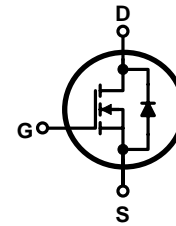
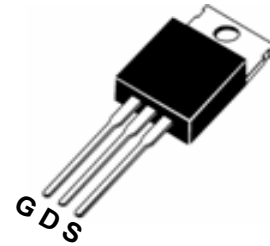




PIN Connection TO-220



Marking Diagram



- Y = Year
- A = Assembly Location
- WW = Work Week
- FIR80N075P = Specific Device Code

Product Summary

BV _{DSS}	typ.	84	V
R _{DS(ON)}	typ.	6.5	mΩ
	max.	8.0	mΩ
I _D		80	A

General Description

The FIR80N075PG uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

Features

- V_{DS}=75V; I_D=80A@ V_{GS}=10V; R_{DS(ON)}<8mΩ @ V_{GS}=10V
- Special process technology for high ESD capability
- Special designed for Convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FIR80N075P	FIR80N075PG	TO-220	-	-	-

Absolute Maximum Ratings (TA=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V _{GS} =0V)	V _{DS}	75	V
Gate-Source Voltage (V _{DS} =0V)	V _{GS}	±25	V
Drain Current (DC) at Tc=25°C	I _{D (DC)}	80	A
Drain Current (DC) at Tc=100°C	I _{D (DC)}	60	A
Drain Current-Continuous@ Current-Pulsed (Note 1)	I _{DM (pluse)}	320	A
Peak diode recovery voltage	dv/dt	30	V/ns
Maximum Power Dissipation(Tc=25°C)	P _D	170	W
Derating factor		1.13	W/°C
Single pulse avalanche energy (Note 2)	E _{AS}	580	mJ
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 175	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.EAS condition: T_J=25°C, V_{BD}=50V, V_G=10V, L=0.3mH, I_D=62A;



Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (Maximum)	R_{thJC}	0.88	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient (Maximum)	R_{thJA}	63	$^{\circ}C/W$

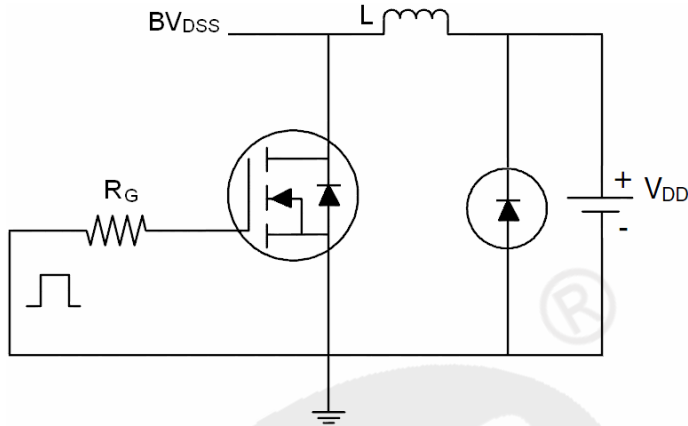
Electrical Characteristics (TA=25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	75	84		V
Zero Gate Voltage Drain Current(Tc=25°C)	I_{DSS}	$V_{DS}=75V, V_{GS}=0V$			1	μA
Zero Gate Voltage Drain Current(Tc=125°C)	I_{DSS}	$V_{DS}=75V, V_{GS}=0V$			10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.85	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=40A$		6.5	8	m Ω
Dynamic Characteristics						
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=30A$		66		S
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$		4400		PF
Output Capacitance	C_{oss}			340		PF
Reverse Transfer Capacitance	C_{riss}			260		PF
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$		100		nC
Gate-Source Charge	Q_{gs}			20		nC
Gate-Drain Charge	Q_{gd}			30		nC
Switching times						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$		17.8		nS
Turn-on Rise Time	t_r			11.8		nS
Turn-Off Delay Time	$t_{d(off)}$			56		nS
Turn-Off Fall Time	t_f			14.6		nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I_{SD}				80	A
Pulsed Source-drain current(Body Diode)	I_{SDM}				320	A
Forward on voltage ^(Note 1)	V_{SD}	$T_j=25^{\circ}C, I_{SD}=40A, V_{GS}=0V$			1.2	V
Reverse Recovery Time ^(Note 1)	t_{rr}	$T_j=25^{\circ}C, I_F=75A, di/dt=100A/\mu s$			36	nS
Reverse Recovery Charge ^(Note 1)	Q_{rr}				56	nC
Forward Turn-on Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

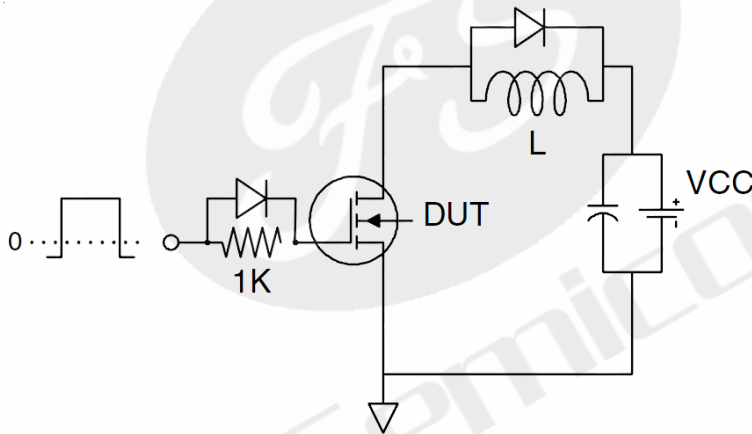
Notes 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$, $R_G=25\Omega$, Starting $T_j=25^{\circ}C$

Test circuit

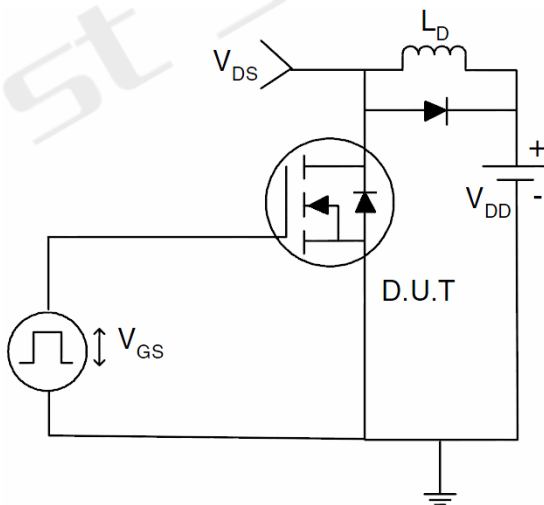
1) E_{AS} test circuits



2) Gate charge test circuit:



3) Switch Time Test Circuit:





Typical Electrical And Thermal Characteristics(Curves)

Figure1. Safe operating area

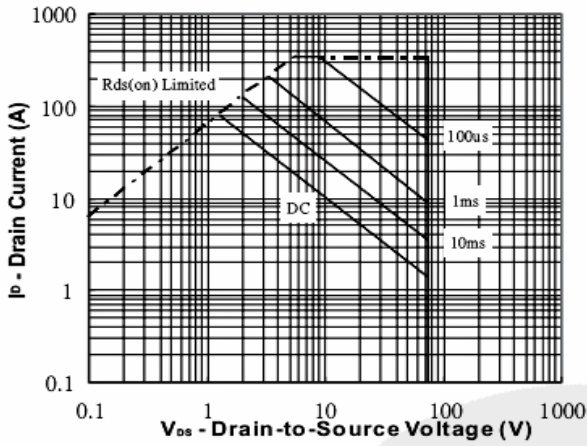


Figure2. Source-Drain Diode Forward Voltage

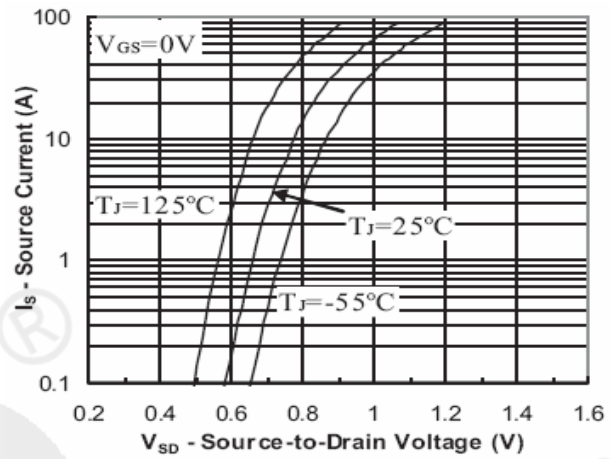


Figure3. Output characteristics

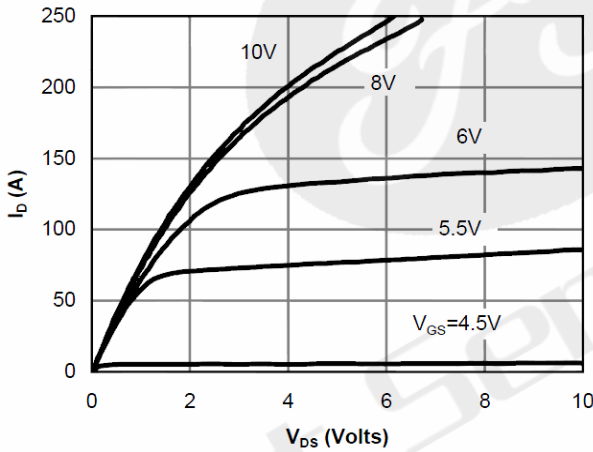


Figure4. Transfer characteristics

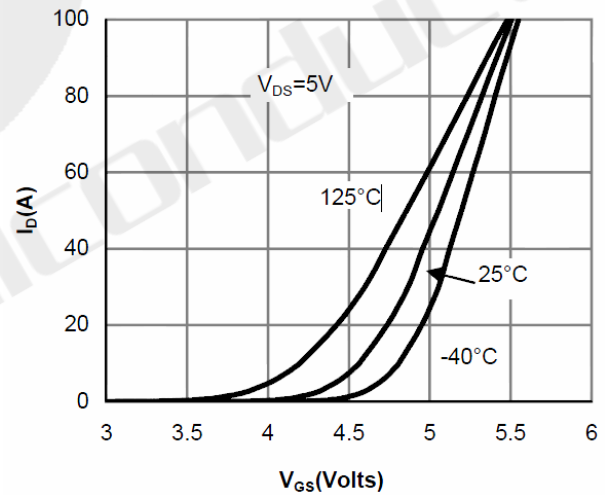


Figure5. Static drain-source on resistance

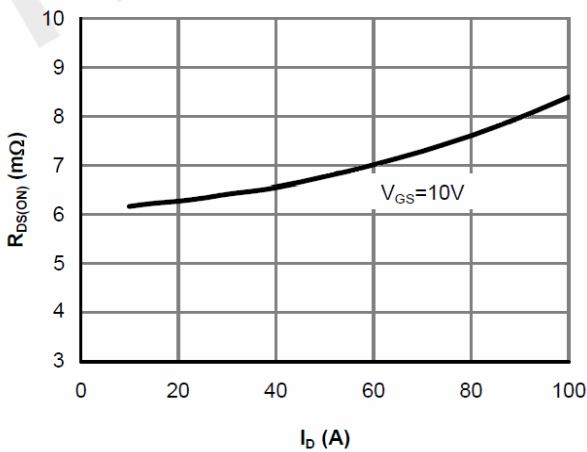


Figure6. $R_{DS(ON)}$ vs Junction Temperature

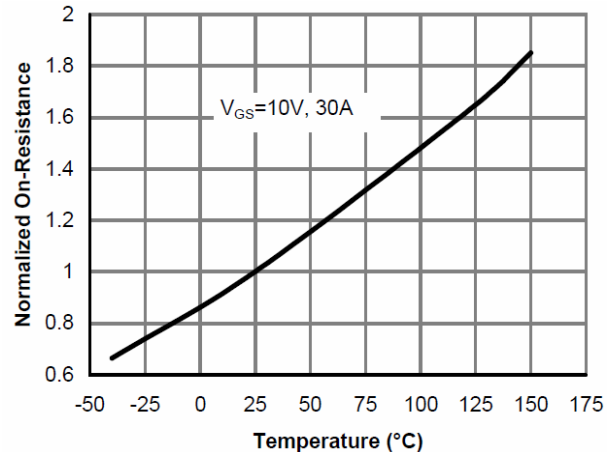


Figure7. BV_{DSS} vs Junction Temperature

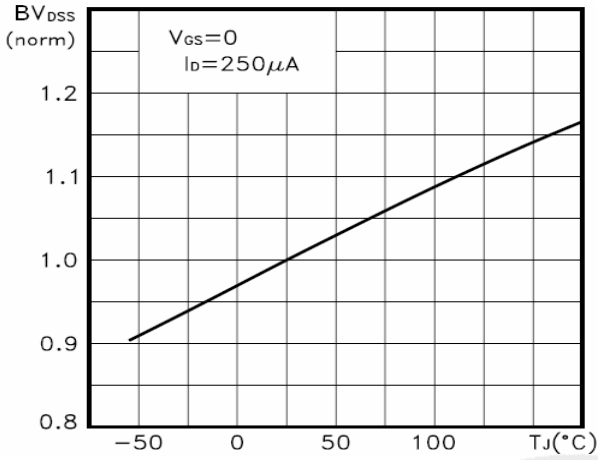


Figure8. $V_{GS(th)}$ vs Junction Temperature

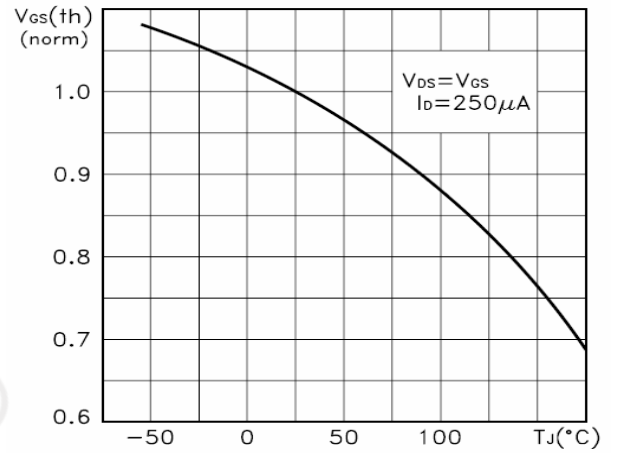


Figure9. Gate charge waveforms

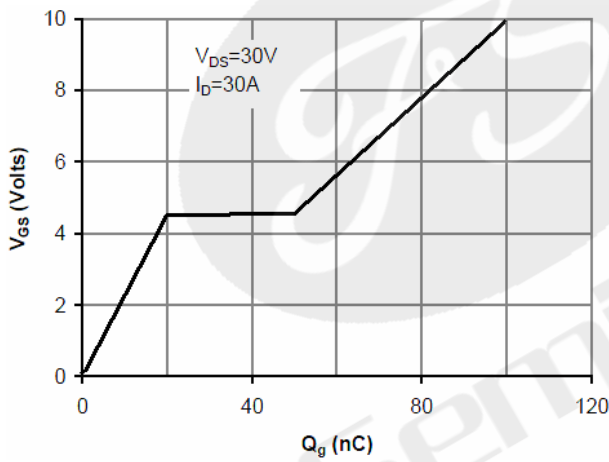
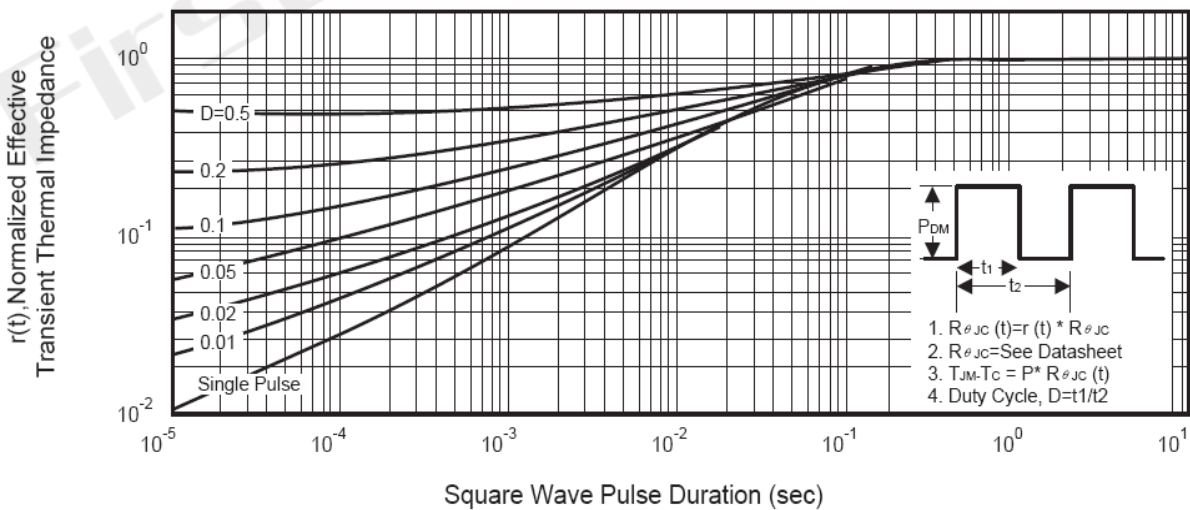
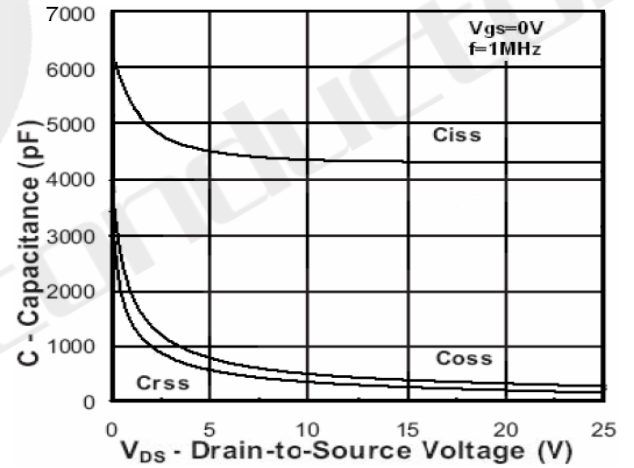
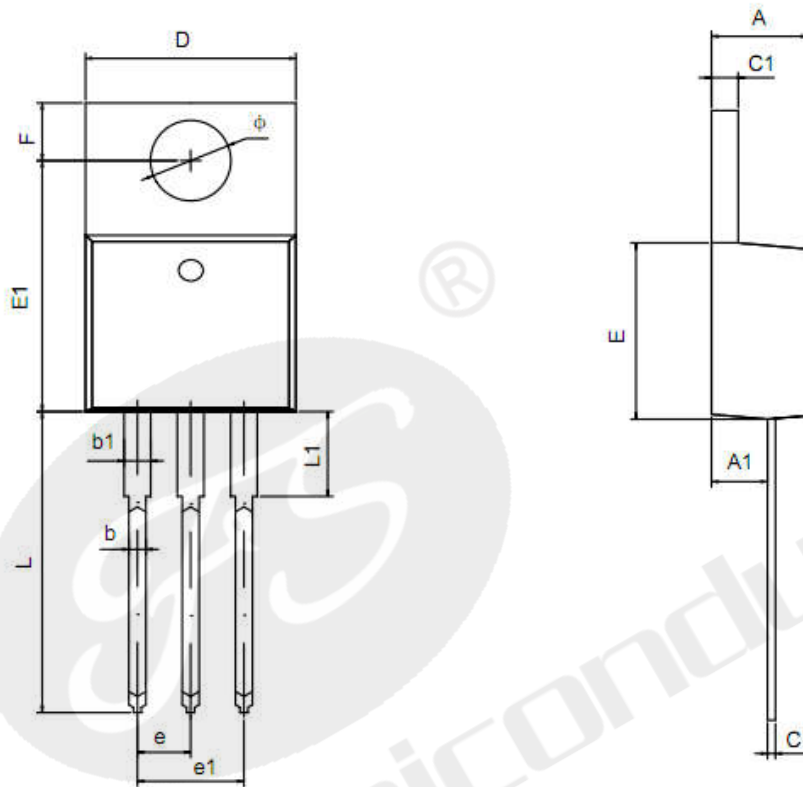


Figure10. Capacitance



Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.42	4.72	0.174	0.188
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.36	0.46	0.014	0.018
c1	1.17	1.37	0.046	0.054
D	9.95	10.25	0.392	0.404
E	8.8	9.1	0.346	0.358
E1	12.55	12.85	0.494	0.506
e	2.540TYP		0.100TYP	
e1	4.98	5.18	0.196	0.204
F	2.59	2.89	0.102	0.114
L	13.08	13.48	0.515	0.531
L1	3.4	3.6	0.134	0.142
Φ	3.8	3.95	0.15	0.156



Declaration

- FIRST reserves the right to change the specifications, the same specifications of products due to different packaging line mold, the size of the appearance will be slightly different, shipped in kind, without notice! Customers should obtain the latest version information before ordering, and verify whether the relevant information is complete and up-to-date.
- Any semiconductor product under certain conditions has the possibility of failure or failure, The buyer has the responsibility to comply with safety standards and take safety measures when using FIRST products for system design and manufacturing, To avoid To avoid potential failure risks, which may cause personal injury or property damage!
- Product promotion endless, our company will wholeheartedly provide customers with better products!

ATTACHMENT

Revision History

Date	REV	Description	Page
2018.01.01	1.0	Initial release	