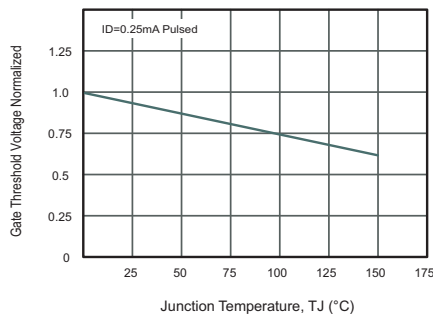
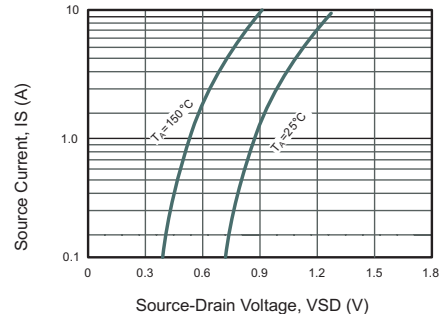
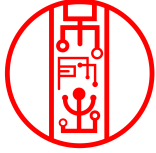


Fig.8 Source Current vs. Source-Drain Voltage





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Typical Characteristics

Fig.9 Drain Current vs. Gate-Source Voltage

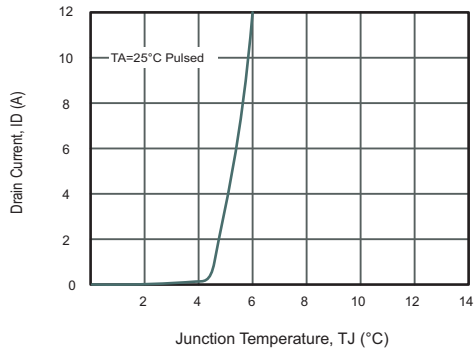


Fig.10 Drain-Source On-Resistance vs. Drain Current

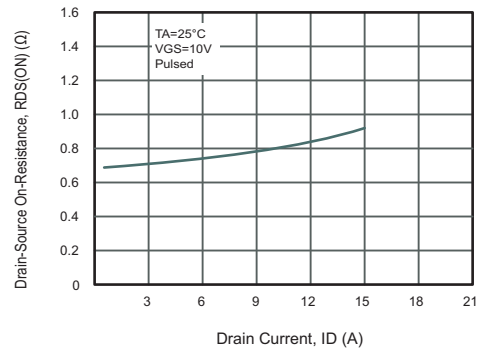


Fig.11 Power Dissipation vs. Junction Temperature

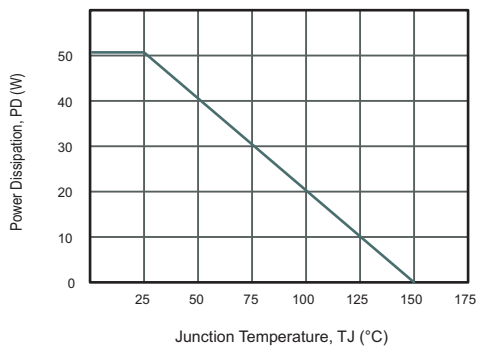


Fig.12 Drain Current vs. Junction Temperature

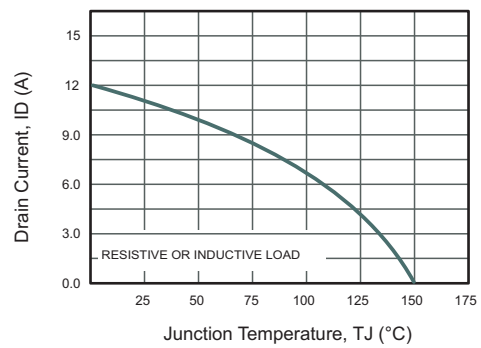
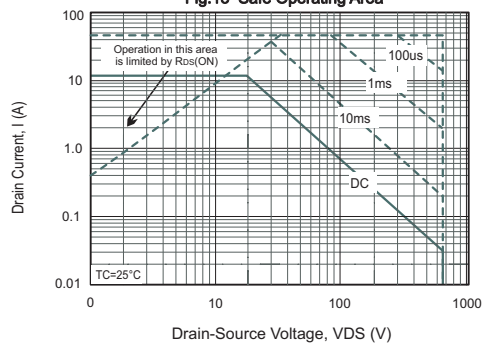


Fig.13 Safe Operating Area



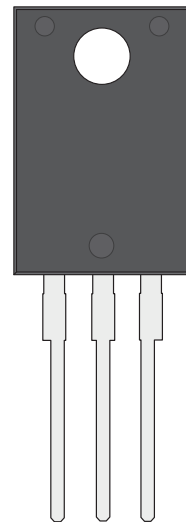
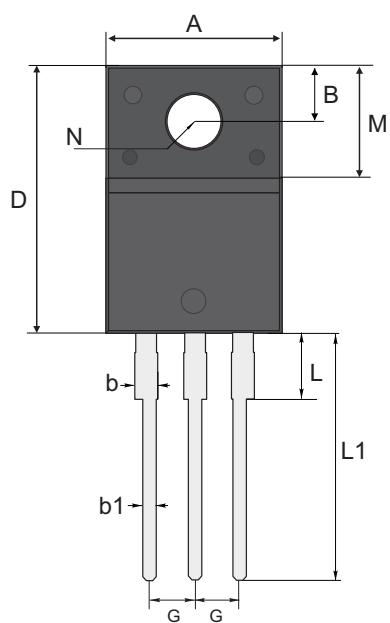


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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

TO-220F-3L



TO-220F-3L mechanical data

UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.34	0.9	4.9	16.07	2.74	2.74	2.64	0.60	2.85	13.7	6.88	3.18 TYPICAL
	typ	10.18	3.27	1.24	0.8	4.7	15.87	2.54	2.54	2.54	0.50	2.65	13.5	6.68	
	min	10.08	3.17	1.14	0.7	4.5	15.67	2.34	2.34	2.44	0.40	2.45	13.3	6.48	
mil	max	405	133	53	35	193	630	108	108	104	27	112	539	271	125 TYPICAL
	typ	401	129	49	31	185	590	100	100	100	20	104	531	267	
	min	397	125	45	28	177	580	92	92	96	16	96	524	255	