Unitpower

UD02N65

N-Ch 650V Fast Switching MOSFETs

General Description

The UD02N65 is the highest performance N-ch MOSFETs with specialized high voltage technology, which provide excellent RDSON and gate charge for most of the SPS, Charger ,Adapter and lighting applications .

The UD02N65 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

Product Summery

BV_{DSS}	$R_{DS(ON)}$	ID
650V	8Ω	2A

Applications

- High efficient switched mode power supplies
- Electronic lamp ballast
- LED Lighting
- Adapter/charger

TO252 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D@T_C$=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	2	A
$I_D@T_C$=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	1.3	A
I_{DM}	Pulsed Drain Current[2]	4	A
EAS	Single Pulse Avalanche Energy[3]	16	mJ
I_{AS}	Avalanche Current	3.4	A
$P_D@T_C$=25℃	Total Power Dissipation[4]	40	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	650	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.37	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=1A	---	6.3	8	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	---	5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-43	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=520V , V_{GS}=0V , T_J=25℃	---	---	2	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=1A	---	1.7	---	S
Q_g	Total Gate Charge (10V)	V_{DS}=520V , V_{GS}=10V , I_D=1A	---	8	---	nC
Q_{gs}	Gate-Source Charge		---	2.56	---	
Q_{gd}	Gate-Drain Charge		---	2.67	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=300V , V_{GS}=10V , R_G=10Ω, I_D=1A	---	4.8	---	ns
T_r	Rise Time		---	18.4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	10.8	---	
T_f	Fall Time		---	23.2	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	290	---	pF
C_{oss}	Output Capacitance		---	25	---	
C_{rss}	Reverse Transfer Capacitance		---	4	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=50V , L=1mH , I_{AS}=1.5A	3.2	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	2	A
I_{SM}	Pulsed Source Current[2,6]		---	---	4	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	IF=1A , dI/dt=100A/μs , T_J=25℃	---	178	---	nS
Q_{rr}	Reverse Recovery Charge		---	382	---	nC

Note :
1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leqq$ 300us , duty cycle $\leqq$ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=50V,V_{GS}=10V,L=1mH,I_{AS}=1.5A
4. The power dissipation is limited by 150℃ junction temperature
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics
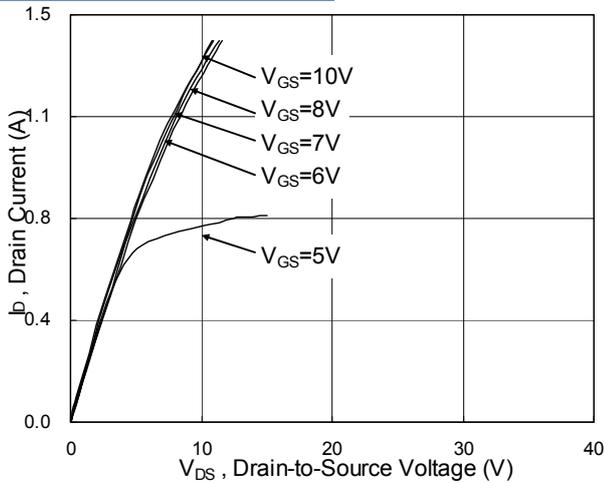


Fig.1 Typical Output Characteristics
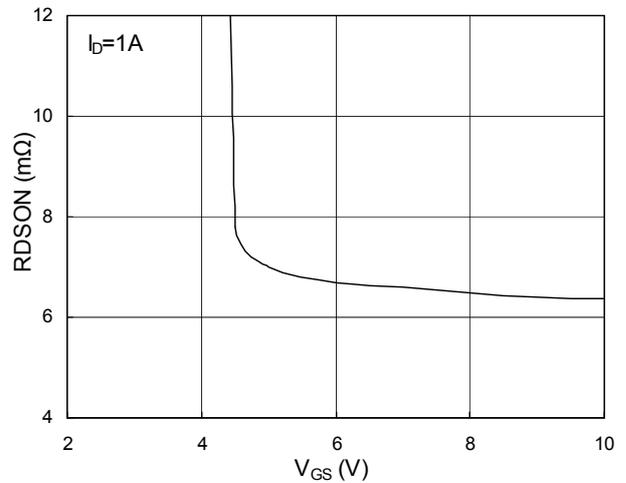

Fig.2 On-Resistance vs. G-S Voltage
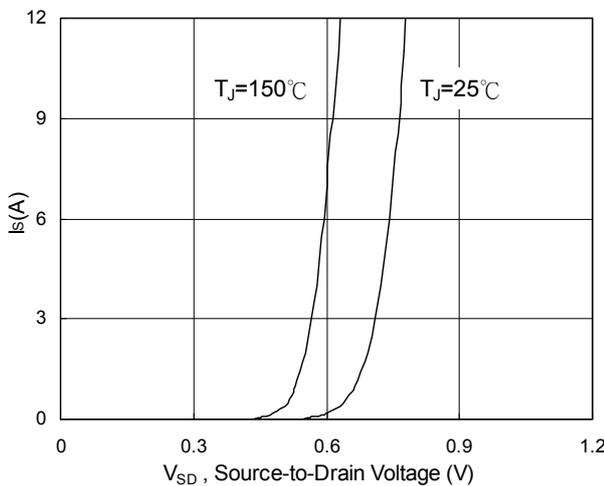
**Fig.3 Forward Characteristics of Reverse**
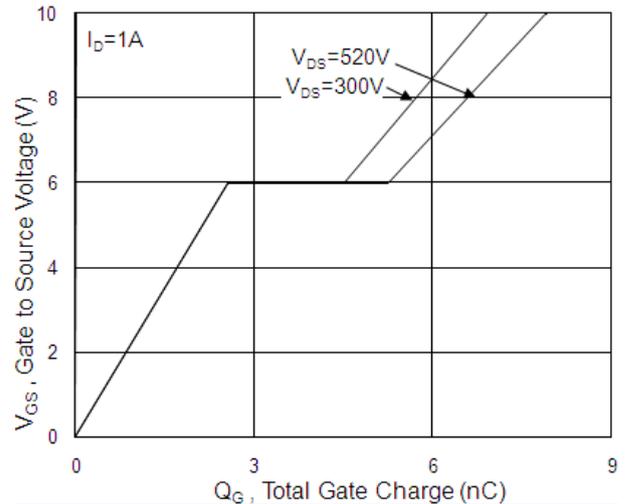
**Fig.4 Gate-charge Characteristics**
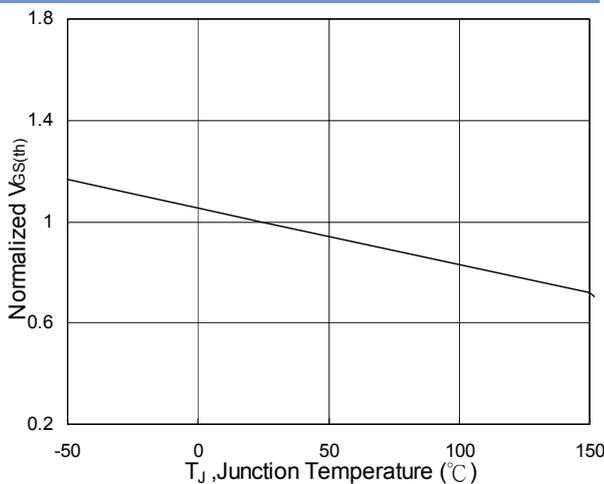
**Fig.5 Normalized $V_{GS(th)}$ vs. T_J**
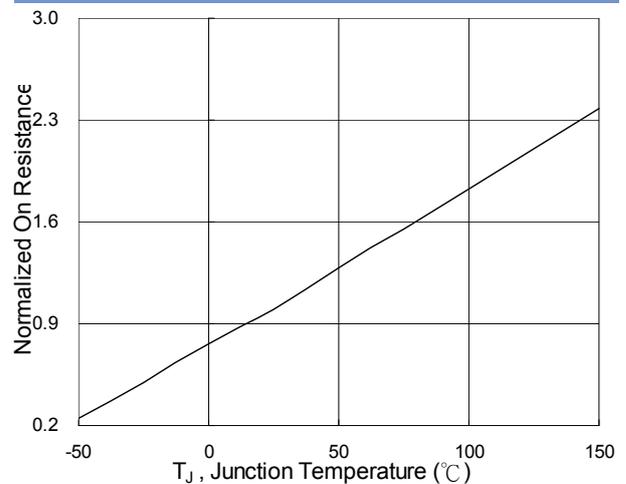
Fig.6 Normalized R_{DSON} vs. T_J
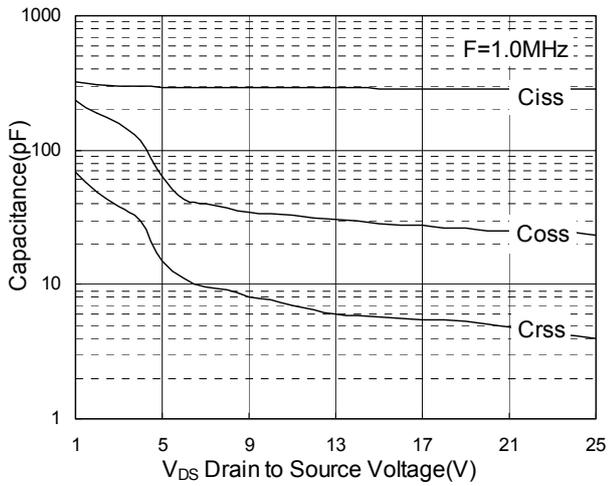
Fig.7 Capacitance
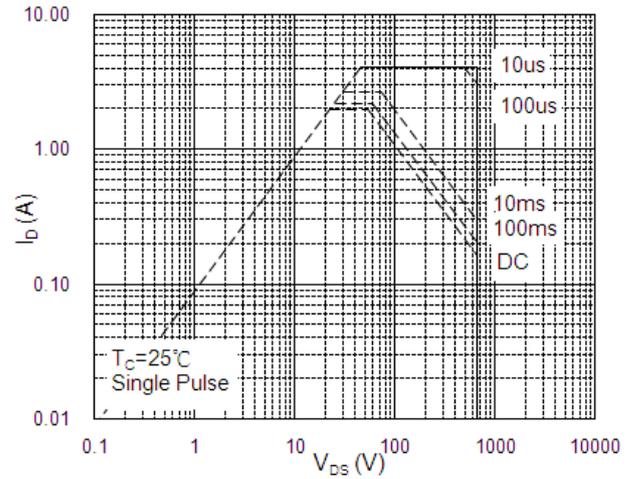
Fig.8 Safe Operating Area

$D = T_{ON}/T$

$T_Jpeak = T_C + P_{DM} \times R_{\theta JC}$
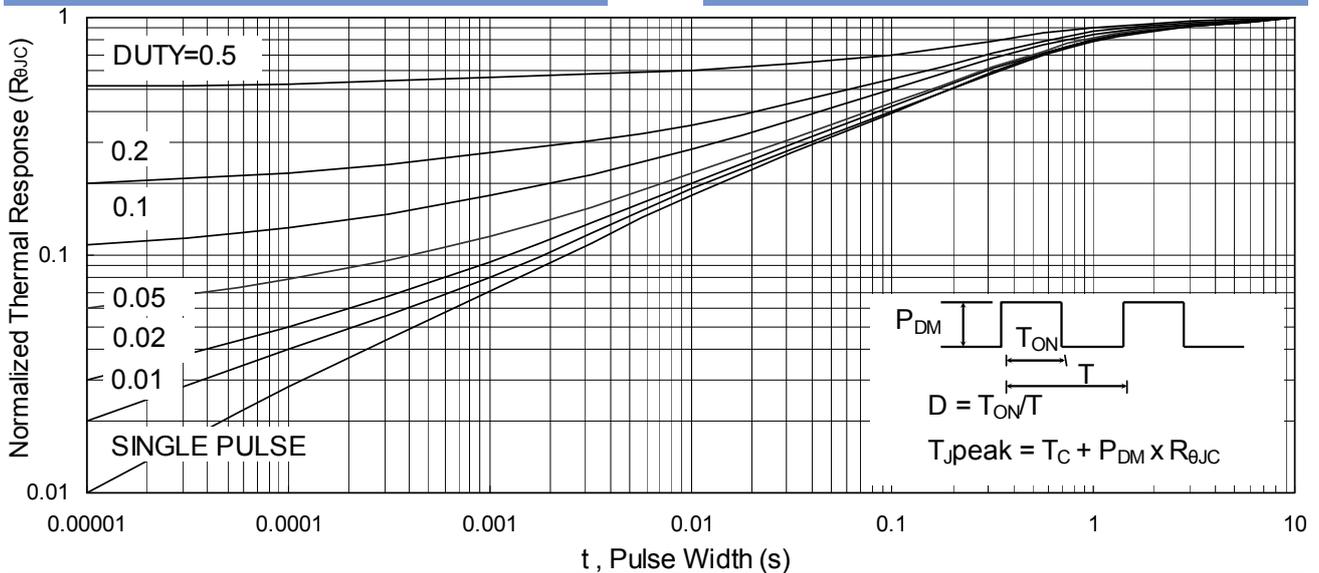
Fig.9 Normalized Maximum Transient Thermal Impedance
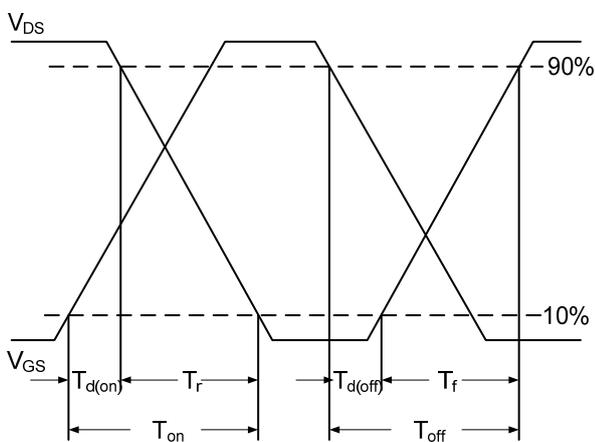
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$
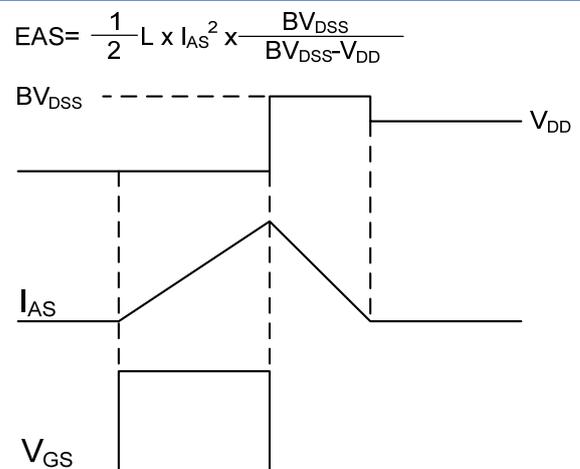
Fig.11 Unclamped Inductive Switching Waveform