Enhancement Mode N-Channel Power MOSFET

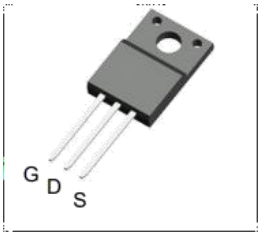
1. Features

- Fast Switching
- Improved dv/dt Capability

V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
500V	0.38Ω @ 10V	20A

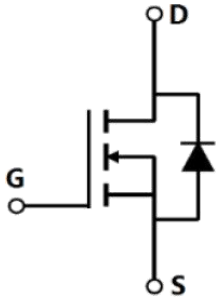
2. Applications

- Load Switch
- PWM Application
- Power management



Pin Description

TO-220F



Schematic Diagram

3. Package Marking and Ordering Information

Part no.	Marking	Package	PCS/Reel	PCS/CTN.
ZX 20N50FF	*	TO-220F	50	5,000

4. Absolute Max Ratings at Ta=25℃ (Note1)

Parameter	Symbol	Value	Units
Drain to Source Voltage	V_{DS}	500	V
Gate to Source Voltage	V_{GS}	±30	V
Drain Current (DC)	I_D	20	A
Drain Current (Pulse), PW≤300μs	I_{DP}	80	A
Total Dissipation	P_D	120	W
Avalanche Energy, Single Pulsed	E_{AS}	1805	mJ
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55 to +150	℃

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

5. Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to case	$R_{\theta JC}$	1.04	℃/W
Junction to ambient	$R_{\theta JA}$	62.5	℃/W

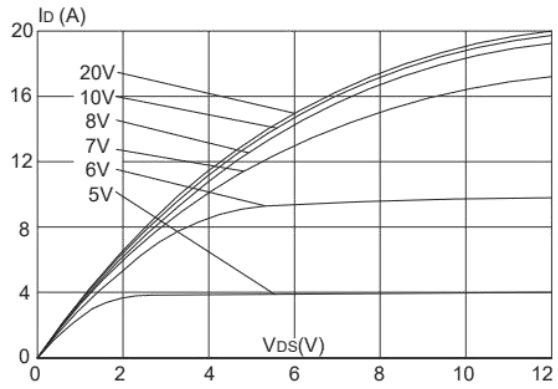
Note 2： When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

6. Electrical Characteristics at Ta=25℃ (Note 3)

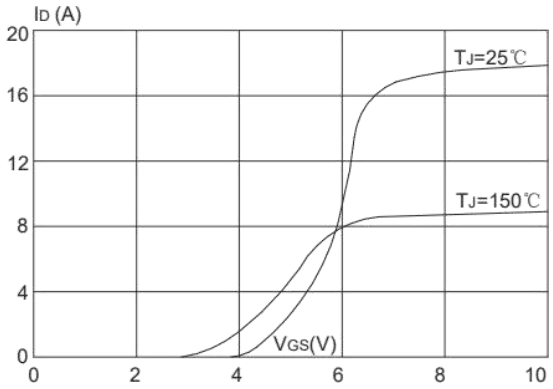
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	650			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 650V, V_{GS} = 0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±30V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	2	3	4	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D = 10A, V_{GS} = 10V	-	0.38	0.42	Ω
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz		3300		pF
Output Capacitance	C_{oss}			255		pF
Reverse Transfer Capacitance	C_{rss}			13		pF
Turn-ON Delay Time	$t_{d(on)}$	V_{DD} = 325V, I_D = 20A, R_G = 25Ω		37		ns
Rise Time	t_r			66		ns
Turn-OFF Delay Time	$t_{d(off)}$			175		ns
Fall Time	t_f			84		ns
Total Gate Charge	Q_g	V_{DD} = 520, V_{GS} = 10V, I_D = 20A		86		nC
	Q_{gs}			16		nC
	Q_{gd}			36		nC
Diode Forward Voltage	V_{FSD}	I_S =16A, V_{GS} = 0	0.55	0.85	1.1	V

Note 3： Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

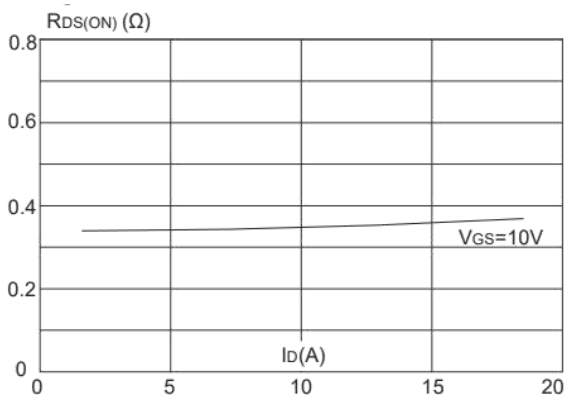
7. Typical electrical and thermal characteristics



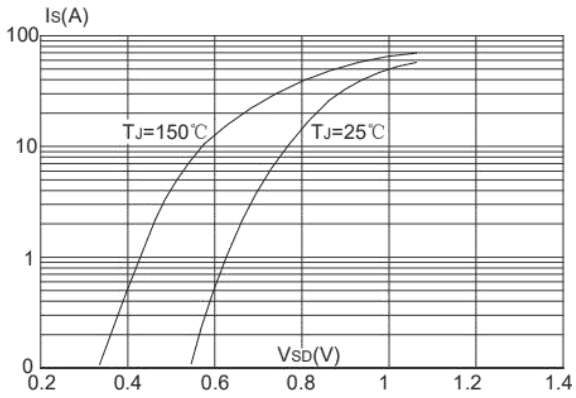
Output Characteristics



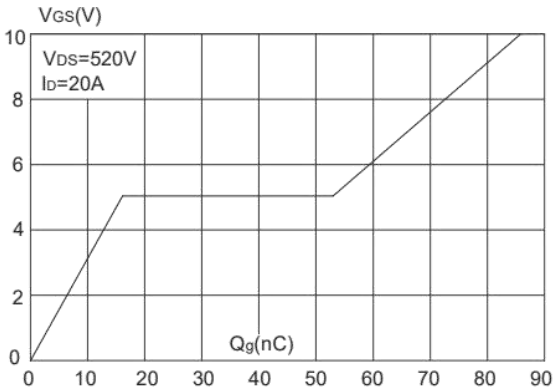
Typical Transfer Characteristics



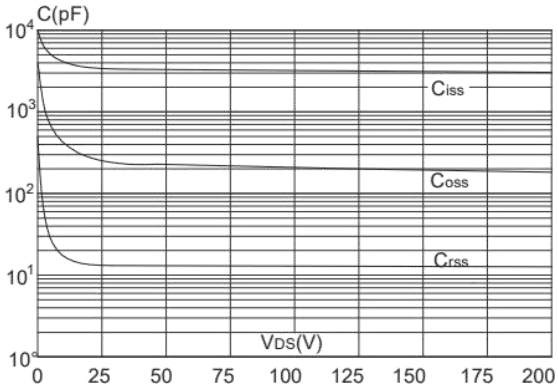
On-resistance vs. Drain Current



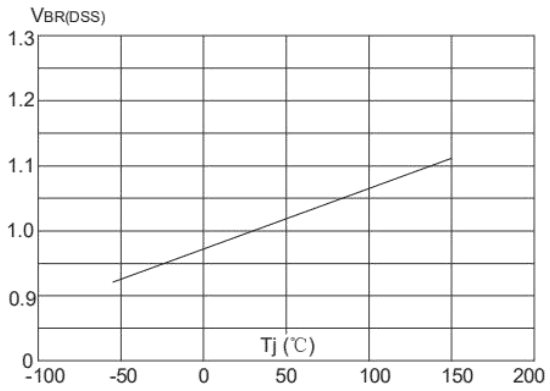
Body Diode Characteristics



Gate Charge Characteristics

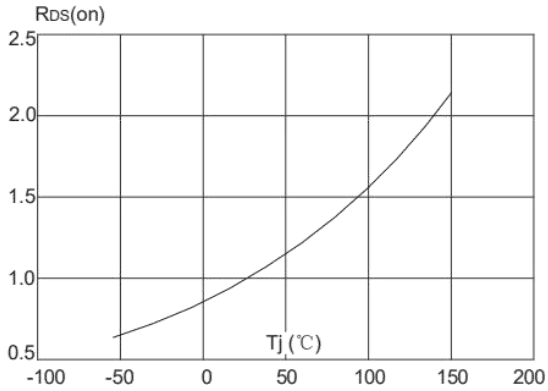


Capacitance Characteristics



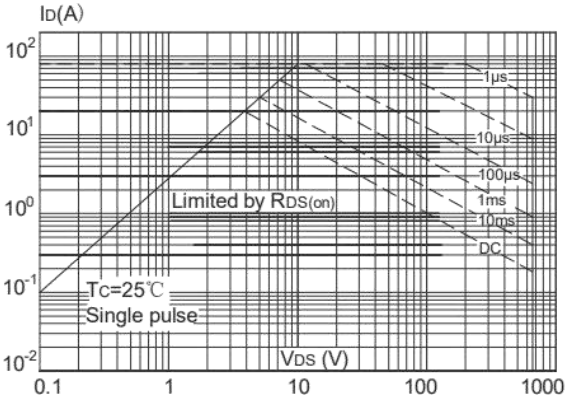
Normalized Breakdown Voltage vs.

Junction Temperature

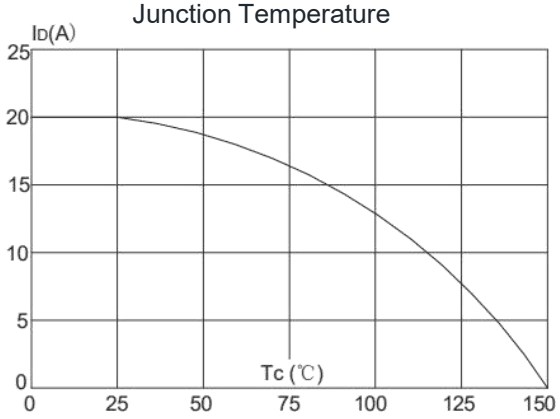


Normalized on Resistance vs.

Junction Temperature

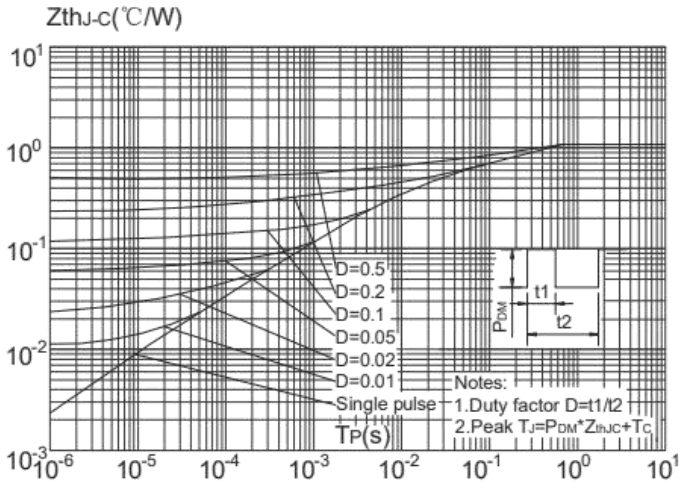


Maximum Safe Operating Area



Maximum Continuous Drain Current vs.

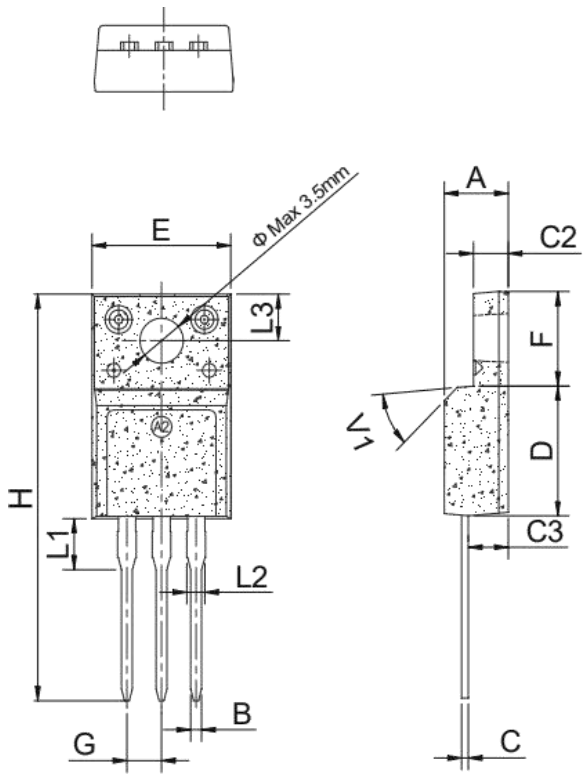
Case Temperature



Maximum Effective Transient

Thermal Impedance, Junction-to-Case

8. Package Dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	