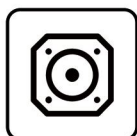


自主封測 品質把控 售後保障

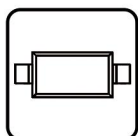
WEB | WWW.TDSEMIC.COM



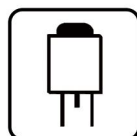
電源管理



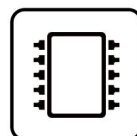
顯示驅動



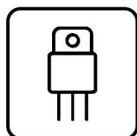
二三極管



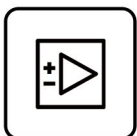
LDO穩壓器



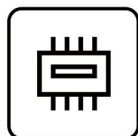
觸摸芯片



MOS管



運算放大器



存儲芯片



MCU



串口通信

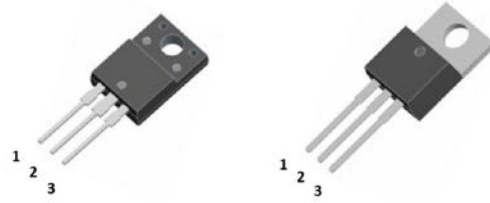
12N65

產品規格說明書

12N65 N Channel Si MOSFET

TO-220F-3L TO-220

V_{DS}	=	650 V
$I_D(T_C=25^\circ\text{C})$	=	12A
$R_{DS(on),max}$	=	$0.8\Omega @ V_{GS}=10V$
$Q_{g,typ}$	=	41.9nC



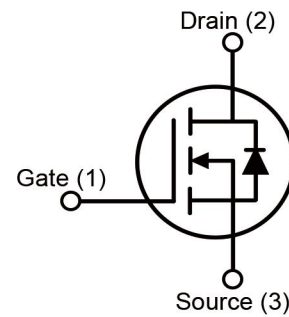
Features

- Low Gate Charge
- Low Capacitance Fast Switching
- Halogen Free, RoHS Compliant
- 100% UIS tested

Applications

- High Frequency Switching Mode Power Supply
- Motor Driver
- LED Power Supply

Schematic Diagram



Package Marking and Ordering Information

Part Number	Marking	Package	Form	MOQ
12N65	12N65	TO-220F	Tube	1000
12N65	12N65	TO-220	Tube	1000

Maximum Ratings($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		650	V
V_{GSS}	Gate-Source Voltage		± 30	V
$I_D^{(1)}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ\text{C}$	12	A
		$T_C=100^\circ\text{C}$	7.5	
T_j	Maximum Junction Temperature		150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range		-55 to 150	$^\circ\text{C}$
P_D	Power Dissipation TO-220F		42	W
	Power Dissipation TO-220		150	
$E_{AS}^{(2)}$	Avalanche Energy, Single Pulsed		500	mJ

Thermal Characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-220	
$R_{th(j-c)}$	Thermal Resistance-Junction to Case	2.98	0.83	°C/W
$R_{th(j-a)}$	Thermal Resistance-Junction to Ambient	110	62.5	°C/W

Electrical Characteristics (Defined at $T_j=25^{\circ}\text{C}$ Unless OtherwiseSpecified)

Static Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	650			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$ $V_{DS}=650V, V_{GS}=0V, T_j = 125^{\circ}\text{C}$			1 100	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2		4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$			± 100	nA
$R_{DS(on)}^{(3)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=6A$		0.64	0.8	Ω

Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{SD}^{(3)}$	Diode Forward Voltage	$I_F=12A, V_{GS}=0V$			1.5	V
I_S	Continuous Source Current(Body Diode)				12	A
I_{SM}	Maximum Pulsed Current(Body Diode)				48	A
t_{rr}	Reverse Recovery Time	$I_F=12A, -di_F/dt = 100A/\mu s, V_{GS}=0V, T_j = 25^{\circ}\text{C}$		450.4		ns
Q_{rr}	Reverse Recovery Charge			4.75		μC

Dynamic Characteristics⁽⁴⁾

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V, f=1MHz$		2000		pF
C_{oss}	Output Capacitance			164		
C_{rss}	Reverse Transfer Capacitance			7.4		
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=325V, I_D=12A, R_G=10\Omega, V_{GS}=15V$		14.6		ns
t_r	Turn-on Rise Time			37.8		
$t_{d(off)}$	Turn-off Delay Time			69.3		
t_f	Turn-off Fall Time			15.8		

Gate Charge Characteristics^④

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=400V, V_{GS}=10V,$ $I_{DS}=12A$		41.9		nC
Q_{gs}	Gate-Source Charge			15		
Q_{gd}	Gate-Drain Charge			10.8		

Notes: ① Calculated continuous current based on maximum allowable junction temperature.

② Limited by T_{jmax} , $L=10mH$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_j=25^\circ C$.

③ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

④ Guaranteed by design, not subjected to production test.

Electrical Characteristics Diagrams

Figure.1 Output Characteristics

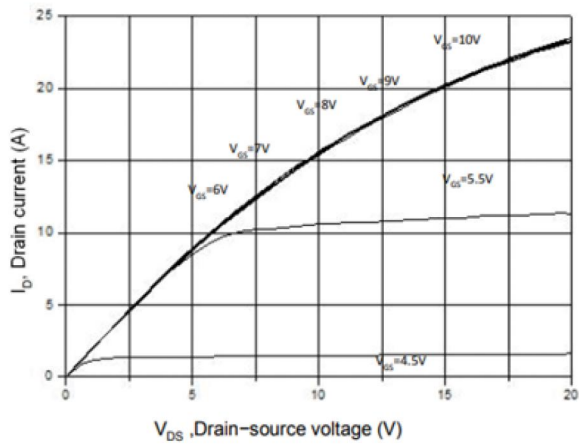


Figure.2 Typical Capacitance

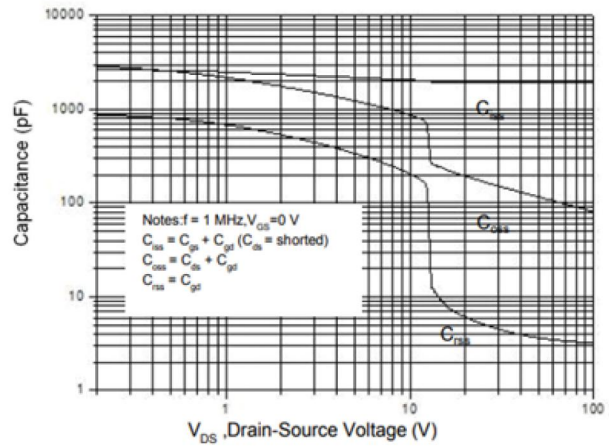


Figure.3 Source-Drain Diode Forward Voltage

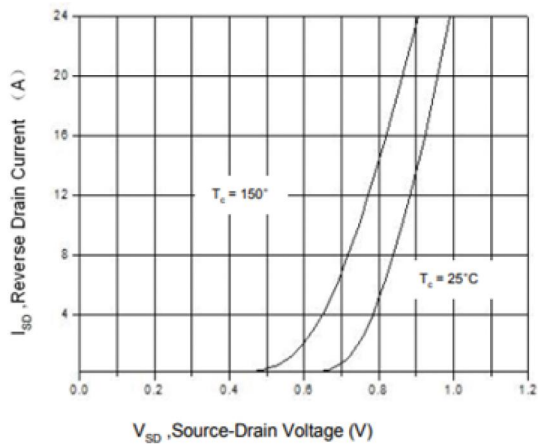


Figure.4 Typical Gate Charge

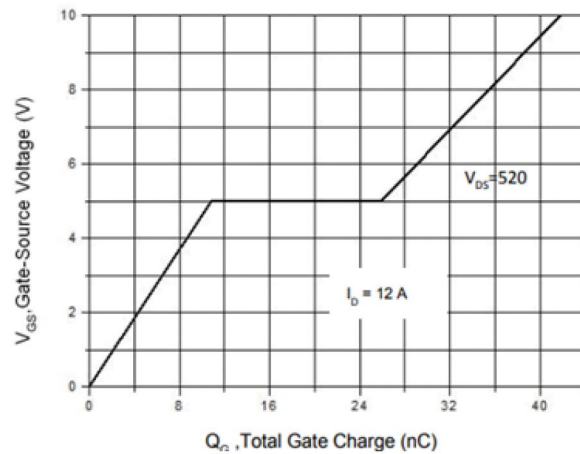


Figure.5 Drain Current Vs. Temperature

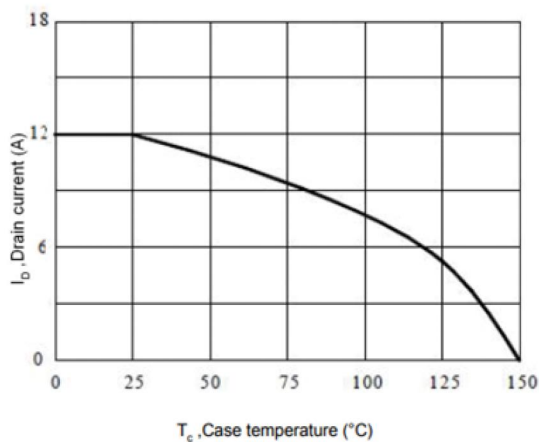
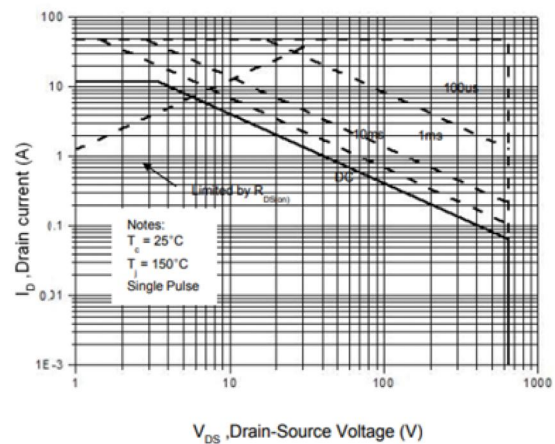
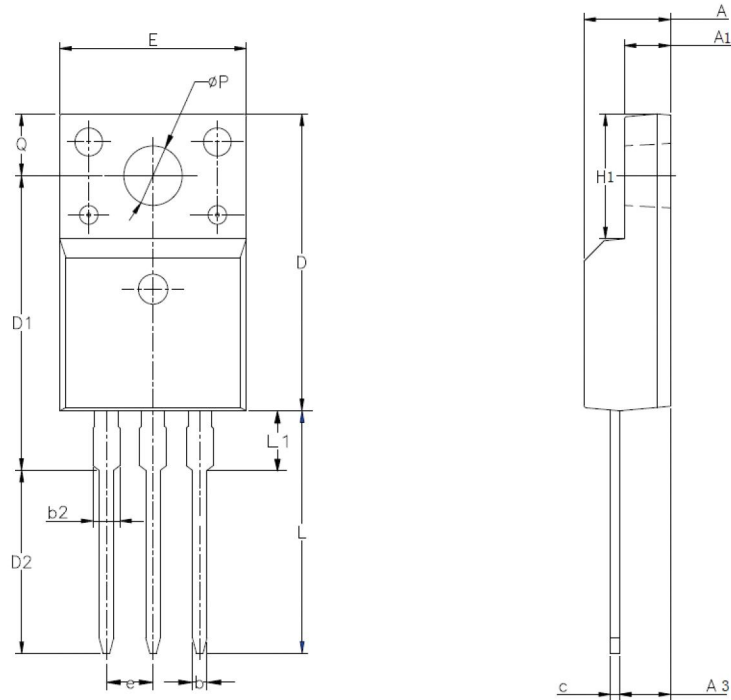


Figure.6 Safe Operating Area

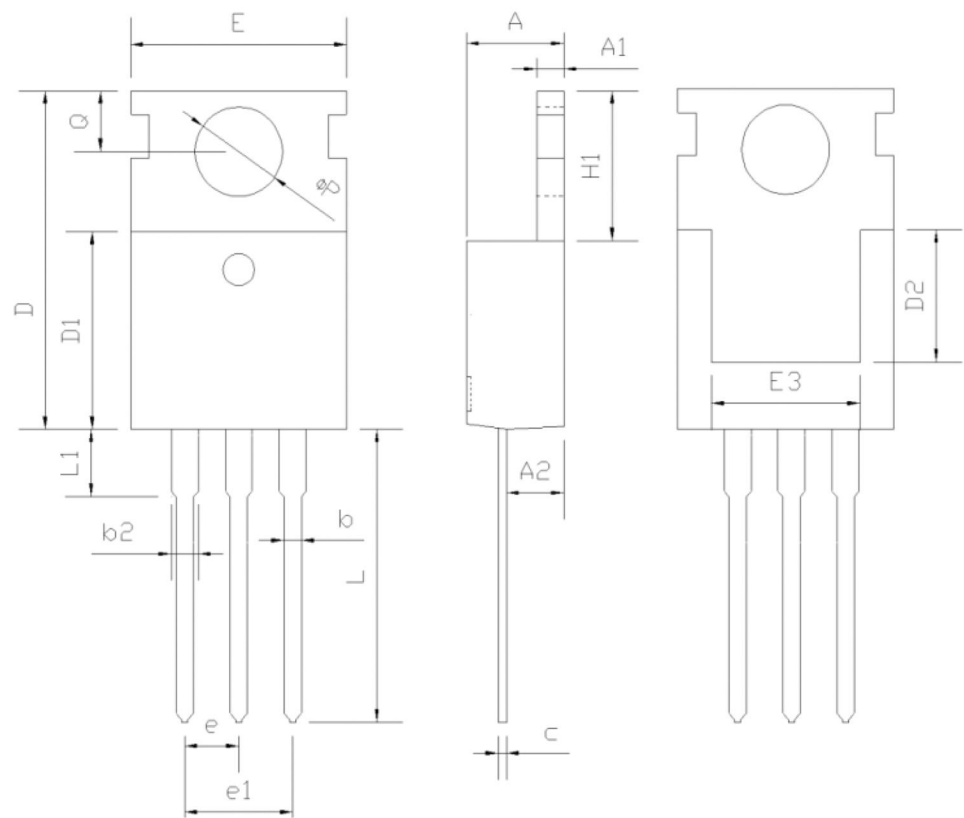


Mechanical Dimensions for TO-220F-3L



SYMBOL	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	0.70	0.80	0.90
b2	—	—	1.47
c	0.35	0.50	0.65
D	15.25	15.87	16.25
D1	15.30	15.75	16.30
D2	9.30	9.80	10.30
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	/	/	3.50
ϕP	3.00	3.18	3.40
Q	3.05	3.30	3.55

Mechanical Dimensions for TO-220



SYMBOL	mm		
	MIN.	NOM.	MAX.
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54BSC		
e1	5.08BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00