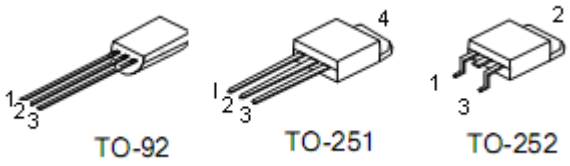
1. Description

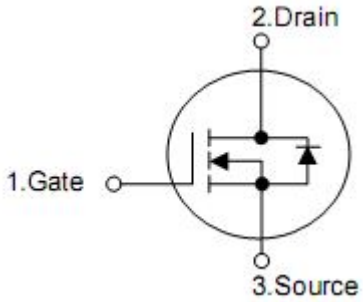
The XXW1N65D N-Channel enhancement mode silicon gate power MOSFET is designed for high voltage, high speed power switching applications such as switching regulators, switching converters,solenoid,motor drivers, relay drivers.

2. Features

- 1A, 650V, $R_{DS(on)}$= 9.3Ω @V_{GS}= 10 V
- Low gate charge (typical 5.0nC)
- High ruggedness
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability

3. Pin configuration





Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C= 25 ºC , unless otherwise noted)

Parameter		Symbol	Rating			Unit
			TO251	TO252	TO92	
Drain-source voltage		V_{DSS}	650			V
Gate-source voltage		V_{GSS}	±30			V
Drain current continuous	T_C=25 ºC	I_D	1.0		0.3*	A
	T_C=100 ºC		0.6		0.18*	A
Drain current pulsed (note 1)		I_{DP}	4.0		1.0*	A
Repetitive avalanche energy (note 1)		E_{AR}	2.8		0.3	mJ
Single pulsed avalanche energy (note 2)		E_{AS}	33		33	mJ
Peak diode recovery dv/dt (note 3)		dv/dt	4.5			V/ns
Total Power dissipation	T_C=25 ºC	P_D	28		1.0	W
	derate above 25 ºC	P_D	0.22		0.02	W/ ºC
Junction temperature		T_J	+150			ºC
Stroage temperature		T_{STG}	-55~+150			ºC

*Drain current limited by maximun junction temperature

5. Thermal characteristics

Parameter	Symbol	Ratings			Unit
		TO251	TO252	TO92	
Thermal resistance,junction -ambient	R_{thJA}	50*（110）		140	ºC/W
Thermal resistance, case-to-sink typ	R_{thCS}	-		-	
Thermal resistance,junction -case	R_{thJC}	4.53		50	

6. Electrical characteristics

(T_C=25°C,unless otherwise noted)

Parameter	Symbol	Test conditions		Min	Typ	Max	Unit
Off characteristics							
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA		650	-	-	V
Breakdown voltage temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA		-	0.6	-	V/ºC
Zero gate voltage drain current	I_{DSS}	V_{GS}=0V, V_{DS}=600V	TO251,TO252	-	-	1	μA
			TO92	-	-	50	
		T_C=125ºC, V_{DS}=480V	TO251,TO252	-	-	10	μA
			TO92	-	-	250	
Gate body leakage current, forward	I_{GSS}	V_{GS}=30V, V_{DS}=0V		-	-	100	nA
Gate body leakage current, reverse	I_{GSS}	V_{GS}=-30V, V_{DS}=0V		-	-	-100	nA
On characteristics							
Gate threshold voltage	$V_{GS(th)}$	V_{DS}= V_{GS} I_D=250μA		2.0	-	4.0	V
Static drain-source on-resistance	$R_{DS(on)}$	V_{DS}=10V, I_D=0.5A(TO251.TO252) I_D=0.15A(TO92)		-	9.3	11.5	Ω
Dynamic characteristics							
Input capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz		-	120	150	pF
Output capacitance	C_{oss}			-	20	60	pF
Reverse transfer capacitance	C_{rss}			-	3	4	pF
Switching characteristics							
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V,I_D=1.2A, R_G=25Ω (note4,5)		-	7	24	ns
Turn-on rise time	t_r			-	21	52	ns
Turn-off delay time	$t_{d(off)}$			-	13	36	ns
Turn-off fall time	t_f			-	27	64	ns
Total gate charge	Q_G	V_{DS}=480V,I_D=1.1A V_{GS}=10V		-	4.8	6.2	nC
Gate-source charge	Q_{GS}			-	0.7	-	nC
Gate-drain charge	Q_{GD}			-	2.7	-	nC
Drain source diode characteristics and maximum ratings							
Continuous drain-source current	I_{SD}	TO251.TO252		-	-	1.0	A
		TO92		-	-	0.3	
Pulsed drain-source current	I_{SM}	TO251.TO252		-	-	4.0	A
		TO92		-	-	1.2	
Drain-source diode forward voltage	V_{SD}	V_{GS}=0V, I_{SD}=1.0A(TO251.TO252). I_{SD}=0.3A(TO92)		-	-	1.4	V
Reverse recovery time	t_{RR}	I_{SD}=1.2A,dI_{SD}/dt=100A/μs (note4)		--	190	--	ns
Reverse recovery charge	Q_{RR}			--	0.53	--	μC

Note:1.repetitive rating:pulse width limited by maximum junction temperature;
2.V_{DD}=50V,R_G=25Ω,staringT_J=25ºC, L=59mH,I_{AS}=1.1A;
3. I_{SD}≤1.1A(TO251,TO252),I_{SD}≤0.3A(TO92),di/dt≤200A/μs,V_{DD}≤BV_{DSS},staring T_J=25ºC
4.Pulse test:pulse width≤300μs,duty cycle≤2%
5.Essentially independent of operating temperature