PS75N75A

75V Single Channel NMOSEFT

Revision	:	1.0
Update Date	:	Apr. 2011

ProsPower Microelectronics Co., Ltd

1. General Description

The PS75N75A uses advanced trench technology and design to provide excellent Rds(on) with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications. Standard Product PS75N75A is Pb-free (meets ROHS & Sony 259 specifications). It is offered in the very popular TO-220 package

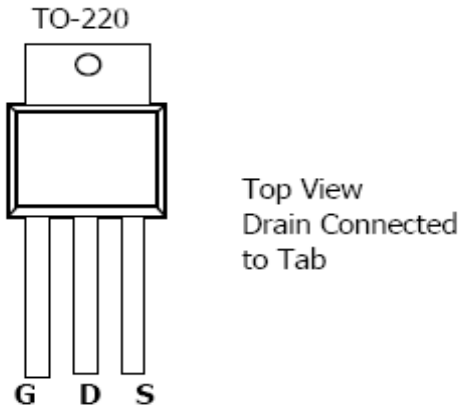
2. Applications

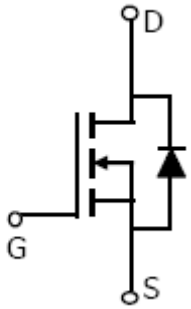
- Solenoid and relay drivers
- DC motor control
- DC-DC converters
- Automotive environment

3. Features

- Vds=75V
- Id=80A (Vgs=10V)
- Rds(on)=<9.5mohm (Vgs=10V)
- Exceptional dv/dt capability
- 100% avalanche tested

Pin Configuration





Pin Descriptions

Pin Name	Symbol	Function
Gate	G	Device Gate terminal
Drain	D	Device drain terminal
Source	S	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}	75	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C=25°C (G)	I_D	80	A
	T_C=100°C		70	
Pulsed Drain Current (C)		I_{DM}	200	A
Avalanche Current (C)		I_{AR}	60	A
Repetitive avalanche energy L=0.3mH (C)		E_{AR}	700	mJ
Power Dissipation (B)	T_C=25°C	P_D	320	W
	T_C=100°C		165	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

Parameter		Symbol	Typ.	Max.	Units
Maximum Junction-to-Ambient (A)	Steady-State	$R_{\theta JA}$	45	60	°C/W
Maximum Junction-to-Case (B)	Steady-State	$R_{\theta JC}$	0.45	0.56	°C/W

Electrical Specifications

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
STATIC PARAMETERS							
Drain-Source Breakdown Voltage	BVD_{SS}	I_D=250uA, V_{GS}=0V		76			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	T_J=25°C			0.1	uA
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±25V				0.1	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		2.6		3.2	V
On state drain current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V		200			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A			8	9.5	mΩ
Transconductance	g_{FS}	V_{DS}=5V, I_D=80A			90		S
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.6	0.7	0.9	V
Maximum Body-Diode Continuous Current (G)	I_S					80	A

DYNAMIC PARAMETERS						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=30V, f=1MHz		5700		pF
Output Capacitance	C_{oss}			400		pF
Reverse Transfer Capacitance	C_{rss}			100		pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		3		Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DD}=30V, I_D=30A		100		nC
Gate Source Charge	Q_{gs}			25		nC
Gate Drain Charge	Q_{gd}			18		nC
Turn-On Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=30V, R_L=1Ω, R_{GEN}=3Ω		19		ns
Turn-On Rise Time	t_r			35		ns
Turn-Off Delay Time	$t_{D(off)}$			70		ns
Turn-Off Fall Time	t_f			24		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=30A, dI/dt=100A/μs		70		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=30A, dI/dt=100A/μs		120		nC

(A): The value of R θJA is measured with the device in a still air environment with T A =25°C.

(B). The power dissipation PD is based on TJ(MAX)=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

(C): Repetitive rating, pulse width limited by junction temperature TJ(MAX)=175°C.

(D). The R θJA is the sum of the thermal impedence from junction to case R θJC and case to ambient.

(E). The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

(F). These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of TJ(MAX)=175°C.

(G). The maximum current rating is limited by bond-wires.

Typical Performance Characteristics

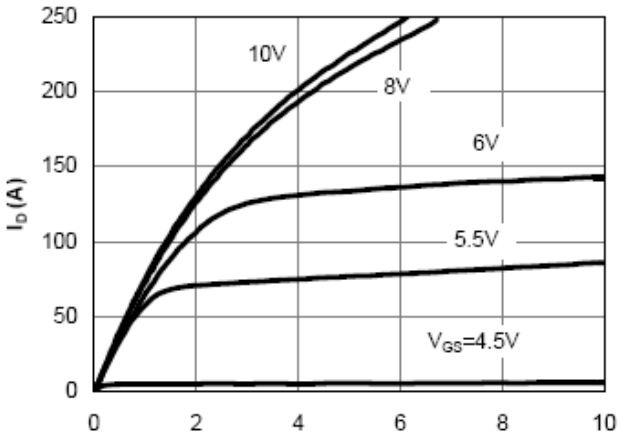


Figure 1: On-Region Characteristics

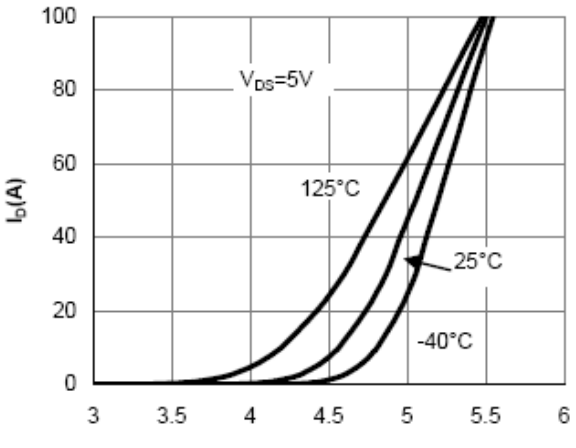


Figure 2: Transfer Characteristics

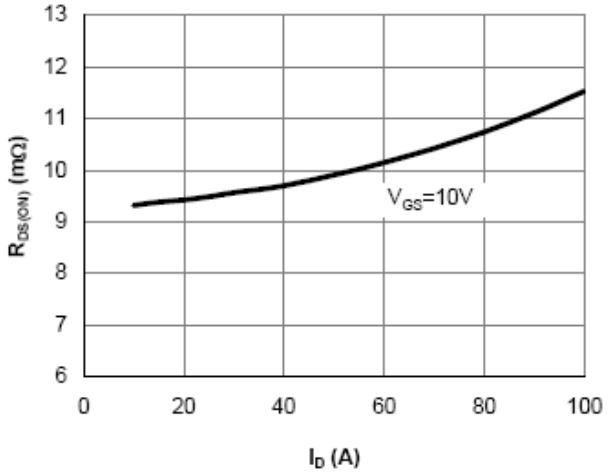


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

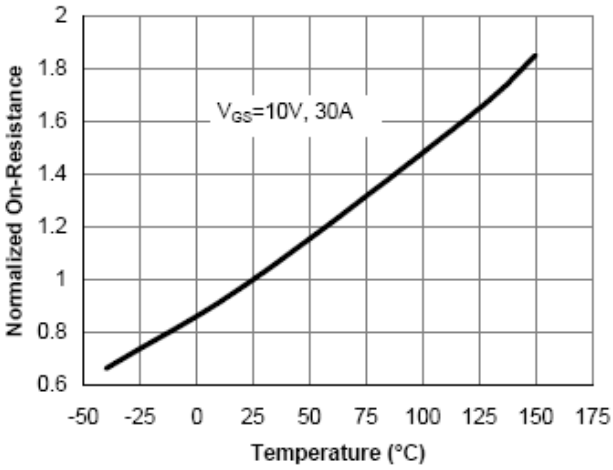


Figure 4: On-Resistance vs. Junction Temperature

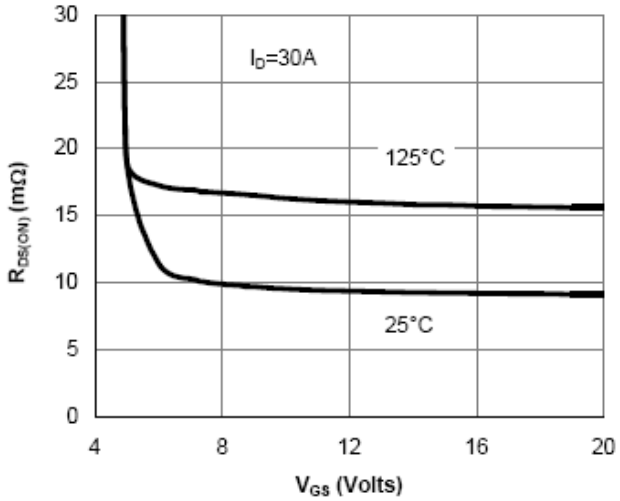


Figure 5: On-Resistance vs. Gate-Source Voltage

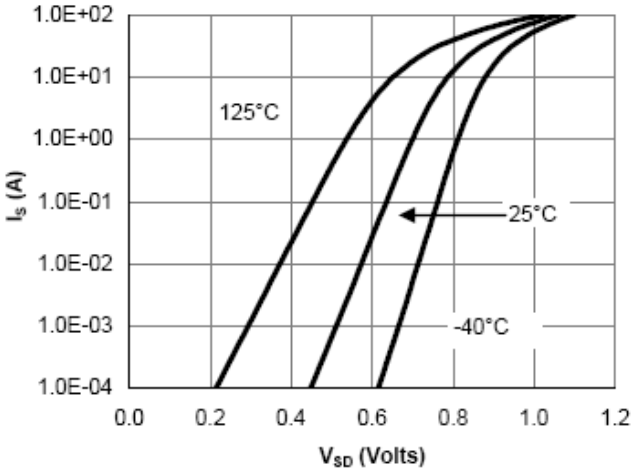


Figure 6: Body-Diode Characteristics

Typical Performance Characteristics (contd.)

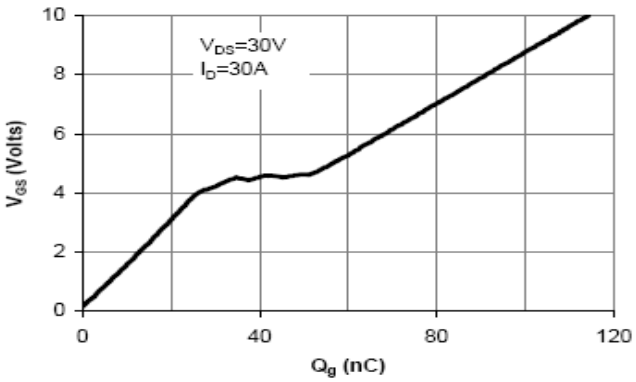


Figure 7: Gate-Charge Characteristics

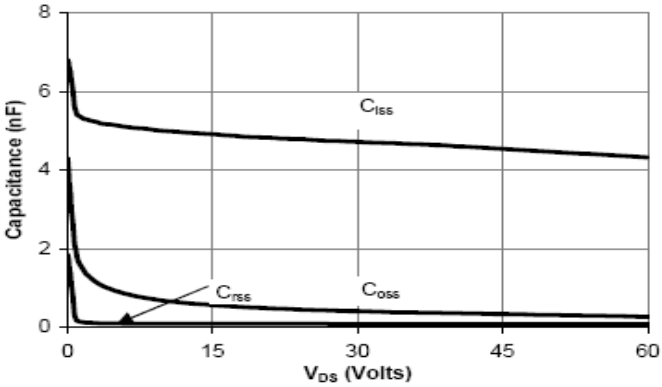


Figure 8: Capacitance Characteristics

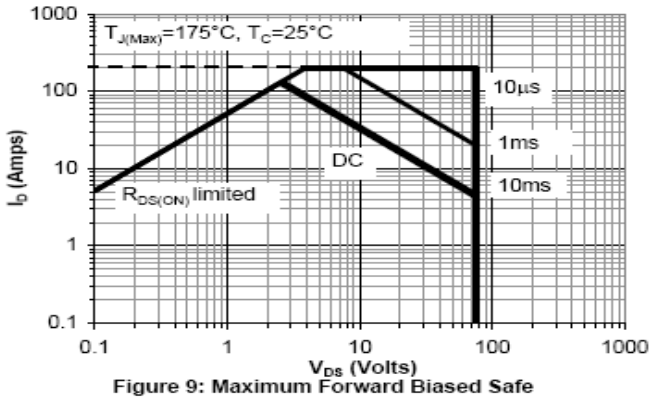


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

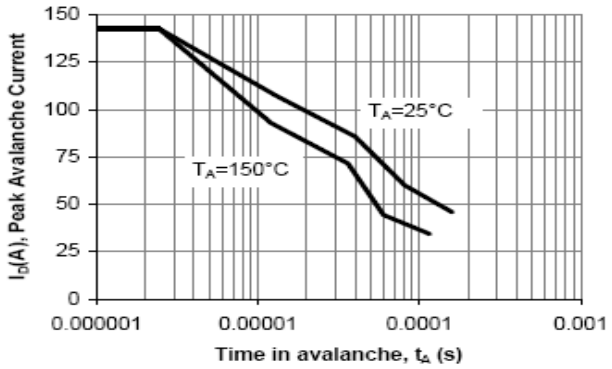


Figure 10: Single Pulse Avalanche capability

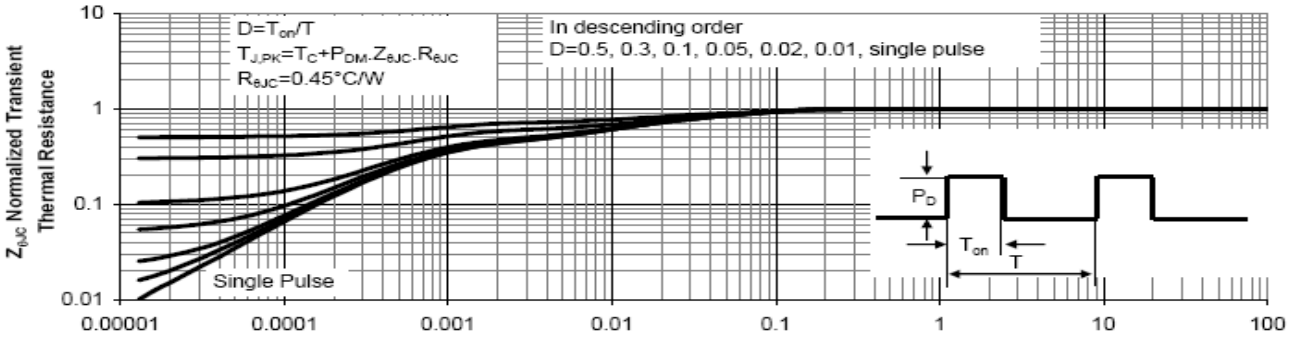


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

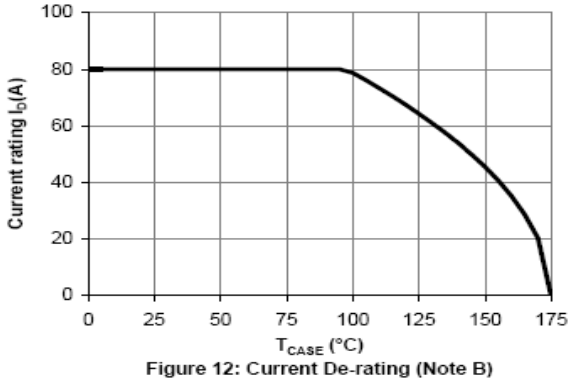


Figure 12: Current De-rating (Note B)

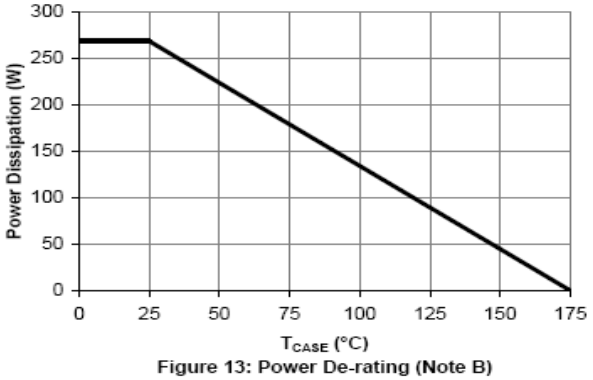
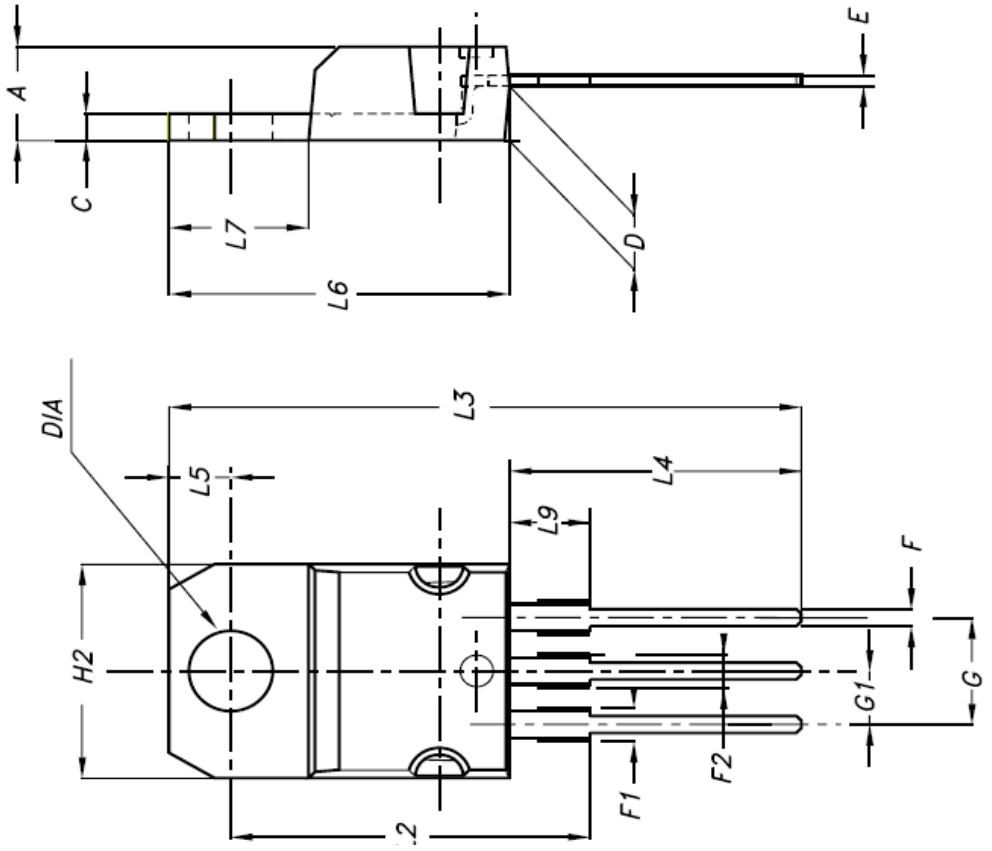


Figure 13: Power De-rating (Note B)

Package Dimensions

TO-220



DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.40		2.70	0.094		0.106
H2	10		10.40	0.393		0.409
L2		16.40			0.645	
L3		28.90			1.137	
L4	13		14	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.260
L9	3.50		3.93	0.137		0.154
DIA	3.75		3.85	0.147		0.151

Ordering Information

Device	Operating T_j	PKG Type	Wrap	Order Number
PS75N75A	-55C° ≤175C°	TO-220	BULK	PS75N75A-T3-BL

Note: Lead Free and RoHS compliant.