

10V Drive Nch MOSFET

ZDX130N50

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) High-speed switching.
- 3) Gate-source voltage
 V_{GSS} guaranteed to be $\pm 30V$.
- 4) High package power.

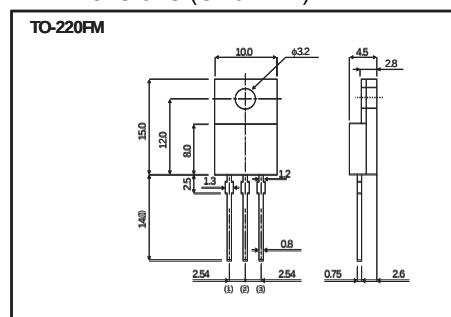
● Application

Switching

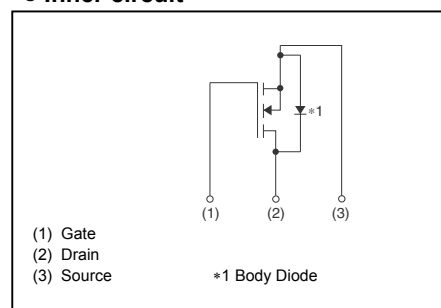
● Packaging specifications

Type	Package	Bulk
	Code	-
	Basic ordering unit (pieces)	500
ZDX130N50		○

● Dimensions (Unit : mm)



● Inner circuit



● Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DSS}	500	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	Continuous	I_D	± 13 A
	Pulsed	I_{DP} *1	± 39 A
Source current (Body Diode)	Continuous	I_S	13 A
	Pulsed	I_{SP} *1	39 A
Avalanche current	I_{AS} *3	10	A
Avalanche energy	E_{AS} *3	50	mJ
Power dissipation	P_D *2	40	W
Channel temperature	T_{ch}	150	°C
Range of storage temperature	T_{stg}	-55 to +150	°C

*1 $P_w \leq 10\mu s$, Duty cycle $\leq 1\%$

*2 $T_c = 25^\circ C$

*3 $L = 1mH$, $V_{DD} = 50V$, $R_G = 25\Omega$ Starting $T_{ch} = 25^\circ C$

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th(ch-c)}$	3.125	°C / W

● Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 30V$, $V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	500	-	-	V	$I_D=1mA$, $V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	100	μA	$V_{DS}=500V$, $V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	2.5	-	4.5	V	$V_{DS}=10V$, $I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}^*$	-	0.4	0.52	Ω	$I_D=6.5A$, $V_{GS}=10V$
Forward transfer admittance	$ Y_{fs} ^*$	2.0	8.5	-	S	$V_{DS}=10V$, $I_D=6.0A$
Input capacitance	C_{iss}	-	2180	-	pF	$V_{DS}=25V$
Output capacitance	C_{oss}	-	200	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	60	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	30	-	ns	$V_{DD}=250V$, $I_D=5.0A$
Rise time	t_r^*	-	25	-	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}^*$	-	43	-	ns	$R_L=50\Omega$, $R_G=10\Omega$
Fall time	t_f^*	-	15	-	ns	
Total gate charge	Q_g^*	-	40	-	nC	$V_{DD}=250V$, $I_D=5.0A$
Gate-source charge	Q_{gs}^*	-	11.5	-	nC	$V_{GS}=10V$
Gate-drain charge	Q_{gd}^*	-	12.5	-	nC	

*Pulsed

● Body diode characteristics (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD}^*	-	-	1.7	V	$I_s=13A$, $V_{GS}=0V$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

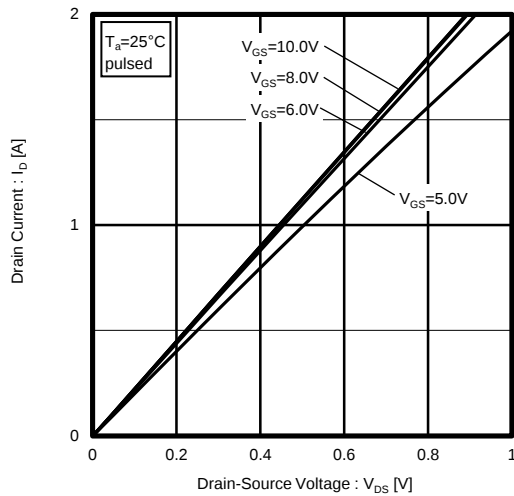


Fig.2 Typical Output Characteristics (II)

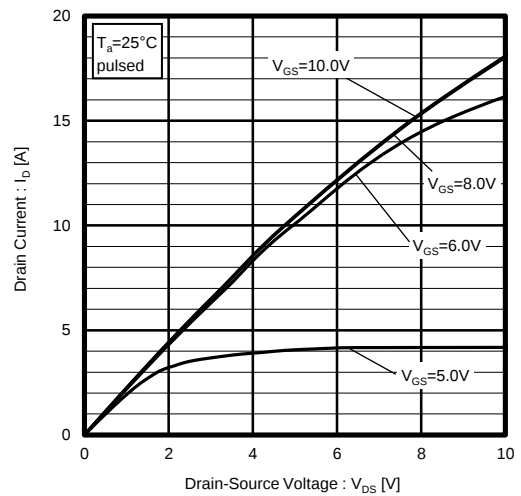


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

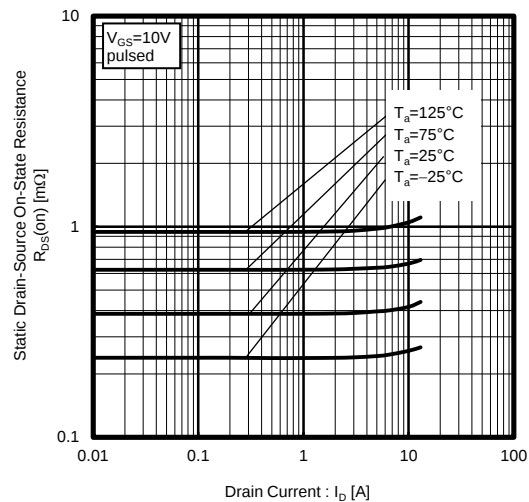


Fig.4 Forward Transfer Admittance vs. Drain Current

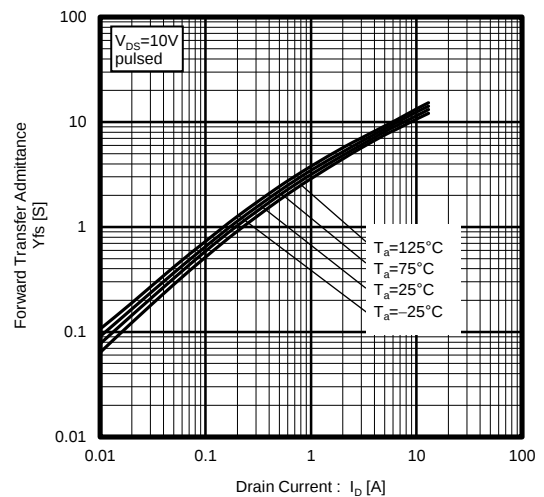


Fig.5 Typical Transfer Characteristics

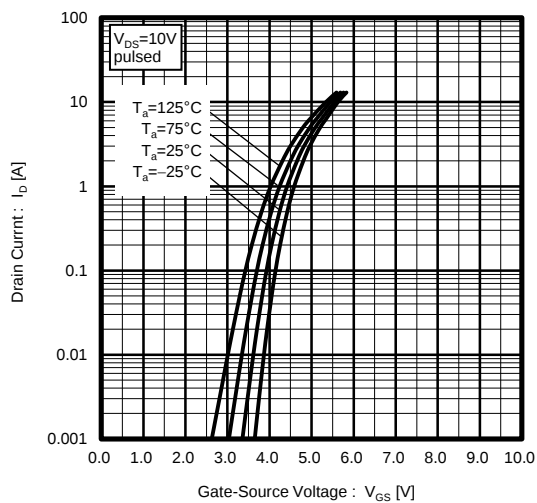


Fig.6 Source Current vs. Source-Drain Voltage

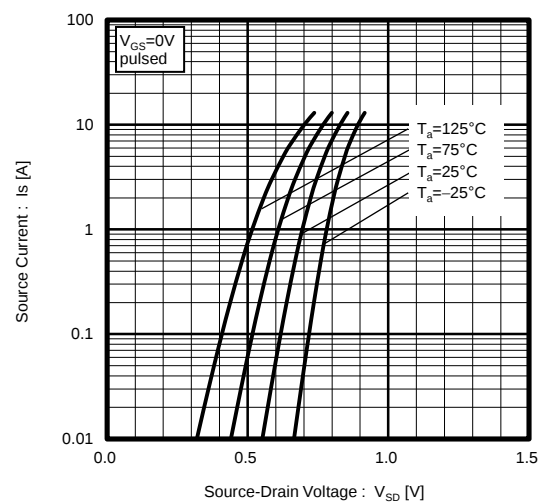


Fig.7 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

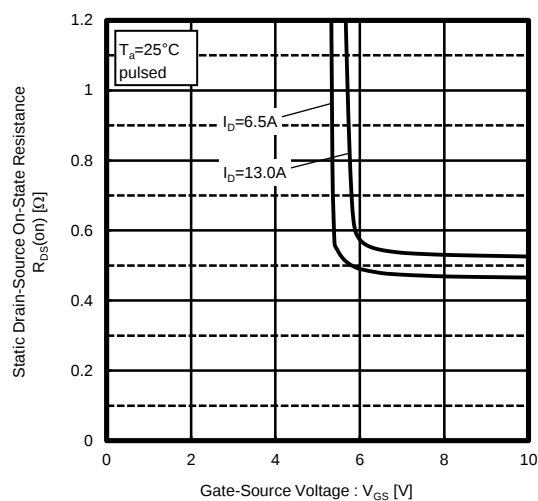


Fig.8 Switching Characteristics

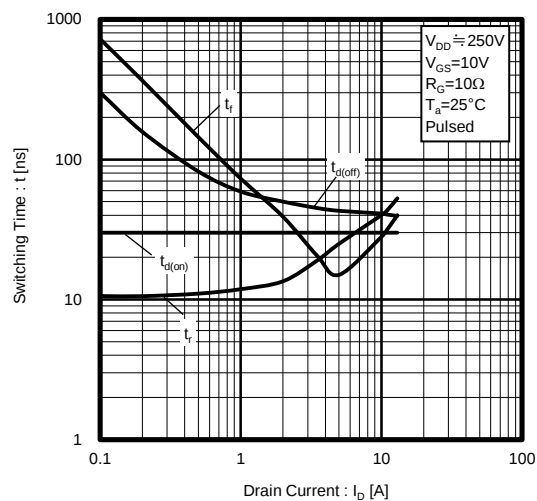


Fig.9 Dynamic Input Characteristics

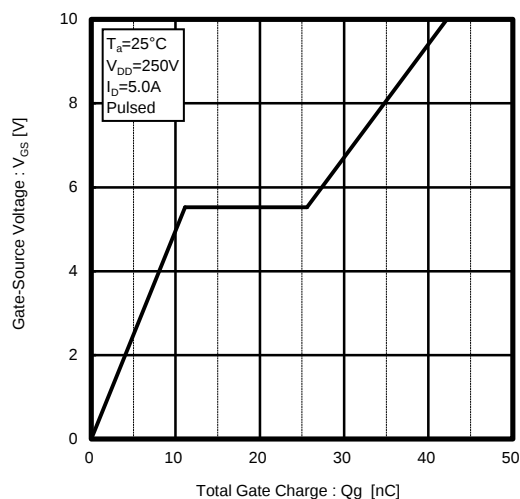


Fig.10 Typical Capacitance vs. Drain-Source Voltage

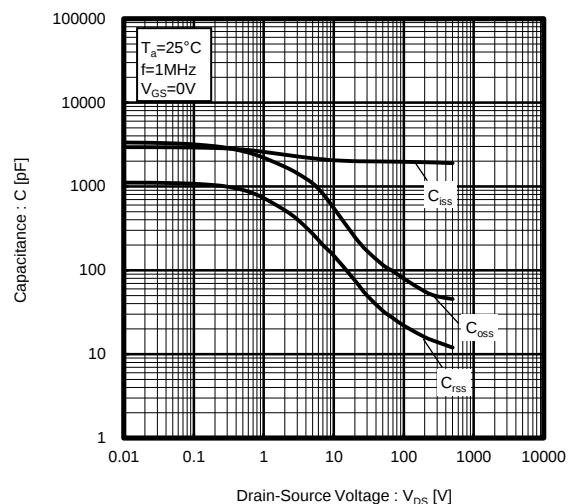
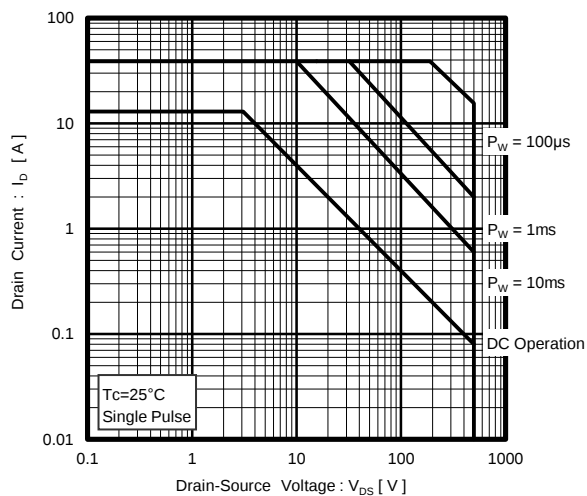


Fig.11 Maximum Safe Operating Area



● Measurement circuits

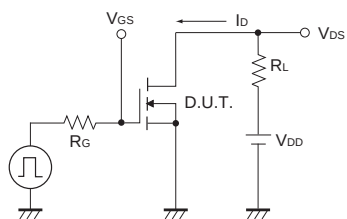


Fig.1-1 Switching Time Measurement Circuit

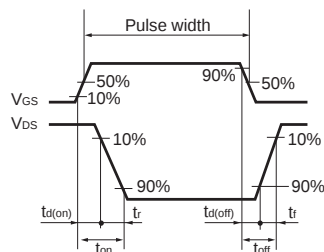


Fig.1-2 Switching Waveforms

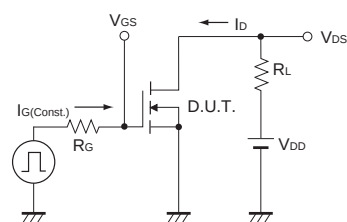


Fig.2-1 Gate Charge Measurement Circuit

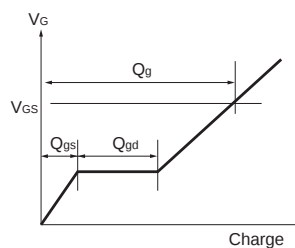


Fig.2-2 Gate Charge Waveform

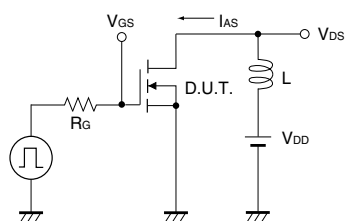


Fig.3-1 Avalanche Measurement Circuit

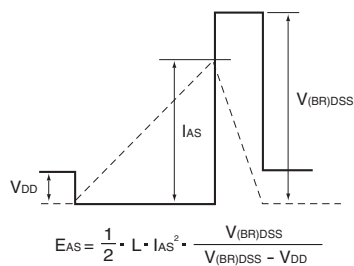


Fig.3-2 Avalanche Waveform

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