

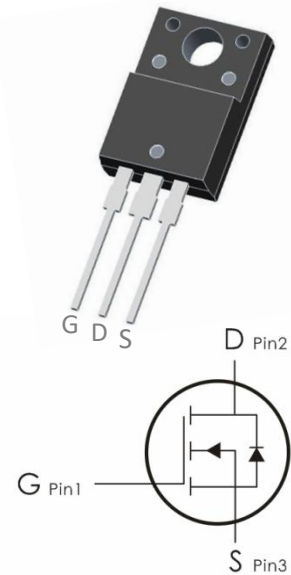
Description:

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) $V_{DS}=650V, I_D=9.5A, R_{DS(ON)}<950m\ \Omega @V_{GS}=10V$ (Typ: $800m\ \Omega$)
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density 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
FO10NFG-J	O10NF-J	TO- 220F	50 pcs/Tube

Absolute Maximum Ratings: ($T_C=25^\circ C$ 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	9.5	A
	Continuous Drain Current- $T_C=100^\circ C$ ¹	6.6	
I_{DM}	Pulsed Drain Current ²	38	
P_D	Power Dissipation	59	W
E_{AS}	Single pulse avalanche energy ³	375	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.1	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	80	$^\circ C/W$

Electrical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=650V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Drain-Source On Resistance ⁴	$V_{GS}=10V, I_D=5A$	---	800	950	$\text{m}\Omega$
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1600	---	pF
C_{oss}	Output Capacitance		---	120	--	
C_{rss}	Reverse Transfer Capacitance		---	3.8	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=325V, I_D=10A,$ $R_{ENG}=25\ \Omega, V_{GS}=10V$	---	41	---	ns
t_r	Rise Time		---	70	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	58	---	ns
t_f	Fall Time		---	32	---	ns
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=520V,$ $I_D=10A$	---	33	---	nC
Q_{gs}	Gate-Source Charge		---	8.7	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	10	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=10A$	---	---	1.2	V
I_S	Continuous Drain Current	$V_D=V_G=0V$	---	---	9.5	A
I_{SM}	Pulsed Drain Current		---	---	38	A
T_{rr}	Reverse Recovery Time	$I_F=10A, T_J=25^{\circ}\text{C}$	---	734	---	ns
Q_{rr}	Reverse Recovery Charge	$dI/dt=100A/\mu\text{s}$	---	9.9	---	nC

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 : $T_J=25^{\circ}C, V_{DD}=325V, V_G=10V, L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_A=25^{\circ}C$ unless otherwise noted)

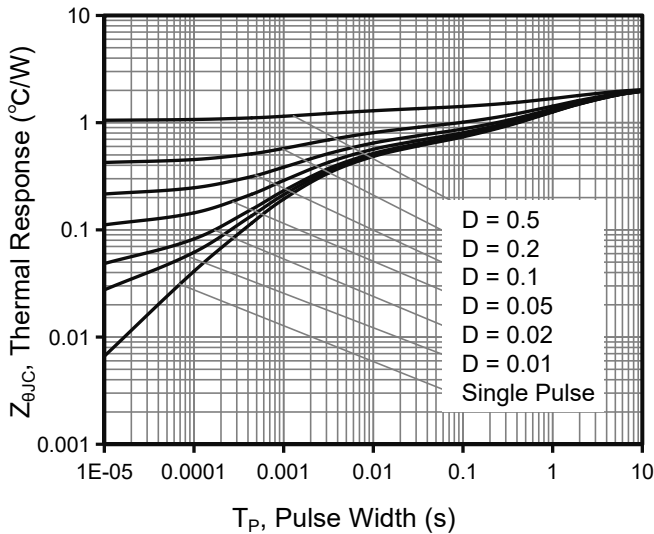


Figure 1. Transient Thermal Impedance For TO-220F

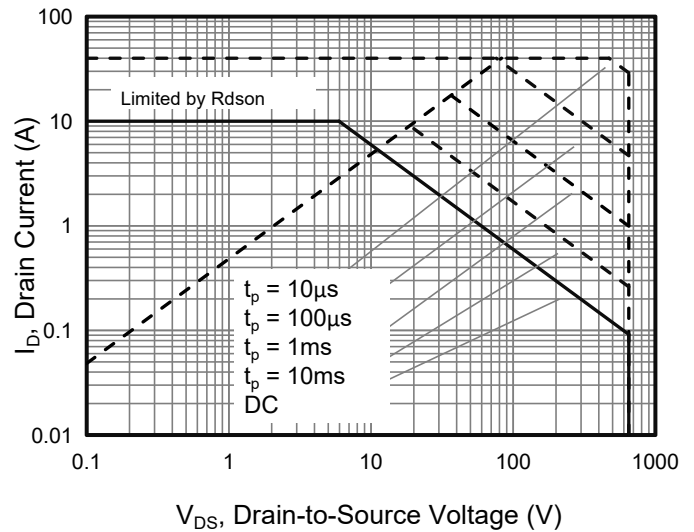


Figure 2. Safe Operation Area For TO-220F

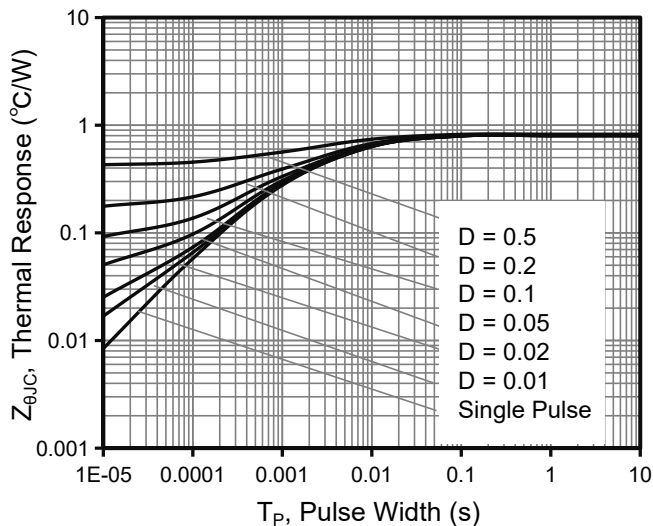


Figure 3. Transient Thermal Impedance For TO-220/251/252

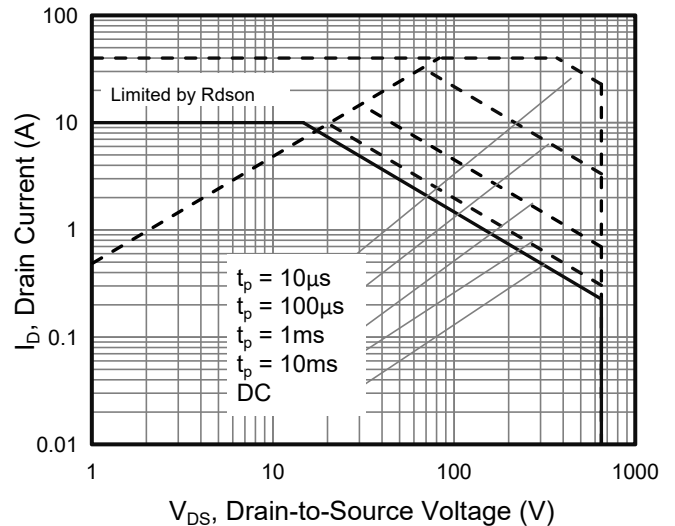


Figure 4. Safe Operation Area For TO-220/251/252

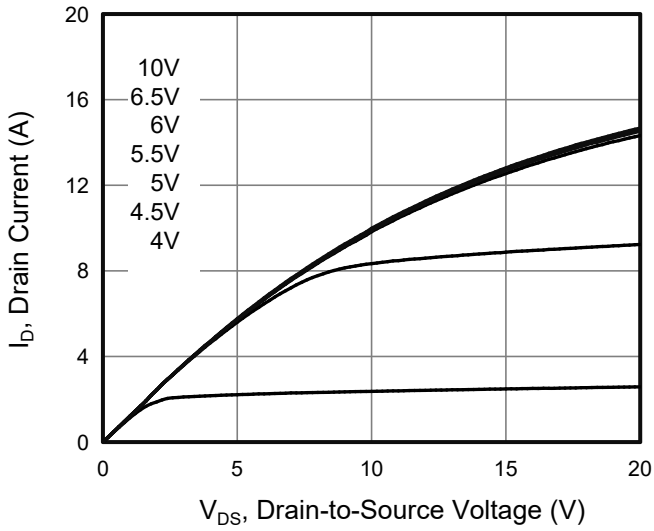


Figure 5. Output Characteristics

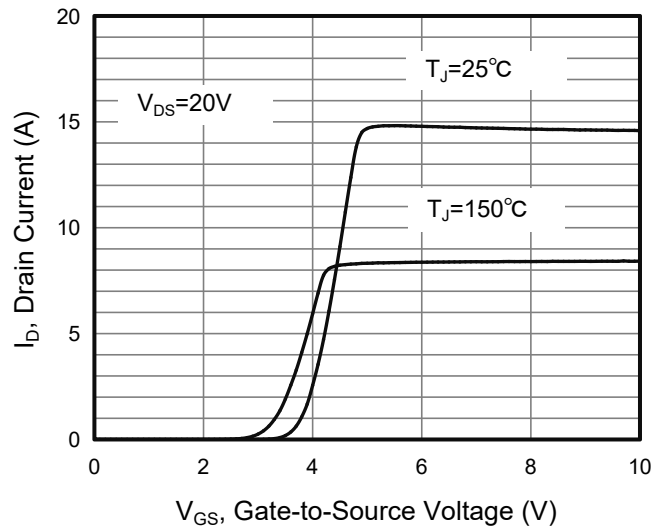


Figure 6. Transfer Characteristics

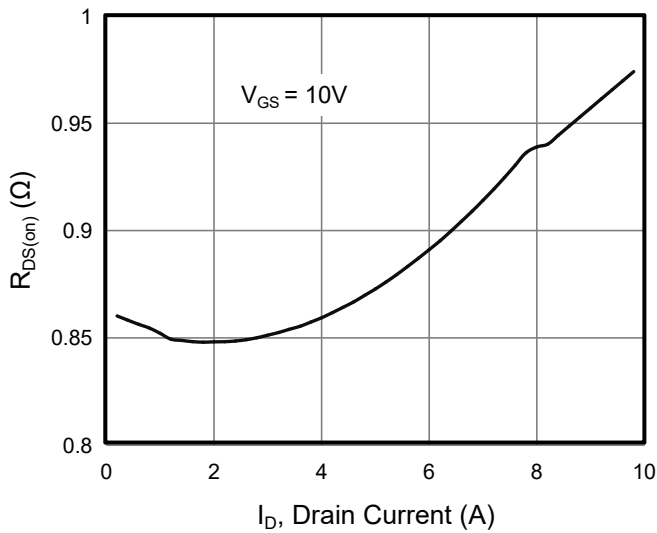


Figure 7. On-Resistance vs Drain Current

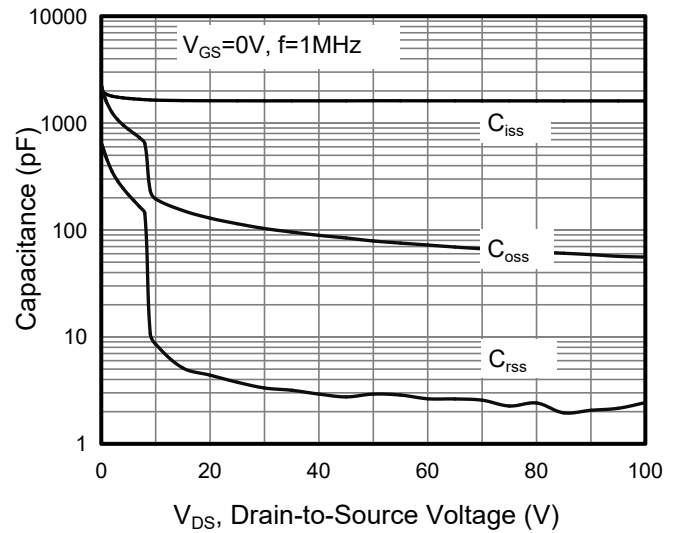


Figure 8. Capacitance

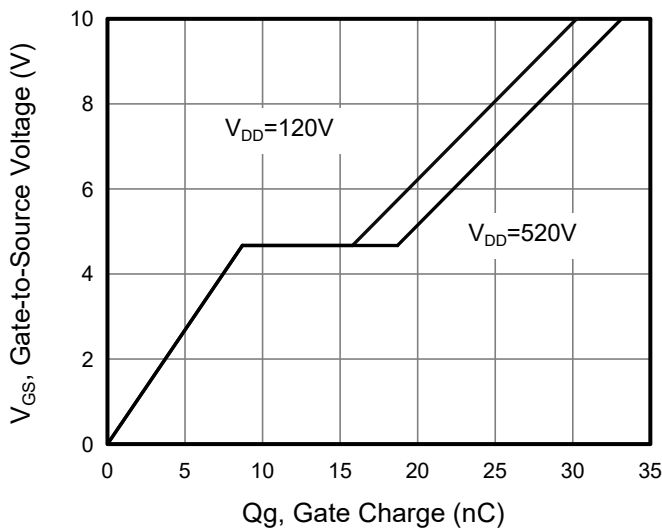


Figure 9. Gate Charge

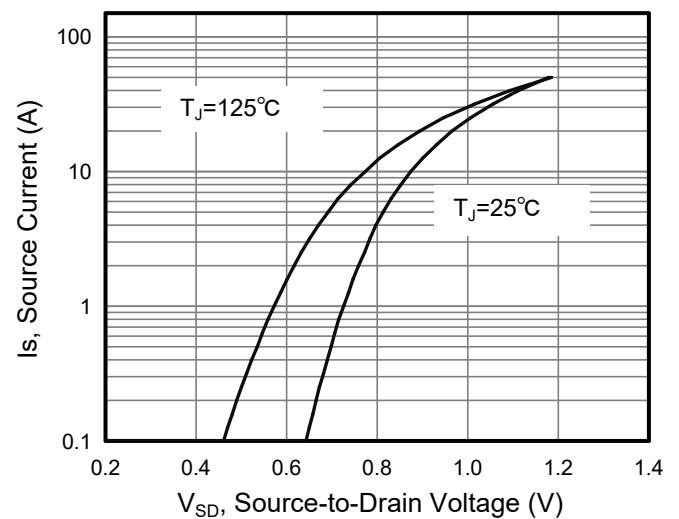


Figure 10. Body Diode Forward Voltage

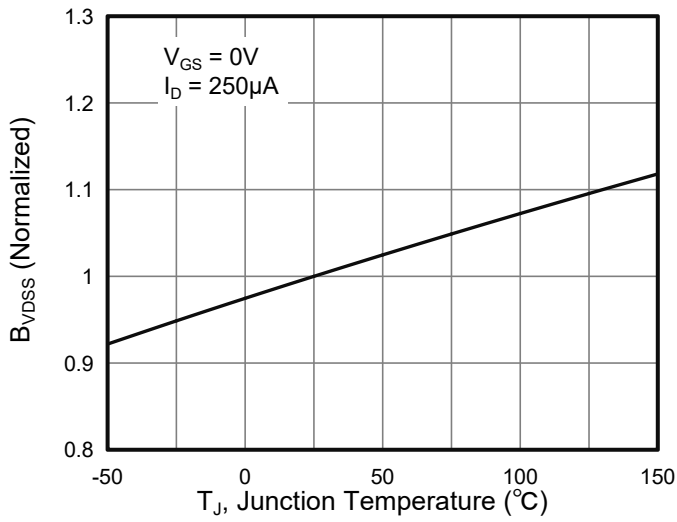


Figure 11. Breakdown Voltage vs Junction Temperature

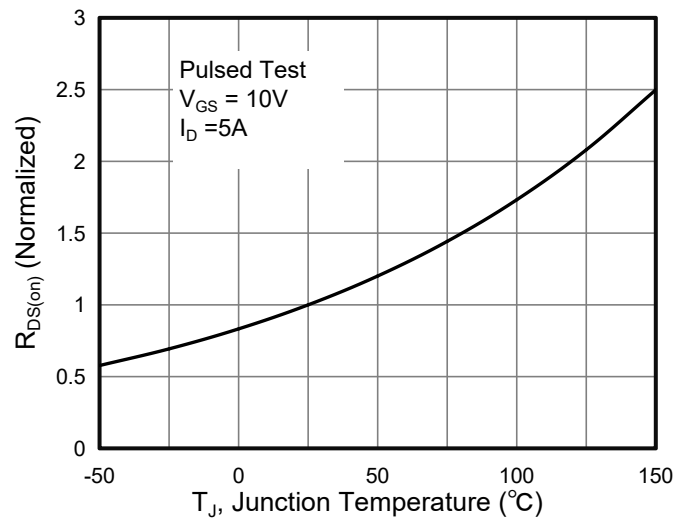
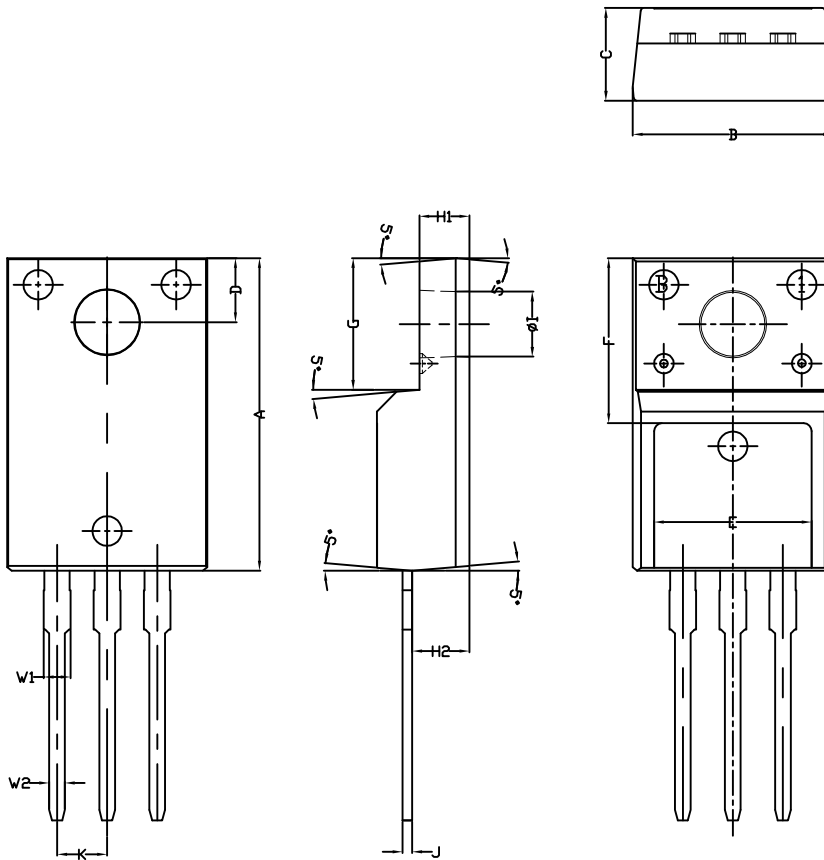


Figure 12. On-Resistance vs Temperature

TO-220F Package Information:



Symbol	MM			Inch		
	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

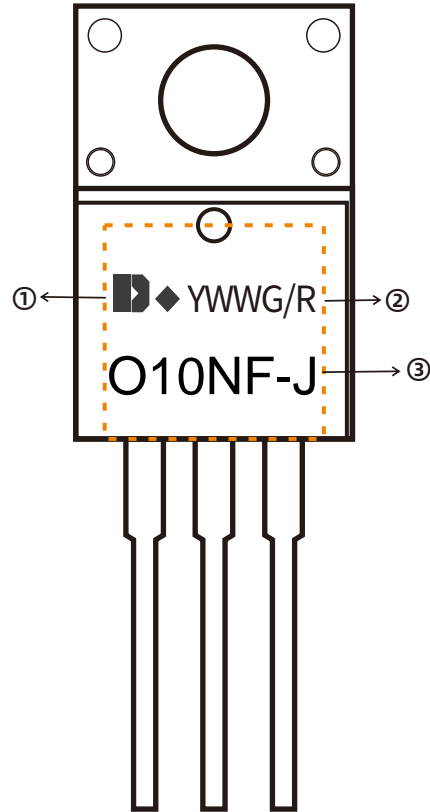
②. Date Code(YWWG / R)

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	2025-05-07	Release of final version

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