

# N-Channel Enhancement Mode Field Effect Transistor

## - 90Amp 80Volt

### Application

- Servomotor control
- Power MOSFET gate drivers
- Other switching applications

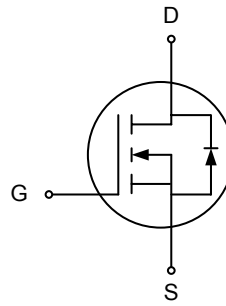
### Feature

- Small surface mounting type
- High density cell design for low  $R_{DS(ON)}$
- Suitable for high packing density
- Rugged and reliable
- High saturation current capability
- Voltage controlled small signal switch

### Construction

- N-Channel Enhancement

### Circuit



### Absolute Maximum Ratings

PARAMETER	SYMBOL	PS90N80	UNIT
Drain-Source Voltage	$V_{DS}$	>80	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous @ $T_A = 125^\circ\text{C}$ (Note 1)	$I_D$	90	A
-Pulsed (Note 2)	$I_{DM}$	300	
Drain-Source Diode Forward Current	$I_S$	60	A
Maximum Power Dissipation	$P_D$	220	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ\text{C/W}$

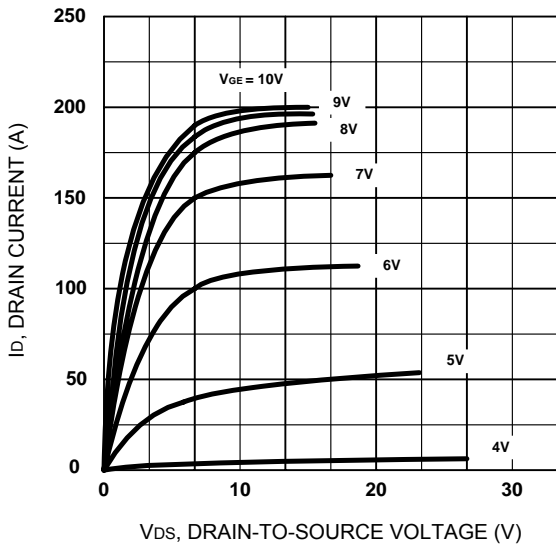
Note: 1.Surface Mounted on FR-4 Board,  $t \leq 2\%$

2.Pulse Test : 380 $\mu\text{s}$  pulse width, 2% duty cycle

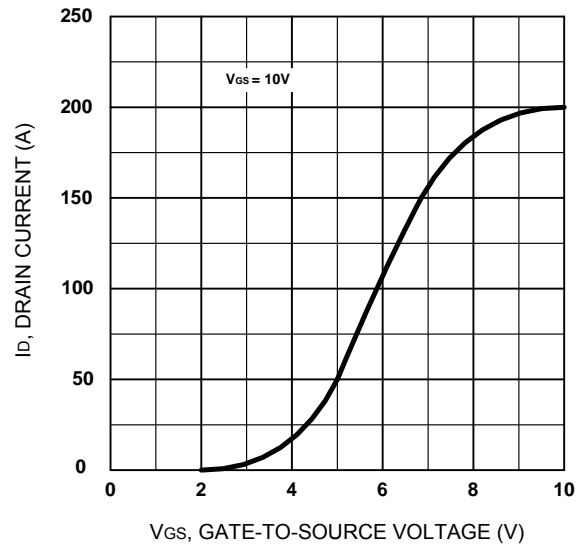
June 2009 / Rev.6.4

**Electrical Characteristics**

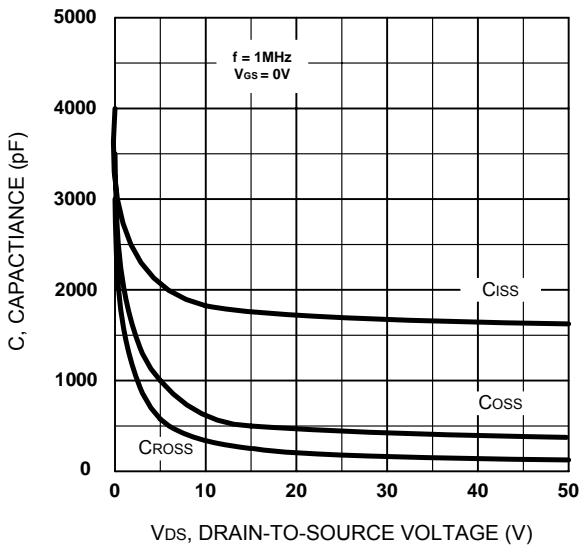
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BVDSS	VGS = 0V, ID = -250µA	75	-	-	V
Zero Gate Voltage Drain Current	IDSS	VDS = 20V, VGS = 0V	-	-	20	µA
Gate-Body Leakage	IGSS	VGS = ±16V, VDS = 0V	-	-	±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	VGS(th)	VDS = VGS, ID = -250µA	2	-	4	V
Static Drain-Source On-Resistance	RDS(ON)	VGS = 10V, ID = 40A	-	7.5	11	mΩ
Forward Transconductance	gFS	VDS = 25V, ID = 30A	-	50	-	S
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	Qg	VDS = 60V, ID = 48A VGS = 10V, RGEN = 4.7Ω	-	90	140	nC
Gate-Source Charge	Qgs		-	20	35	
Gate-Drain Charge	Qgd		-	30	45	
Turn-On Delay Time	TD(on)	VDD = 38V, ID = 48A VGEN = 10V, RL = 10Ω RGEN = 4.7Ω	-	12	-	nS
Rise Time	tr		-	79	-	
Turn-Off Delay Times	TD(off)		-	80	-	nS
Fall Time	tf		-	52	-	
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	Ciss	VDS = 25V, VGS = 0V f = 1.0MHz	-	3300	-	pF
Output Capacitance	Coss		-	530	-	
Reverse Transfer Capacitance	Crss		-	80	-	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage	VSD	VGS = 0V, IS = 60A	-	1.5	-	V



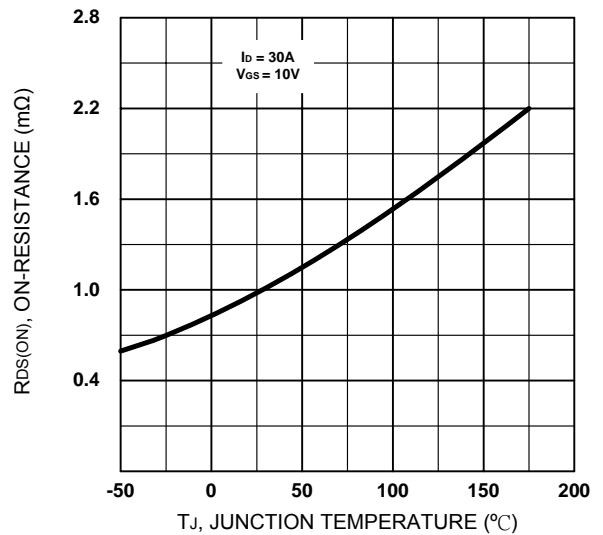
**Figure 1. Output Characteristics**



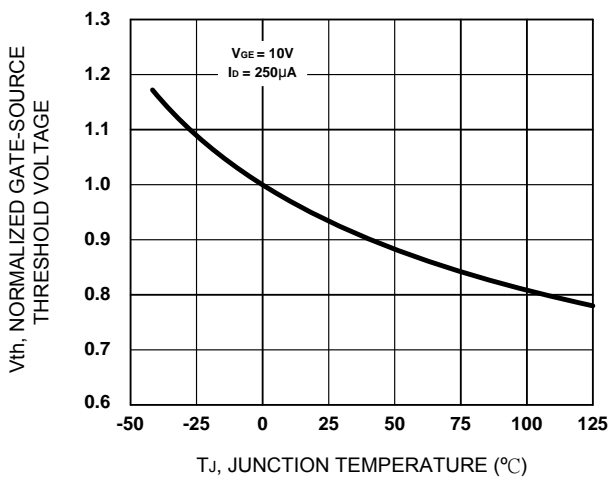
**Figure 2. Transfer Characteristics**



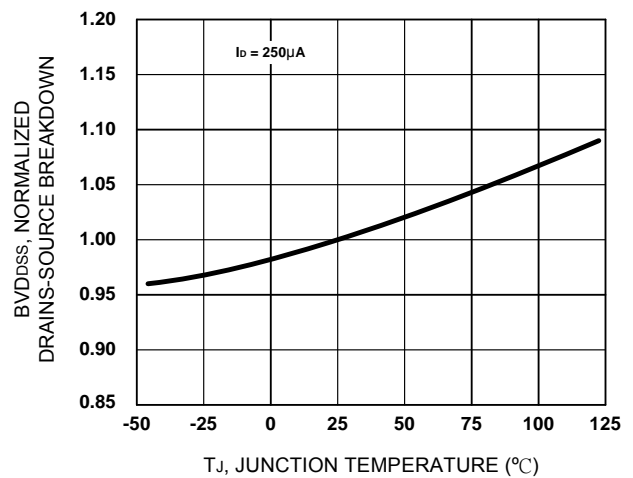
**Figure 3. Capacitance Characteristics**



**Figure 4. On-Resistance Variation with temperature**



**Figure 5. Gate Threshold Variation with Temperature**



**Figure 6. Breakdown Voltage Variation with Temperature**

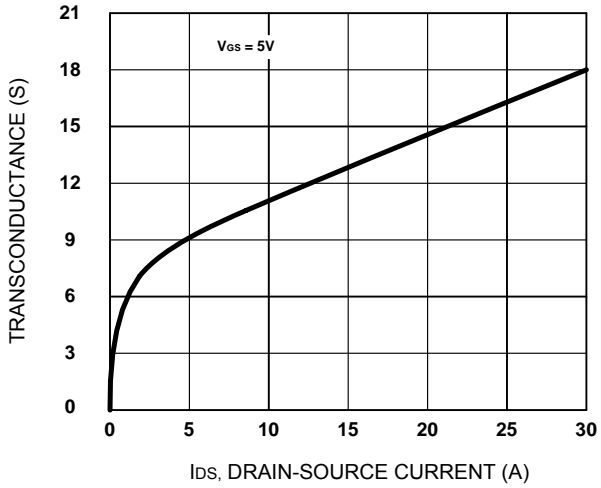


Figure 7. Transconductance Variation with Drain Current

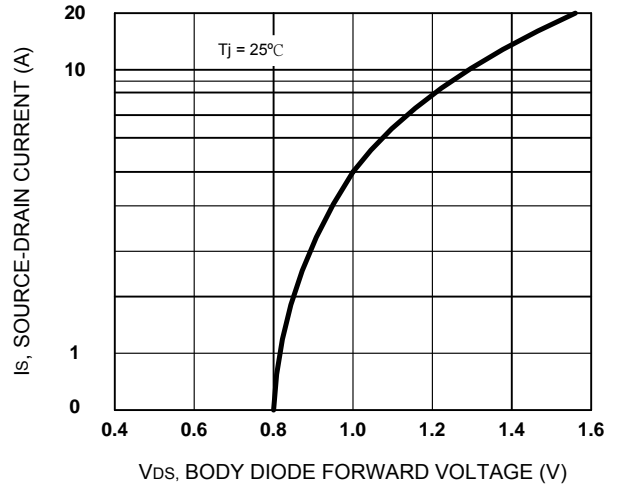


Figure 8. Body Diode Forward Voltage Variation with Source Current

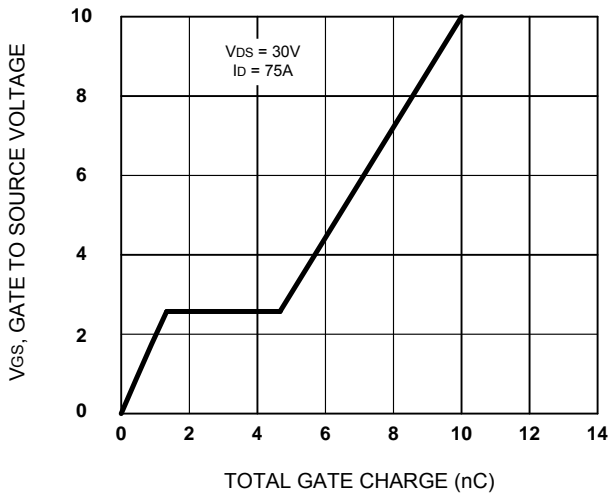
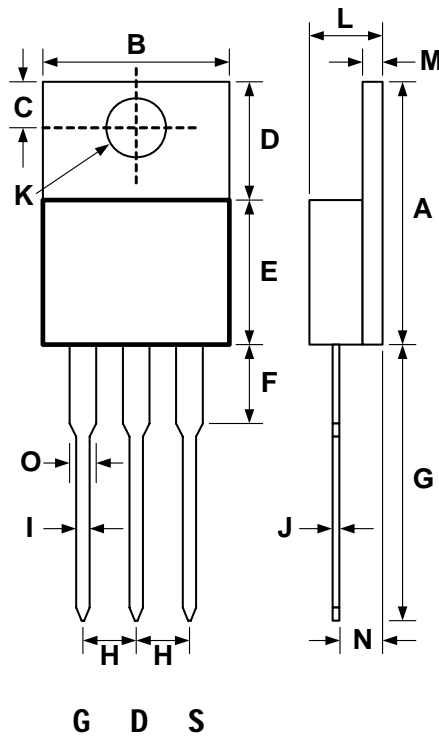


Figure 9. Gate Charge

**TO-220AB PACKAGE**



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.579	.606	14.70	15.40	
B	.392	.411	9.95	10.45	
C	.104	.116	2.65	2.95	
D	.248	.272	6.30	6.90	
E	.325	.350	8.25	8.90	
F	.126	.157	3.20	4.00	
G	.492	.551	12.50	14.00	
H	.096	.108	2.45	2.75	
I	.028	.039	0.70	1.00	
J	.010	.022	0.25	0.55	
K	.146	.157	3.70	4.00	
L	.167	.187	4.25	4.75	
M	.045	.057	1.15	1.45	
N	.089	.114	2.25	2.90	
O	.047	.055	1.20	1.40	



Sirectifier Global Corp., Delaware, U.S.A.

U.S.A.: [sgc@sirectsemi.com](mailto:sgc@sirectsemi.com) France: [ss@sirectsemi.com](mailto:ss@sirectsemi.com) Taiwan: [se@sirectsemi.com](mailto:se@sirectsemi.com) Hong Kong: [hk@sirectsemi.com](mailto:hk@sirectsemi.com)  
 China: [st@sirectsemi.com](mailto:st@sirectsemi.com) Thailand: [th@sirectsemi.com](mailto:th@sirectsemi.com) Philippines: [aiac@sirectsemi.com](mailto:aiac@sirectsemi.com) Belize: [belize@sirectsemi.com](mailto:belize@sirectsemi.com)