ProsPower

PS06N20DEA

20V Dual Channel NMOSEFT with 3KV ESD

Revision	:	1.0
Update Date	:	Apr. 2011

ProsPower Microelectronics Co., Ltd

PS06N20DEA

20V Dual Channel NMOSFET with 3KV ESD

1. General Description

The PS06N20DEA uses advanced trench technology and design to provide excellent Rds(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 PS06N20DEA 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

- Vds=20V, Id=6A
- Rds(on)=<26.5mohm (Vgs=4V)
- ESD: HBM 3KV
- Low capacitance minimizes driver loss
- Optimized gate charge minimizes switching loss

Pin Configuration
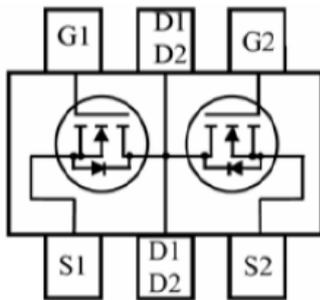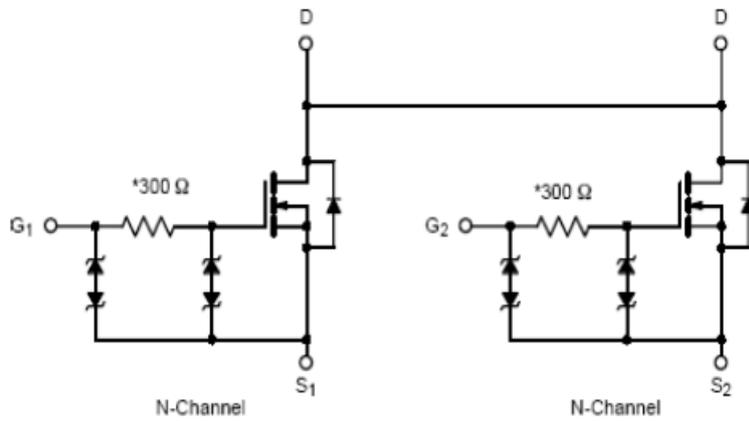
SOT23-6   Schematic

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°C (Note 3)	I_D	6	A
Power Dissipation T_C=25°C		P_D	2	W
Junction and Storage Temperature Range		T_J, T_{STG}	-65 to 150	°C

Electrical Specifications

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
STATIC PARAMETERS							
Drain-Source Breakdown Voltage	BVD_{SS}	I_D=250uA, V_{GS}=0V		20	24		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V	T_J=25°C			1	uA
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V				10	µA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250µA		0.5	0.73	1	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4V, I_D=5A			16	26.5	mΩ
		V_{GS}=2.5V, I_D=4.3A			21	37	
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=6A		6	20		S
Diode Forward Voltage	V_{SD}	I_S=1.5A, V_{GS}=0V			0.7	1	V
DYNAMIC PARAMETERS							
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=8V, f=1MHz			1120	1500	pF
Output Capacitance	C_{oss}				480	630	pF
Reverse Transfer Capacitance	C_{rss}				110	160	pF
SWITCHING PARAMETERS							
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DD}=10V, I_D=6A (Note 2)			47	60	nC
Gate Source Charge	Q_{gs}				6		nC
Gate Drain Charge	Q_{gd}				8		nC
Turn-On Delay Time	$t_{D(on)}$	I_D=1A, V_{DD}=10V, V_{GEN}=4.5V, R_L=10Ω R_G=6Ω(Note 2)			25	60	ns
Turn-On Rise Time	t_r				60	140	ns
Turn-Off Delay Time	$t_{D(off)}$				60	140	ns

Turn-Off Fall Time	t_f			30	60	ns

Notes

1. Pulse width limited by max. junction temperature

2. Pulse Width <= 300us, Duty Cycle <=2%

3. Surface mounted on 1 in^2 copper pad of FR4 board, t <= 5sec; 180ºC/W when mounted on min. copper pad.

**Typical Performance Characteristics**
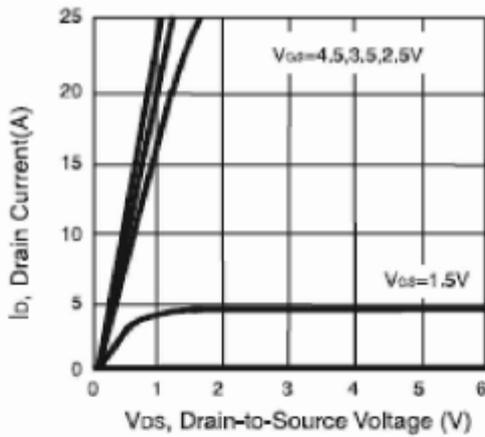
Figure 1. Output Characteristics
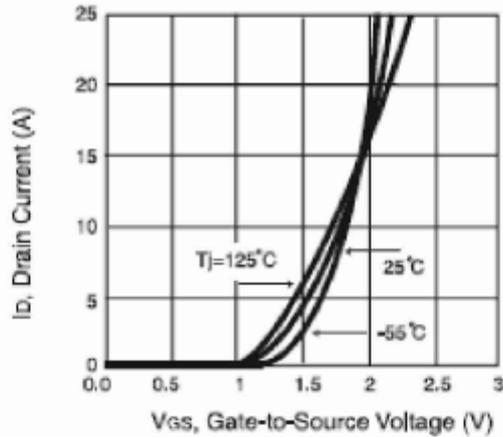

Figure 2. Transfer Characteristics
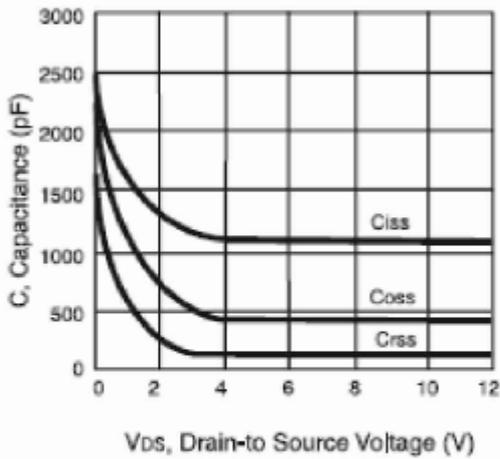
Figure 3. Capacitance
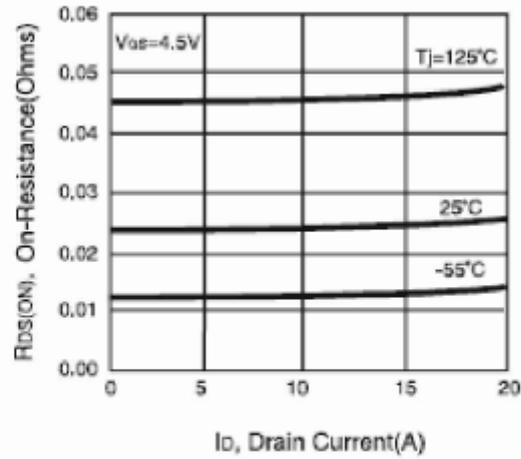
Figure 4. On-Resistance Variation with Drain Current and Temperature
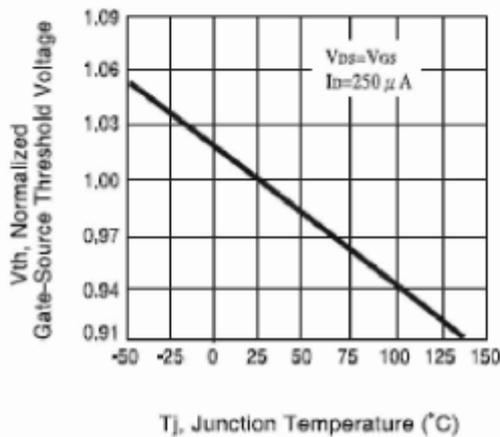
Figure 5. Gate Threshold Variation with Temperature
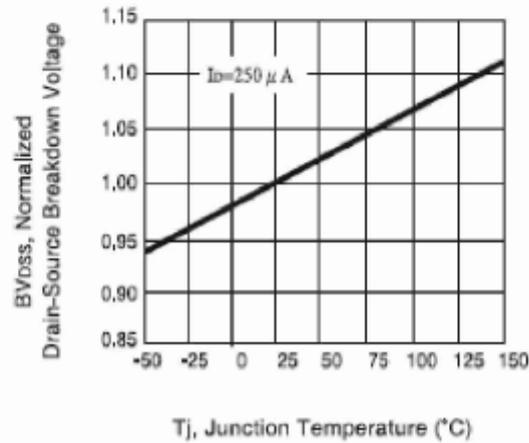
Figure 6. Breakdown Voltage Variation with Temperature

Typical Performance Characteristics (contd.)
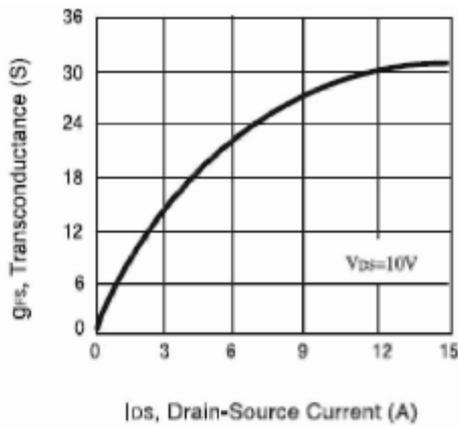
Figure 7. Transconductance Variation with Drain Current
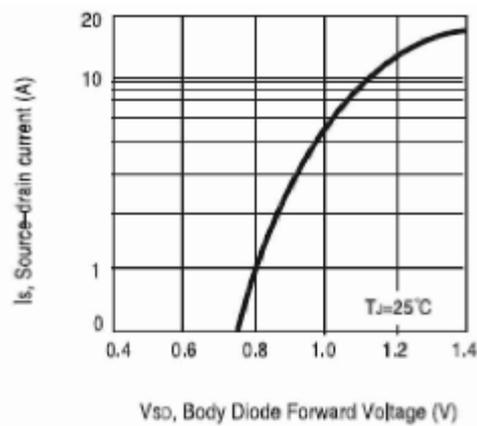
Figure 8. Body Diode Forward Voltage Variation with Source Current
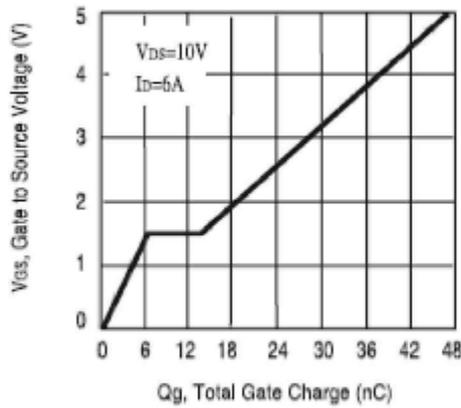
Figure 9. Gate Charge
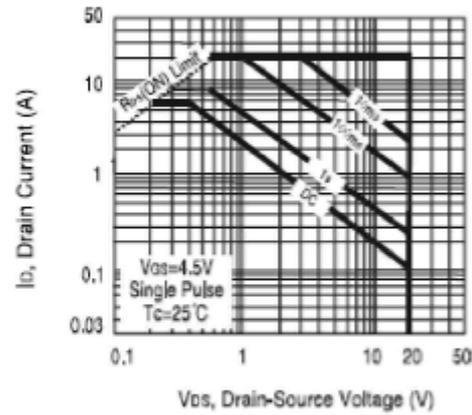
Figure 10. Maximum Safe Operating Area
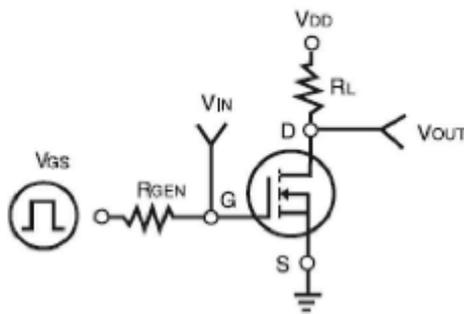
Figure 11. Switching Test Circuit
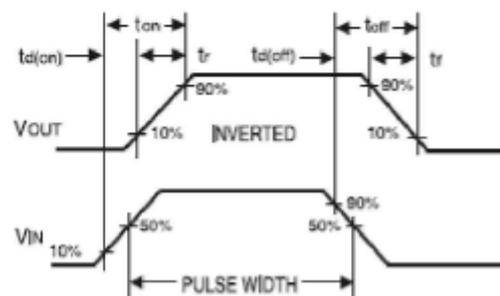
Figure 12. Switching Waveforms

Typical Performance Characteristics (contd.)
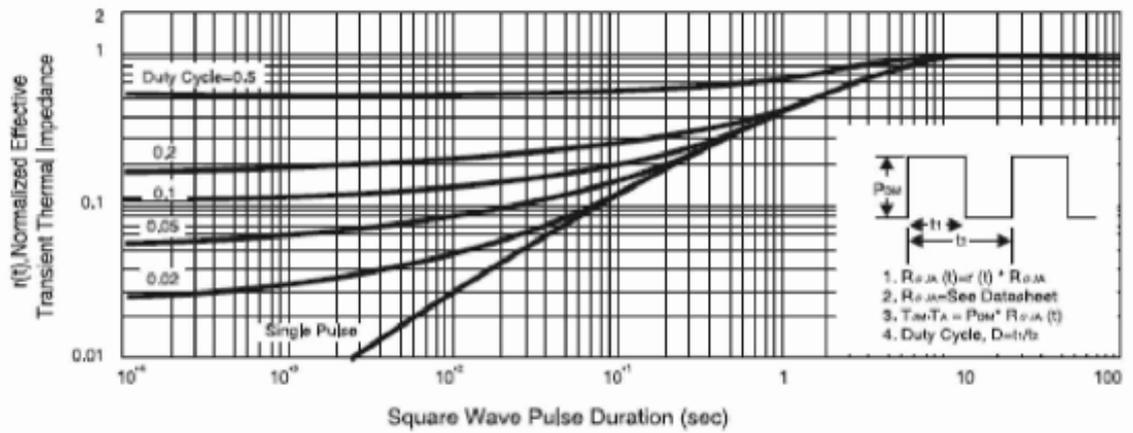
Figure 13. Normalized Thermal Transient Impedance Curve

Package Dimensions
SOT23-6
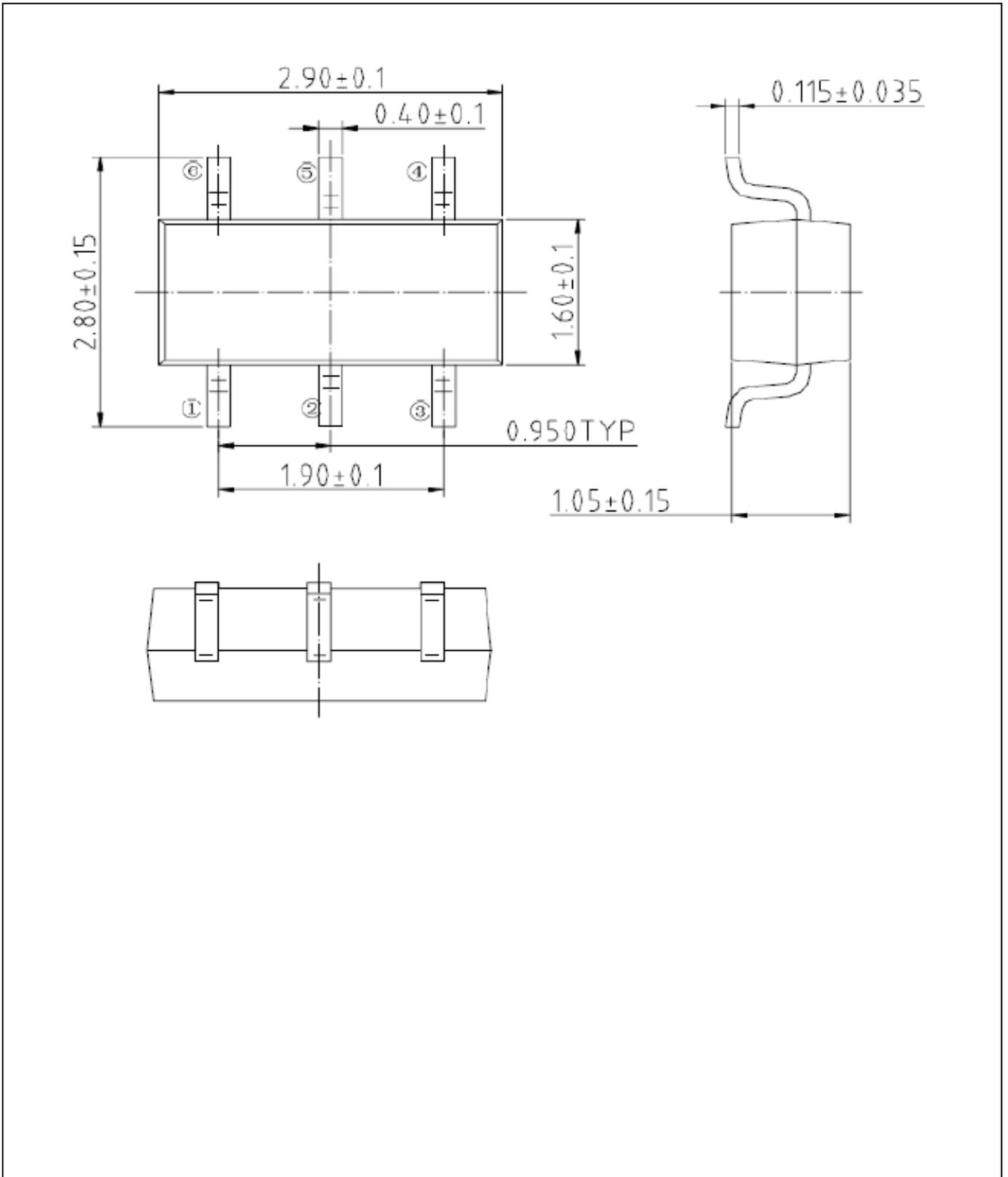
Ordering Information

Device	Operating T$_j$	PKG Type	Wrap	Order Number
PS06N20DEA	-65C° ≤150C°	SOT23-6	T&R	PS06N20DEA-M6-TL

Note: Lead Free and RoHS compliant.