/ Descriptions

TO-220FL N MOS N-CHANNEL MOSFET in a TO-220FL Plastic Package.

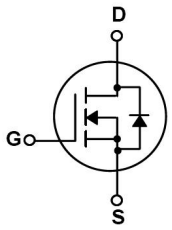
/ Features

Low gate charge, Low Crss , Fast switching.

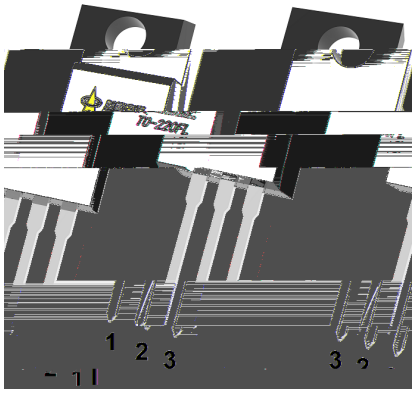
/ Applications

High efficiency switch mode power supplies, Electronic lamp ballasts based on half bridge, UPS .

/ Equivalent Circuit



/ Pinning



PIN1 G PIN 2 D PIN 3 S

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings(Ta=25)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	650	V
Drain Current	I_D(Tc=25)	20	A
Drain Current - Pulsed	I_{DM}	40	A
Gate-Source Voltage	V_{GSS}	±30	V
Single Pulsed Avalanche Energy	E_{AS}	477	mJ
Avalanche Current	I_{AR}	10.5	A
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.27	/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	/W
Power Dissipation	P_D	55	W
Operating and Storage Temperature Range	T_J,T_{STG}	-55 to 150	

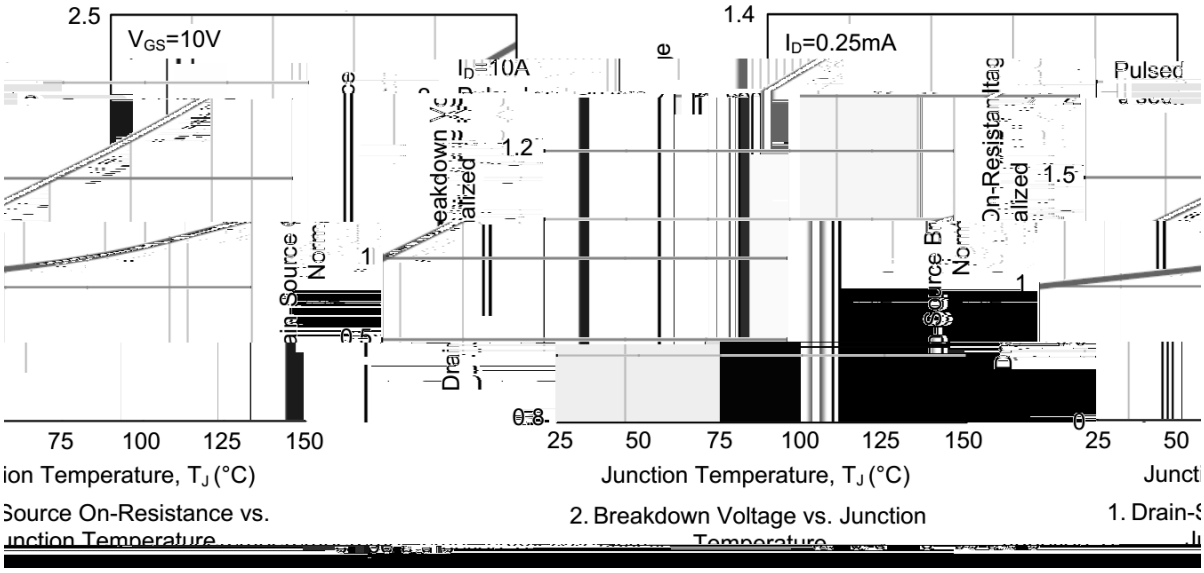
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	650			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V V_{GS}=0V			1.0	μA
Gate-Body Leakage Current Forward	I_{GSS}	V_{GS}=±30V V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250μA	2.0	3.2	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V I_D=10A		0.42	0.55	Ω
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V I_S=20A			1.4	V
Input Capacitance	C_{iss}	V_{DS}=25V V_{GS}=0V f=1.0MHz		3400		pF
Output Capacitance	C_{oss}			270		pF
Reverse Transfer Capacitance	C_{rss}			23		pF
Total Gate Charge	Q_G	V_{DS}= 100V I_D= 20A V_{GS}= 10V		54		nC
Gate-Source Charge	Q_{GS}			10		ns
Gate-Drain Charge	Q_{GD}			13		ns

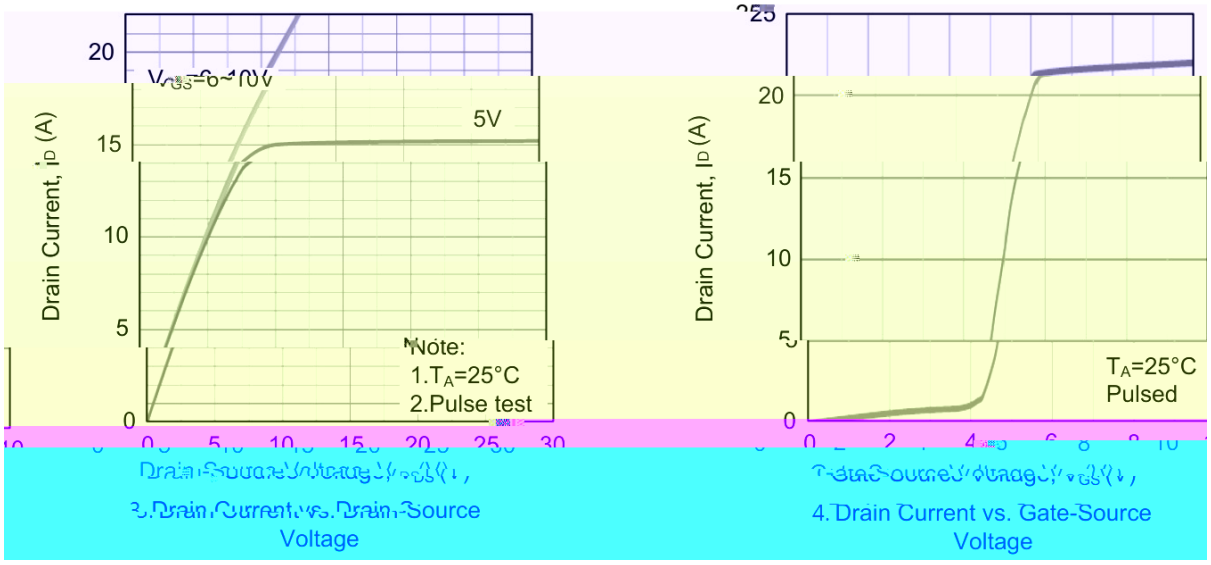
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=100V I_D=20A V_{GS}=10V R_G=25Ω		28		ns
Turn-On Rise Time	t_r			35		
Turn-Off Delay Time	$t_{d(off)}$			140		
Turn-Off Fall Time	t_f			76		
Maximum Continuous Drain-Source Diode Forward Current	I_S				20	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				40	A
Reverse Recovery Time	t_{rr}	V_{GS} = 0V I_S = 20A dI_F/dt = 100 A/μs		506		ns
Reverse Recovery Charge	Q_{rr}			9		μC

/ Electrical Characteristic Curve

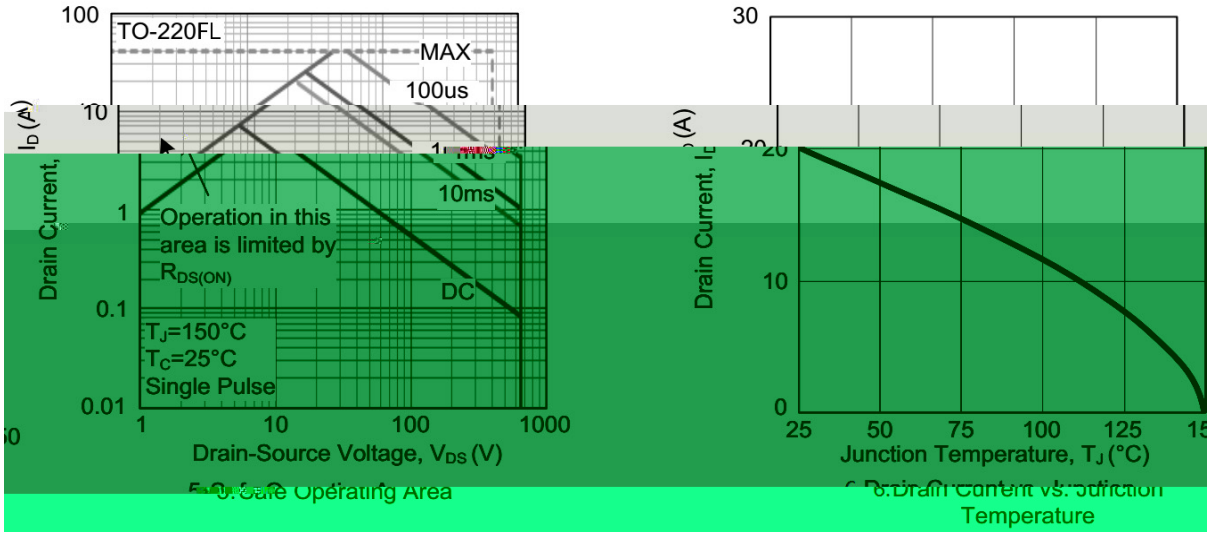


2. Breakdown Voltage vs. Junction Temperature



3. Drain Current vs. Drain-Source Voltage

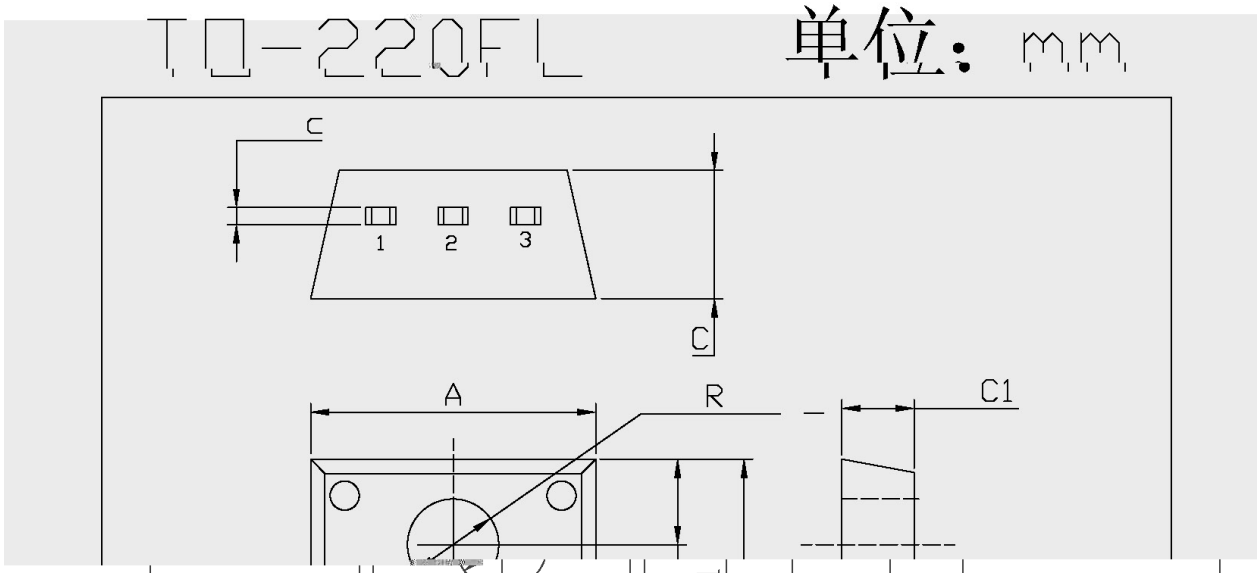
4. Drain Current vs. Gate-Source Voltage

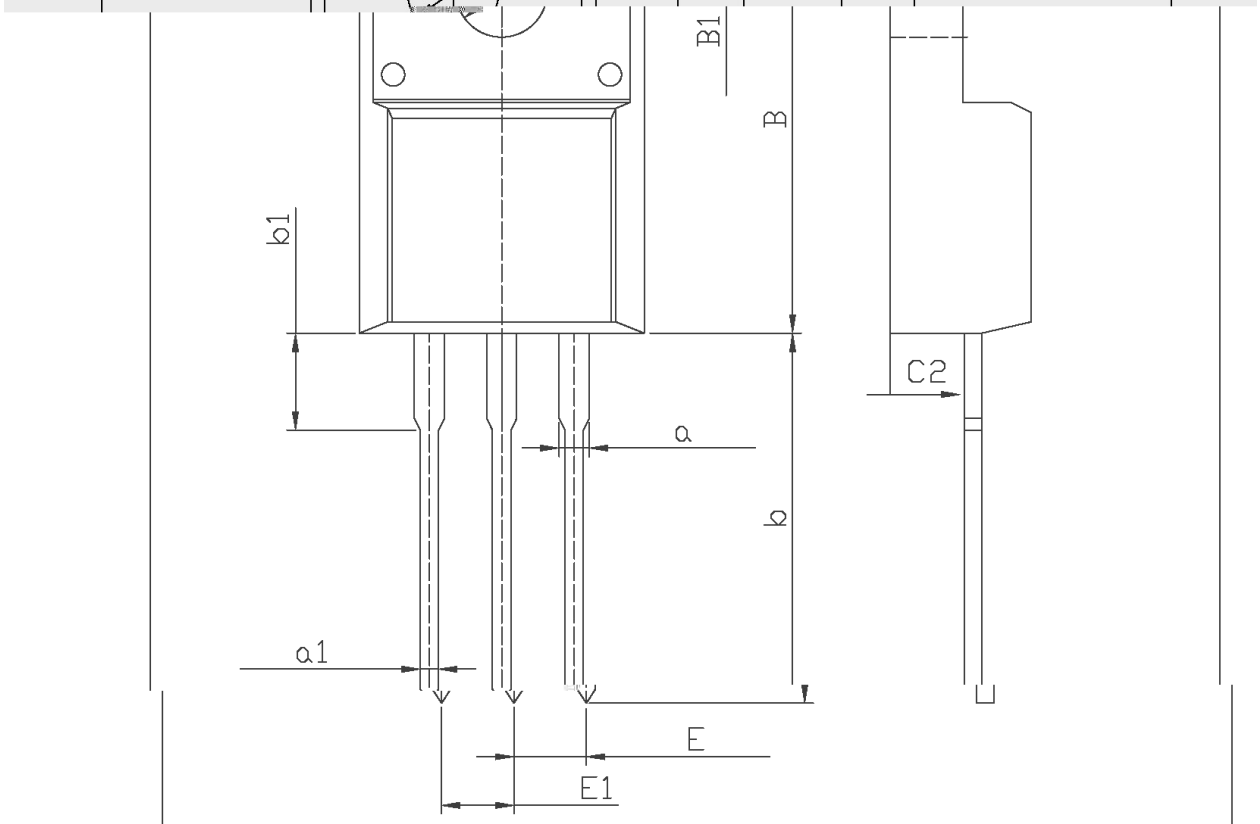


5. Safe Operating Area

6. Drain Current vs. Junction Temperature

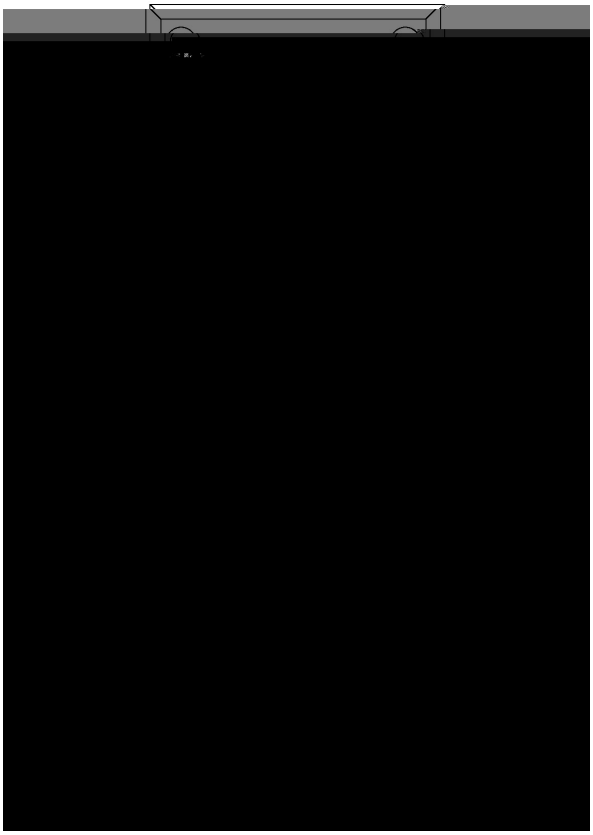
/ Package Dimensions





Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	0.4	0.6	a	1.08	1.48
A	9.96	10.36	a1	0.70	0.90
B	15.67	16.07	E	2.34	2.74
B1	3.30	3.50	E1	2.34	2.74
R	3.08	3.28	C1	2.34	2.74

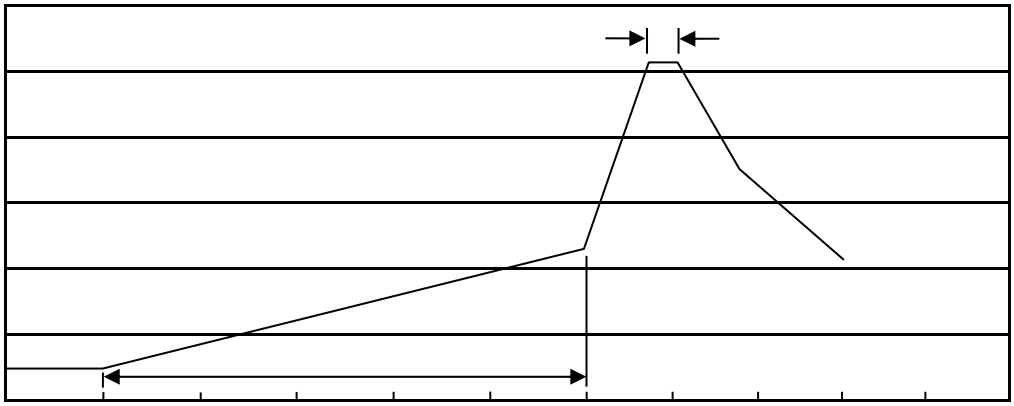
/ Marking Instructions



Note:

BR:	Company Code
20N65:	Product Type Code
****:	Lot No. Code, code change with Lot No

( ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

1 25 150 60 90sec;

1.Preheating:25~150 , Time:60~90sec.

2 255 5 5 0.5sec;

2.Peak Temp.:255 5 , Duration:5 0.5sec.

3 2 10 /sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

270 5 10 1 sec. Temp.:270±5 Time:10±1 sec

/ Packaging SPEC.

/ TUBE

Package Type	Units					Dimension (unit mm³)		
	Units/Tube /	Tubes/Inner Box /	Units/Inner Box /	Inner Boxes/Outer Box /	Units/Outer Box /	Tube	Inner Box	Outer Box
TO-220FL	50	20	1,000	5	5,000	532×33×7.0	555×164×50	575×290×180

/ Notices