

N-Ch 100V Fast Switching MOSFETs
General Description

The UD0006 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The UD0006 meet the RoHS and Green Product requirement with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	14.7	A
$I_D@T_C=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	13.6	A
I_{DM}	Pulsed Drain Current ²	59	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	50	W
$P_D@T_C=70^\circ C$	Total Power Dissipation ³	32	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

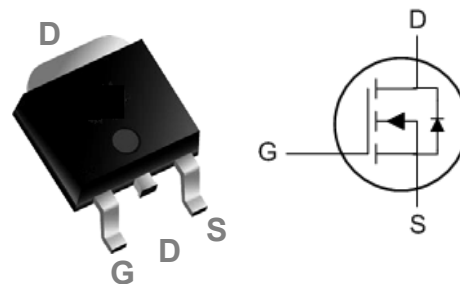
Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	3.6	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	50	$^\circ C/W$

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	145m Ω	15A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application

TO252 Pin Configuration


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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=6A$	---	100	145	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	150	195	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.12	---	mV/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$	---	---	1	μA
			---	---	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=10V, I_D=6A$	---	5	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2.5	5	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=50V, V_{GS}=10V, I_D=6A$	---	7.8	---	nC
Q_{gs}	Gate-Source Charge		---	1.3	---	
Q_{gd}	Gate-Drain Charge		---	2.9	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=6\ \Omega$ $I_D=1A$	---	9.8	---	ns
T_f	Fall Time		---	10.2	---	
$T_{d(off)}$	Rise Time		---	18	---	
T_i	Turn-Off Delay Time		---	8.5	---	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	480	---	pF
C_{oss}	Output Capacitance		---	47	---	
C_{riss}	Reverse Transfer Capacitance		---	29	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25\text{ }^\circ\text{C}$	---	0.775	1.3	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

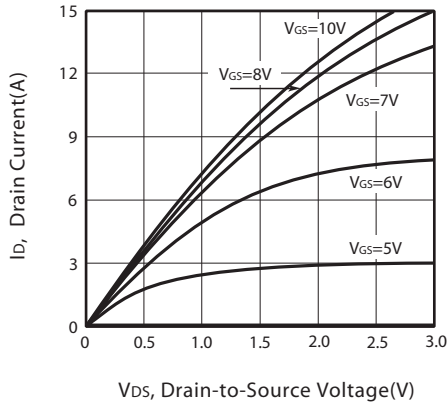


Figure 1. Output Characteristics

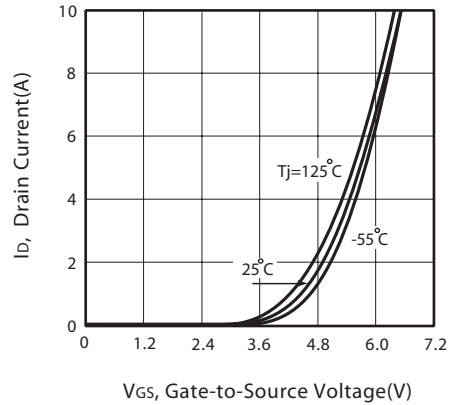


Figure 2. Transfer Characteristics

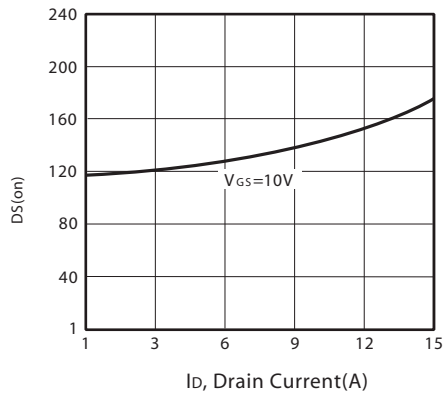
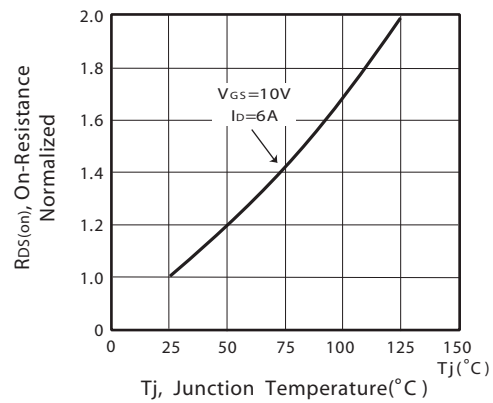


Figure 3. On-Resistance vs. Drain Current and Gate Voltage



Current and Temperature

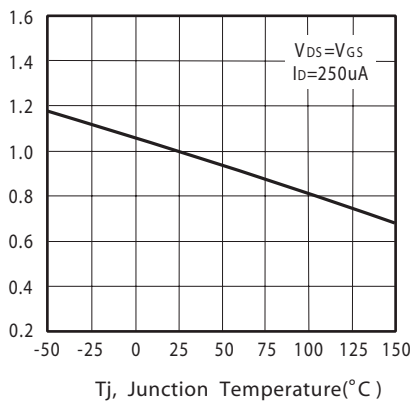


Figure 5. Gate Threshold Variation with Temperature

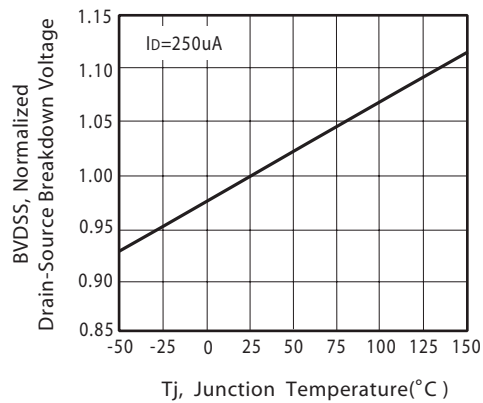
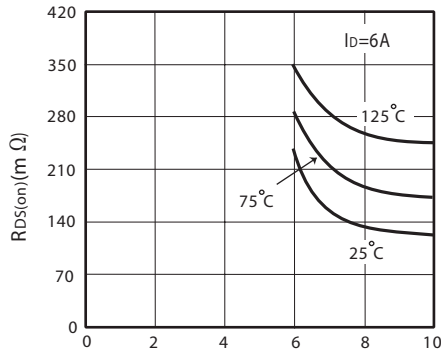
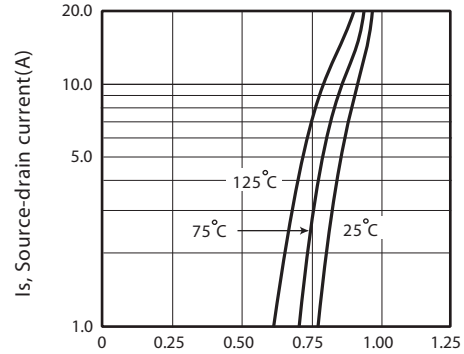


Figure 6. Breakdown Voltage Variation with Temperature

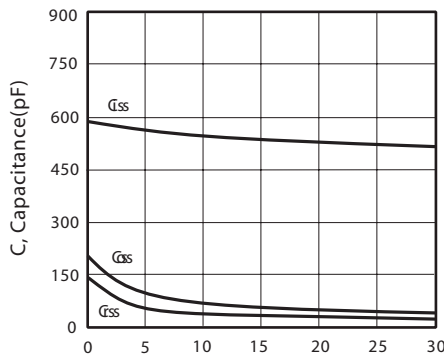
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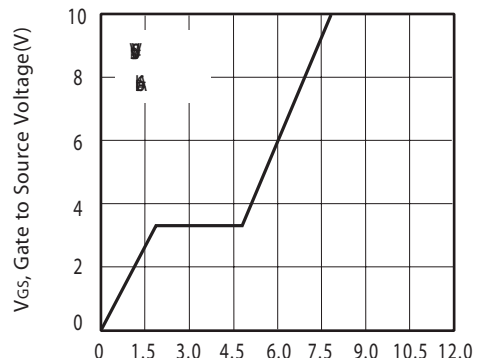
V_{GS}, Gate-to-Source Voltage(V)
Figure 7. On-Resistance vs. Gate-Source Voltage



V_{SD}, Body Diode Forward Voltage(V)
Figure 8. Body Diode Forward Voltage Variation with Source Current



V_{DS}, Drain-to-Source Voltage(V)
Figure 9. Capacitance



Q_g, Total Gate Charge(nC)
Figure 10. Gate Charge

