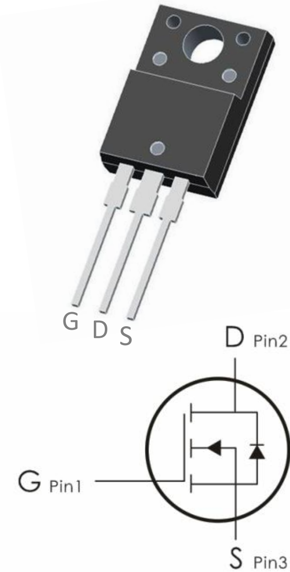
Description:

This N-Channel MOSFET uses advanced Planar technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features:

1) V_{DS}=650V,I_D=12A,$R_{DS(ON)}$<780mΩ@V_{GS}=10V（Typ：600mΩ）
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity Planar technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
FO12NFG-C	O12NF-C	TO- 220F	50 pcs/Tube

Absolute Maximum Ratings: (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current[1]	12	A
	Continuous Drain Current-T_C=100℃[1]	8.4	
I_{DM}	Pulsed Drain Current[2]	48	
P_D	Power Dissipation	55	W
E_{AS}	Single pulse avalanche energy[3]	792	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+150	℃

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{θJC}$	Thermal Resistance,Junction to Case	2.2	℃/W
$R_{θJA}$	Thermal Resistance,Junction to Ambient	80	℃/W

Electrical Characteristics： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250 μA	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=650V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250 μA	2	3	4	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=10V,I_D=10A	---	600	780	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	2100	---	pF
C_{oss}	Output Capacitance		---	159	--	
C_{rss}	Reverse Transfer Capacitance		---	4.6	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=325V, I_D=12A, R_{ENG}=25Ω,V_{GS}=10V	---	32.5	---	ns
t_r	Rise Time		---	28	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	64	---	ns
t_f	Fall Time		---	49	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=520V, I_D=10A	---	43	---	nC
Q_{gs}	Gate-Source Charge		---	10.8	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	12.4	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=12A	---	---	1.2	V
I_S	Continuous Drain Curren	V_D=V_G=0V	---	---	12	A
I_{SM}	Pulsed Drain Current		---	---	48	A
Trr	Reverse Recovery Time	I_F=12A,T_J=25℃ dI/dt=100A/us	---	870	---	ns
Qrr	Reverse Recovery Charge		---	9.6	---	μC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=325V,V_G=10V,L=11mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Characteristics: (Tc=25℃ unless otherwise noted)

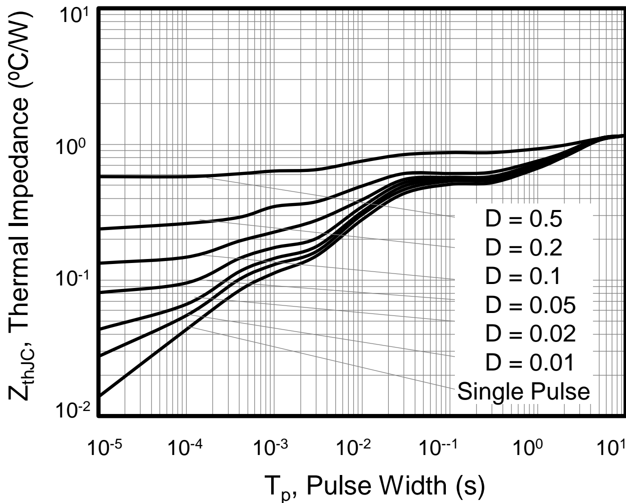


Figure 1. Transient Thermal Impedance For TO-220F

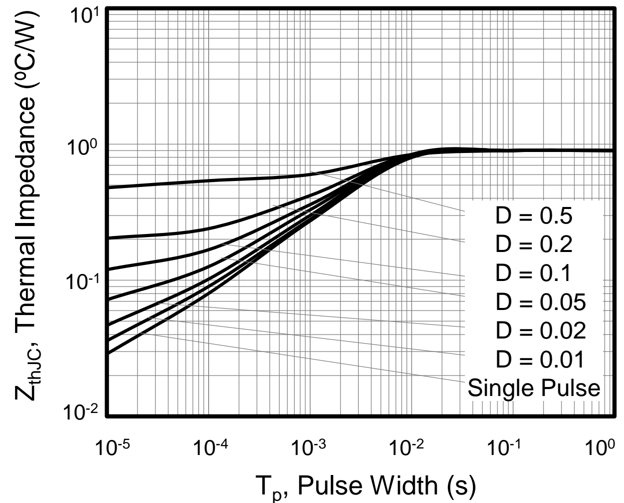


Figure 2. Transient Thermal Impedance For TO-220/3P/263

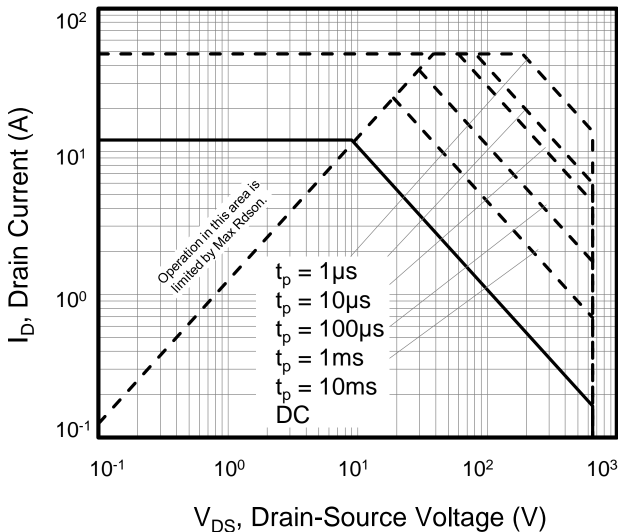


Figure 3. Safe Operation Area For TO-220F

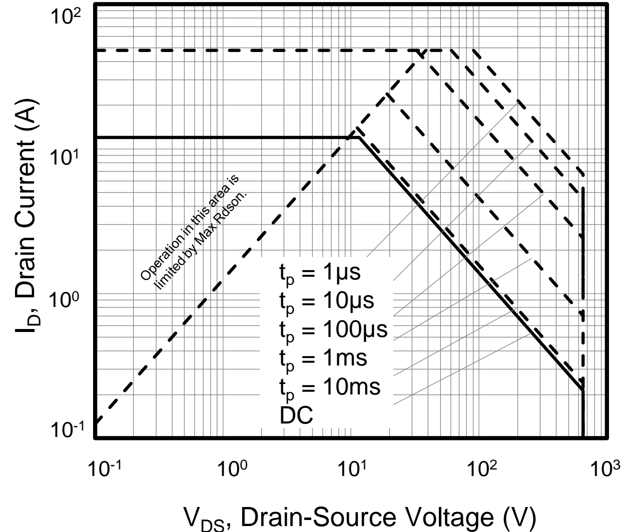


Figure 4. Safe Operation Area For TO-220/3P/263

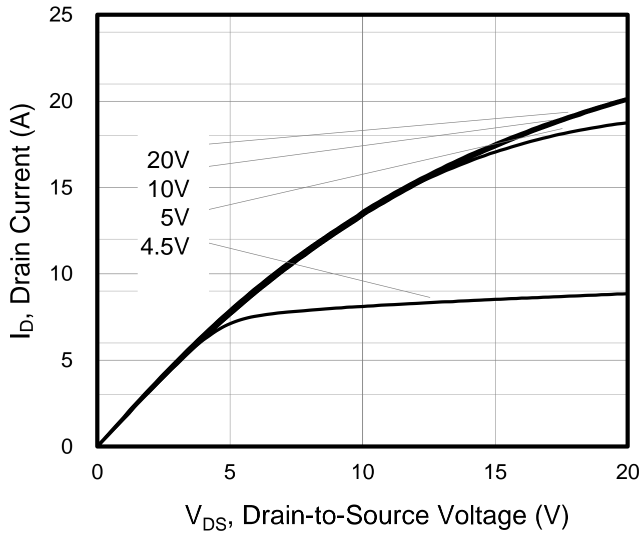


Figure 5. Output Characteristics

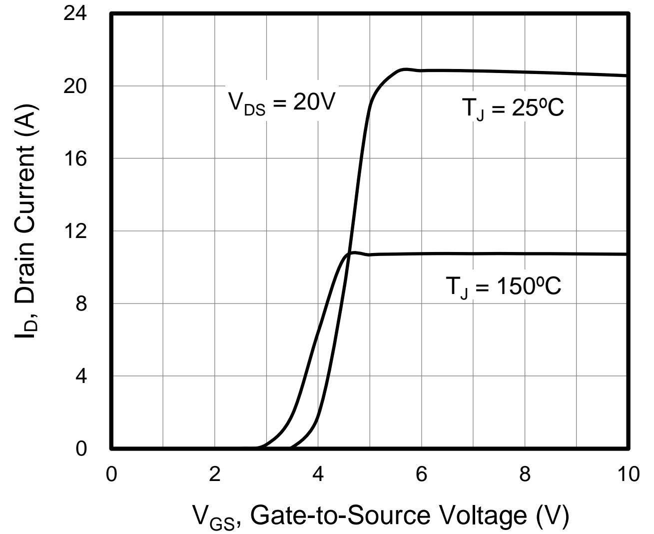


Figure 6. Transfer Characteristics

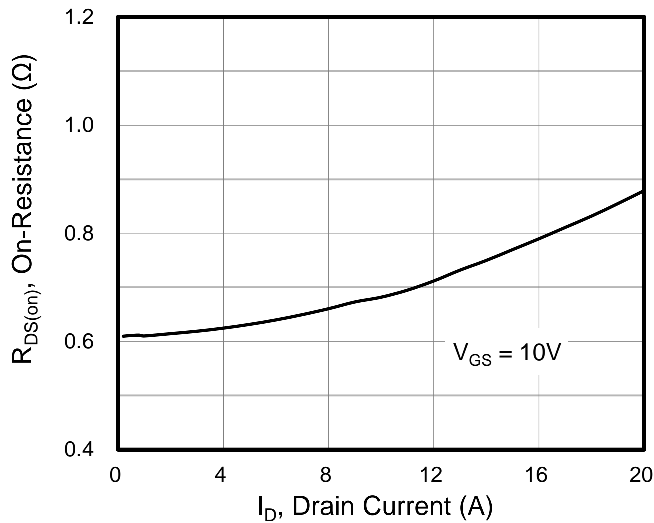


Figure 7. On-Resistance vs Drain Current

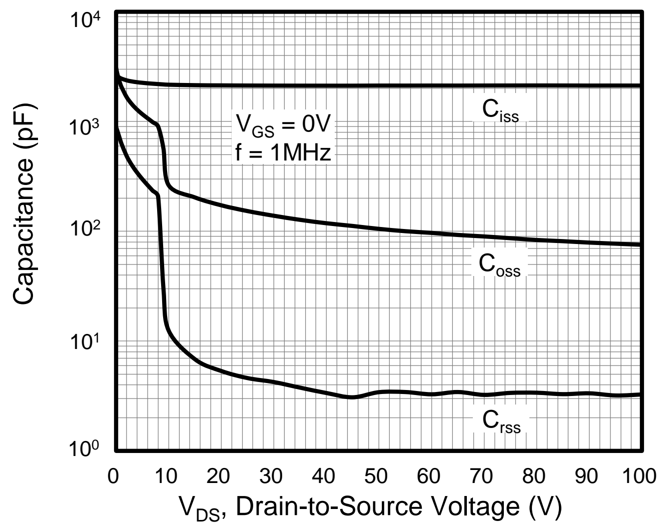


Figure 8. Capacitance

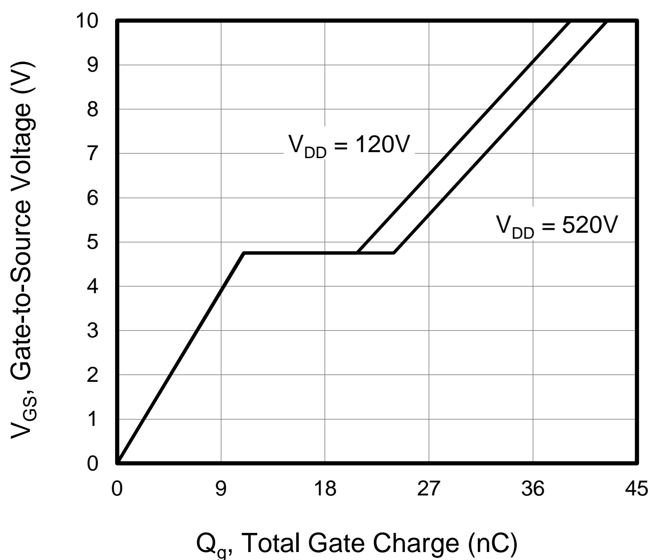


Figure 9. Gate Charge

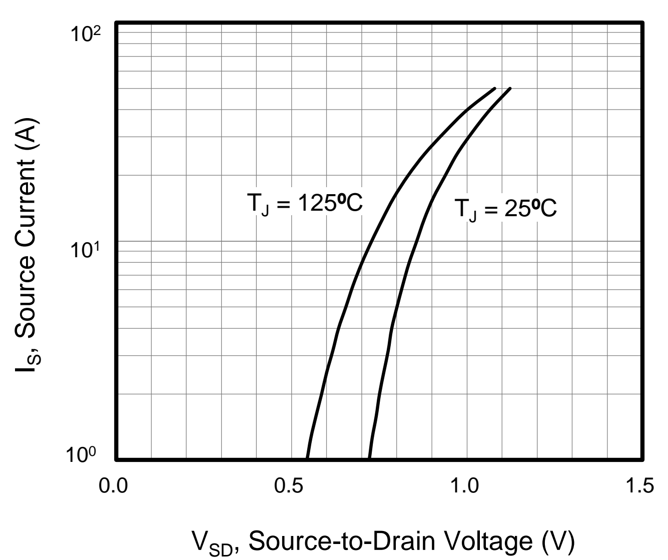


Figure 10. Body Diode Forward Voltage

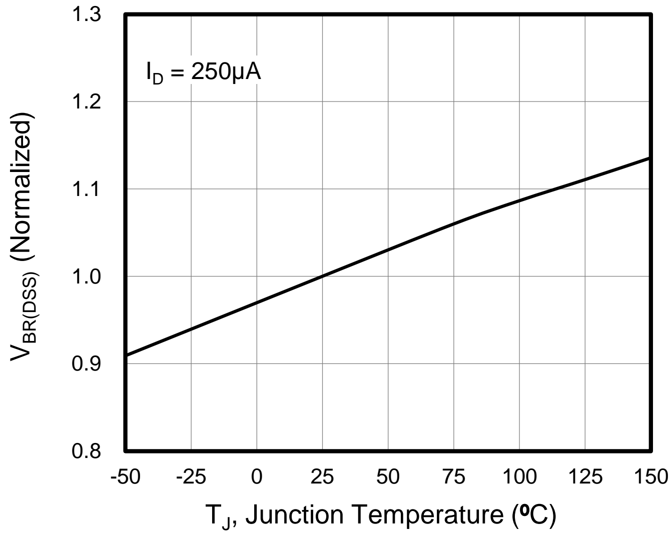


Figure 11. Breakdown Voltage vs Junction Temperature

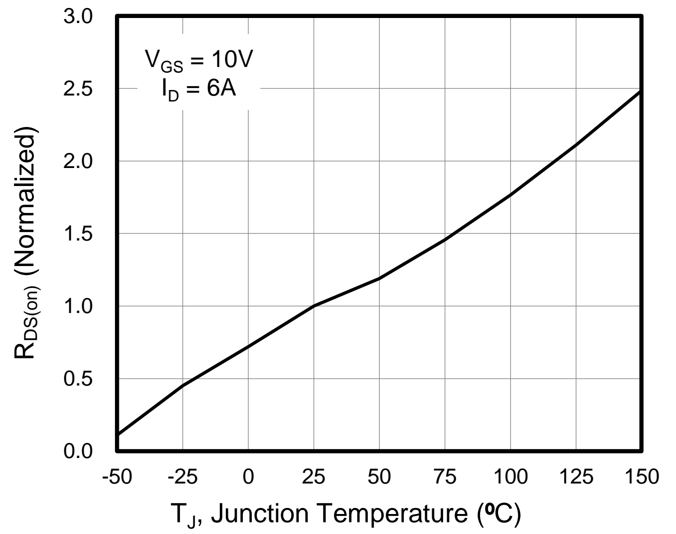
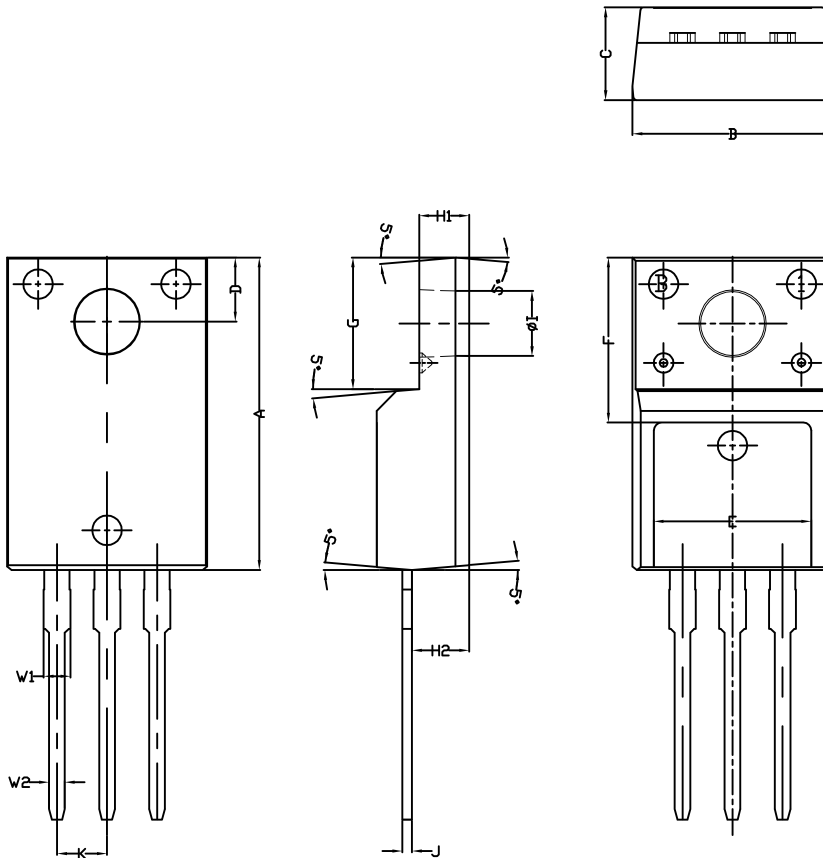


Figure 12. On-Resistance vs Temperature

TO-220F Package Information：



	MM			Inch		
Symbol	Min	Mim	Max	Min	Mim	Max
A	15.67	15,87	16.07	0.6169	0.6248	0.6328
B	9.86	10.16	10.46	0.3882	0.4000	0.4118
C	4.50	4.70	4.90	0.1772	0.1850	0.1929
D	3.15	3.35	3.55	0.1240	0.1319	0.1398
E	7.80	8.00	8.20	0.3071	0.3150	0.3228
F	8.18	8.38	8.58	0.3220	0.3299	0.3378
H1	2.34	2.54	2.84	0.0921	0.1000	0.1118
H2	2.40	2.90	3.40	0.0945	0.1141	0.1339
I	3.10	3.30	3.50	0.1220	0.1299	0.1378
W1	1.08	1.28	1.48	0.0425	0.0504	0.0583
W2	0.70	0.80	0.90	0.0276	0.0315	0.0354
K	2.44	2.54	2.64	0.0961	0.1000	0.1039
G	6.48	6.68	6.88	0.2551	0.2630	0.2709
J	0.45	0.50	0.6	0.0177	0.0197	0.0236

Marking Information：

①. Doingter LOGO

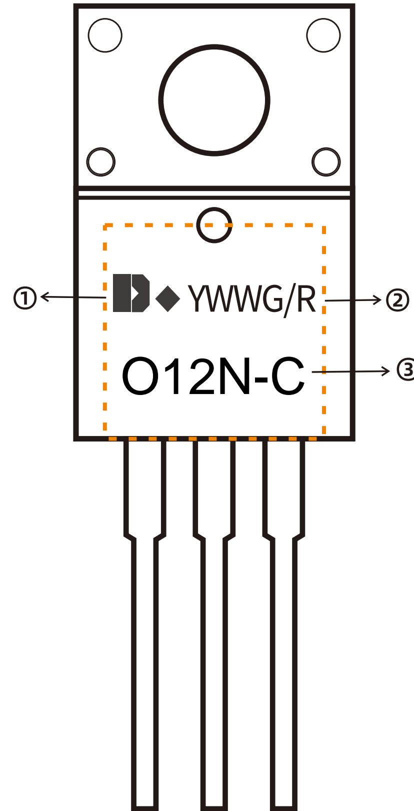
②. Date Code(YWWG / R)

Y：Year Code，last digit of the year

WW：Week Code(01-53)

G/R：G(Green) /R(Lead Free)

③. Part NO.



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2025-06-17	Release of final version

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