



ProsPower

PS06N20DA

20V Dual Channel NMOSFET

Revision : 1.0
Update Date : Apr. 2011

ProsPower Microelectronics Co., Ltd

1. General Description

The PS06N20DA uses advanced trench technology and design to provide excellent $R_{ds(on)}$ with low gate charge. This device is suitable for use in high efficiency switching applications, DC/DC conversion, CPU power delivery and Synchronous rectification. Standard Product PS06N20DA is Pb-free (meets ROHS & Sony 259 specifications). It is offered in the very popular SOT23-6 package

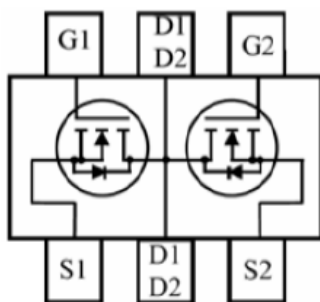
2. Applications

- Battery management
- Power management
- DC-DC converter
- Load switch
- LCD adapter

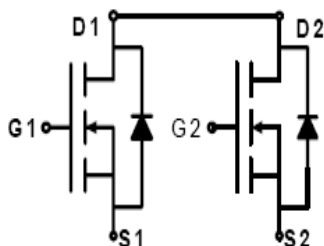
3. Features

- $V_{ds}=20V, I_d=6A$
- $R_{ds(on)} < 23m\Omega (V_{gs}=4.5V)$
- Low capacitance minimizes driver loss
- Optimized gate charge minimizes switching loss

Pin Configuration



SOT23-6



Schematic

Pin Descriptions

Pin Name	Symbol	Function
Gate(4,6)	G1/G2	Device Gate terminal
Drain(2,5)	D1/D2	Device drain terminal
Source(1,3)	S1/S2	Device source terminal

Absolute Maximum Ratings

Stress greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These stress ratings only, and functional operation of the device at these or any conditions beyond those indicated under recommended Operating Conditions is not implied. Exposure to “Absolute Maximum Rating” for extended periods may affect device reliability. Use of standard ESD handling precautions is required..

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_C=25^\circ\text{C}$ (Note 3)	I_D	6	A
Power Dissipation	$T_C=25^\circ\text{C}$	P_D	0.5	W
Junction and Storage Temperature Range		T_J, T_{STG}	-65 to 150	$^\circ\text{C}$

Electrical Specifications

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BVD_{SS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	20	22		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16\text{V}, V_{GS}=0\text{V}$ $T_J=25^\circ\text{C}$			1	μA
Gate-Body leakage current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 12\text{V}$			0.1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.5	0.72	1	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{V}, I_D=6\text{A}$		22	23	m Ω
		$V_{GS}=2.5\text{V}, I_D=4\text{A}$		31	35	
Forward Transconductance	g_{FS}	$V_{DS}=5\text{V}, I_D=4.5\text{A}$		10		S
Body-Diode Continuous Current	I_S				1.7	A
Diode Forward Voltage	V_{SD}	$I_S=1.5\text{A}, V_{GS}=0\text{V}$		0.8	1	V
DYNAMIC PARAMETERS						
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=8\text{V},$ $f=1\text{MHz}$		600		pF
Output Capacitance	C_{oss}			330		pF
Reverse Transfer Capacitance	C_{rss}			140		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_g	$V_{GS}=4.5\text{V}, V_{DD}=10\text{V},$ $I_D=6\text{A}$ (Note 2)		10	15	nC
Gate Source Charge	Q_{gs}			2.3		nC
Gate Drain Charge	Q_{gd}			2.9		nC
Turn-On Delay Time	$t_{D(on)}$	$I_D=1\text{A}, V_{DD}=10\text{V},$ $V_{GEN}=4.5\text{V}, R_L=10\Omega$		8	20	ns
Turn-On Rise Time	t_r			10	25	ns

Turn-Off Delay Time	$t_{D(off)}$	$R_G=6\Omega$ (Note 2)		35	70	ns
Turn-Off Fall Time	t_f			30	60	ns

Notes

1. Pulse width limited by max. junction temperature
2. Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
3. Surface mounted on 1 in² copper pad of FR4 board, $t \leq 5\text{sec}$; 180°C/W when mounted on min. copper pad.



Typical Performance Characteristics

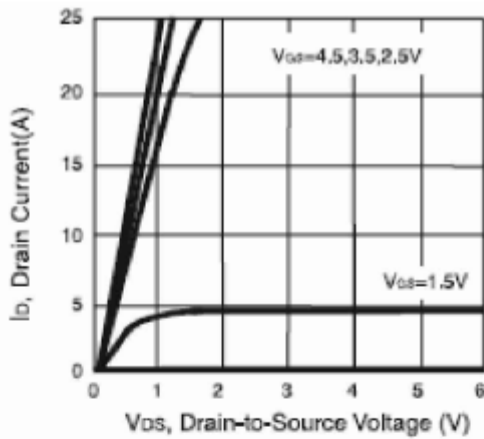


Figure 1. Output Characteristics

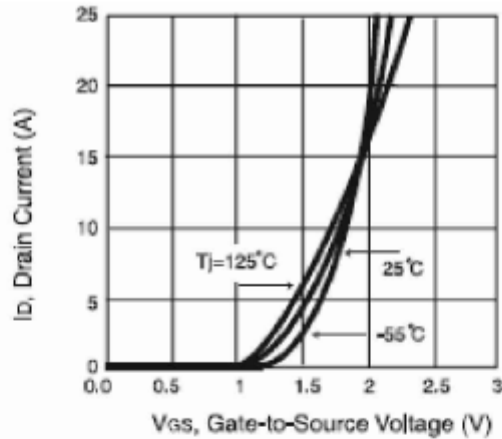


Figure 2. Transfer Characteristics

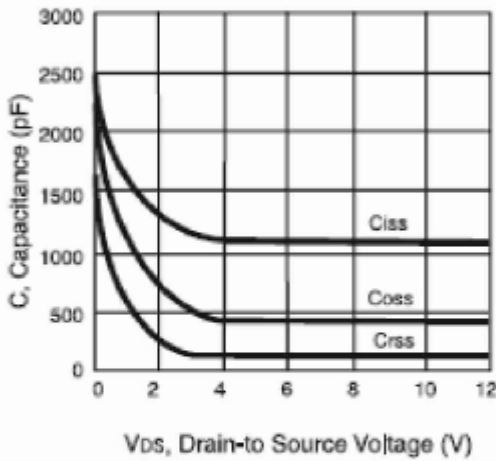


Figure 3. Capacitance

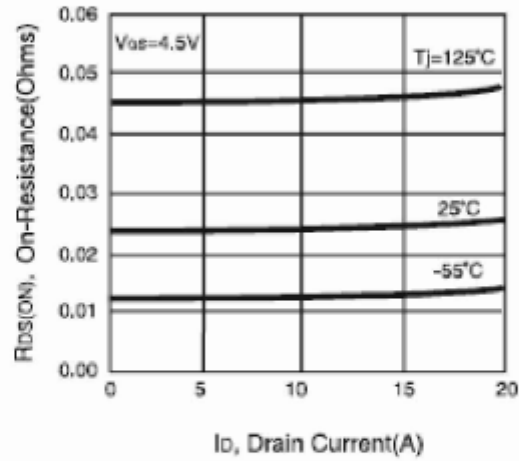


Figure 4. On-Resistance Variation with Drain Current and Temperature

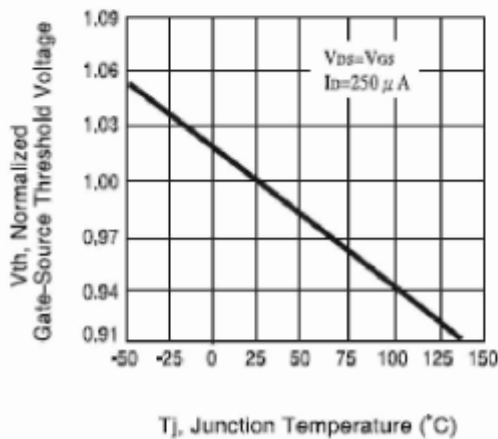


Figure 5. Gate Threshold Variation with Temperature

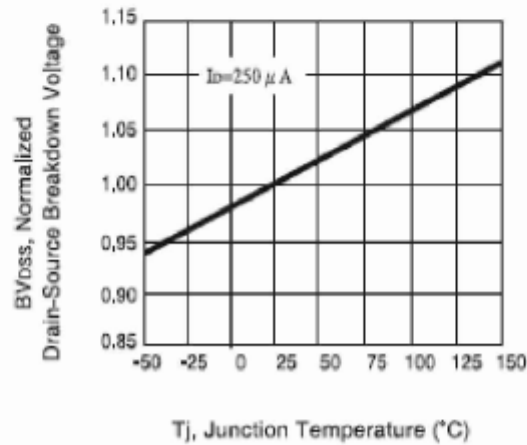
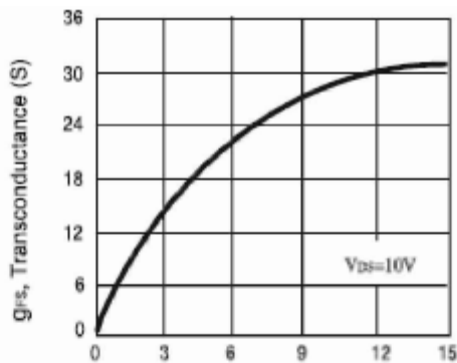


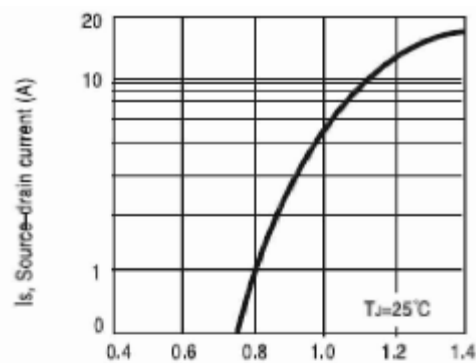
Figure 6. Breakdown Voltage Variation with Temperature

Typical Performance Characteristics (contd.)



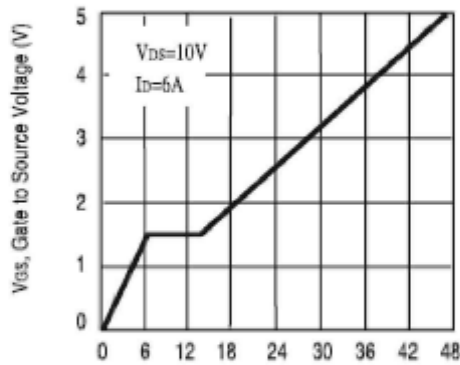
I_{DS} , Drain-Source Current (A)

Figure 7. Transconductance Variation with Drain Current



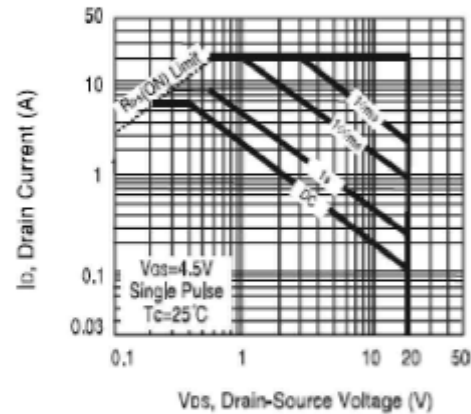
V_{SD} , Body Diode Forward Voltage (V)

Figure 8. Body Diode Forward Voltage Variation with Source Current



Q_g , Total Gate Charge (nC)

Figure 9. Gate Charge



V_{DS} , Drain-Source Voltage (V)

Figure 10. Maximum Safe Operating Area

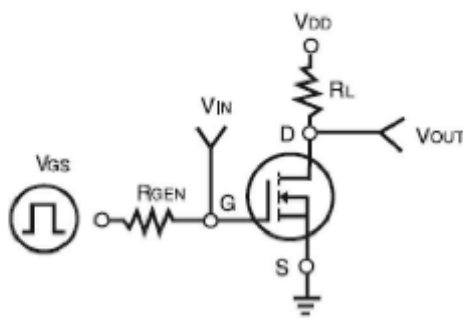


Figure 11. Switching Test Circuit

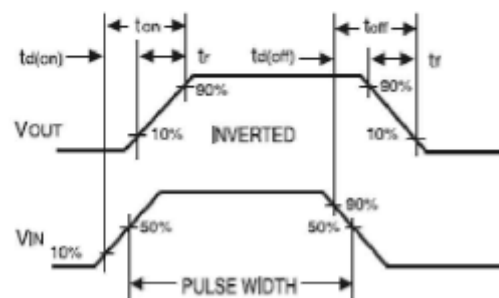
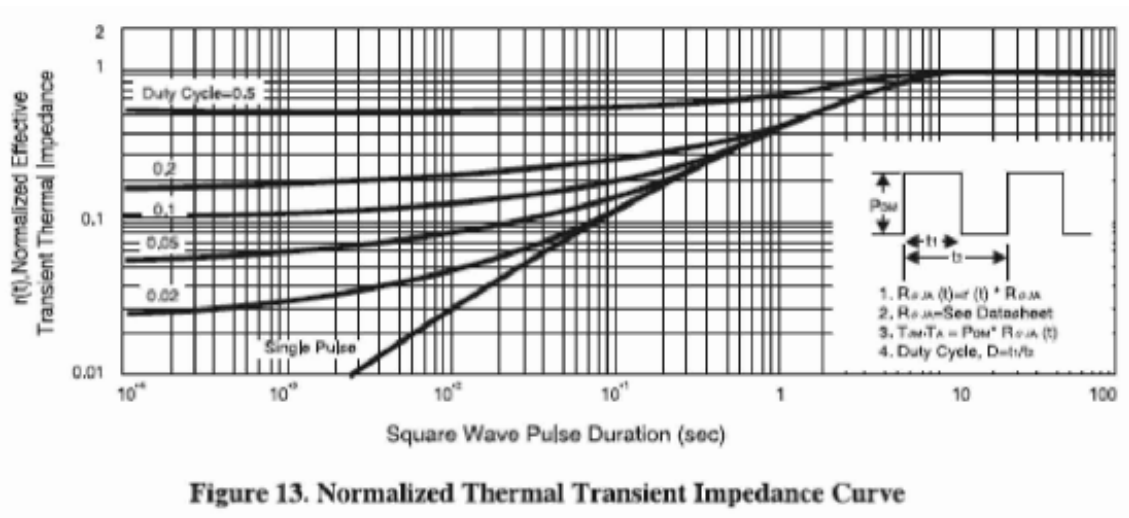


Figure 12. Switching Waveforms

Typical Performance Characteristics (contd.)





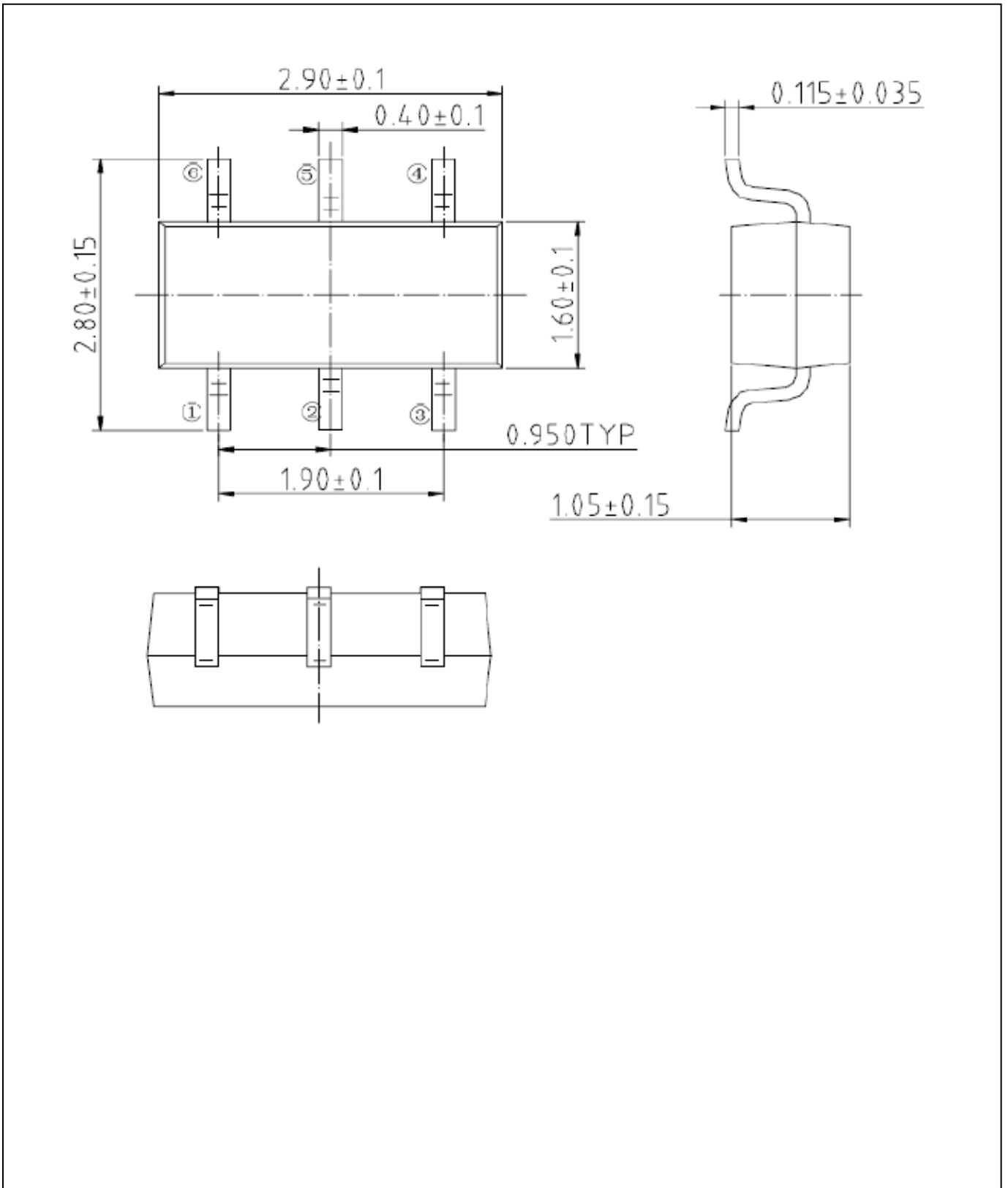
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Package Dimensions

SOT23-6



Ordering Information

Device	Operating T _j	PKG Type	Wrap	Order Number
PS06N20DA	-65C° ≤ 150C°	SOT23-6	T&R	PS06N20DA-M6-TL

Note: Lead Free and RoHS compliant.

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