

MT82P70N5

P-Channel Enhancement Mode Field Effect Transistor

Product Summary

- $V_{DS} = -20V$
- $I_D = -75A @ V_{GS} = -10V$
- $R_{DS(ON)} = 2.1m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} = 2.8m\Omega @ V_{GS} = -2.5V$

Features

- Advanced Trench Process Technology.
- High Density Cell Design for Ultra Low On-Resistance.
- Lead free product is acquired.
- RoHS Compliant.
- PDFN5x6-8L Package

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 10	V
Drain Current-Continuous	I_D	-75	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D (100^\circ C)$	-58.5	A
Pulsed Drain Current	I_{DM}	-225	A
Maximum Power Dissipation	P_D	130	W
Derating factor		0.64	W/ $^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MT82P70N5	MT82P70N5	DFN 5x6 -8L	-	-	-

Thermal Characteristic

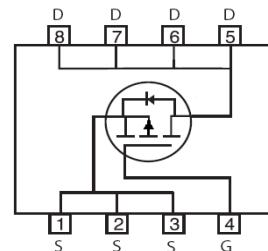
Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.6	$^\circ C/W$
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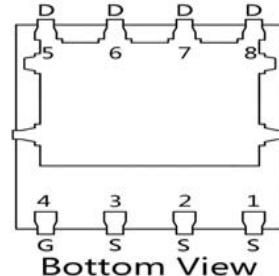
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Bottom View

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=-250\mu\text{A}$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=-20\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 10\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=-250\mu\text{A}$	-0.4	-0.6	-1.0	V
Drain-Source On-State Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=-4.5\text{V}, I_{\text{D}}=-20\text{A}$	-	2.1	-	$\text{m}\Omega$
		$V_{\text{GS}}=-2.5\text{V}, I_{\text{D}}=-20\text{A}$	-	2.8	-	
		$V_{\text{GS}}=-1.8\text{V}, I_{\text{D}}=-20\text{A}$		3.8	-	
Forward Transconductance	g_{FS}	$V_{\text{DS}}=-5\text{V}, I_{\text{D}}=-20\text{A}$	100	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{\text{DS}}=-10\text{V}, V_{\text{GS}}=0\text{V}, F=1.0\text{MHz}$	-	4950	-	PF
Output Capacitance	C_{oss}		-	380	-	PF
Reverse Transfer Capacitance	C_{rss}		-	290	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=-10\text{V}, R_{\text{GEN}}=3\Omega$ $V_{\text{GS}}=-4.5\text{V}, R_{\text{L}}=0.5\Omega$	-	20	-	nS
Turn-on Rise Time	t_r		-	50	-	nS
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	100	-	nS
Turn-Off Fall Time	t_f		-	40	-	nS
Total Gate Charge	Q_g	$V_{\text{DS}}=-10\text{V}, I_{\text{D}}=-20\text{A}, V_{\text{GS}}=-4.5\text{V}$	-	100	-	nC
Gate-Source Charge	Q_{gs}		-	21	-	nC
Gate-Drain Charge	Q_{gd}		-	32	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=-20\text{A}$	-	-	-1.2	V
Diode Forward Current ^(Note 2)	I_{S}		-	-	-70	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, IF = -10\text{A}$ $dI/dt = 100\text{A}/\mu\text{s}$ ^(Note 3)	-	48	-	nS
Reverse Recovery Charge	Q_{rr}		-	55	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics (Curves)

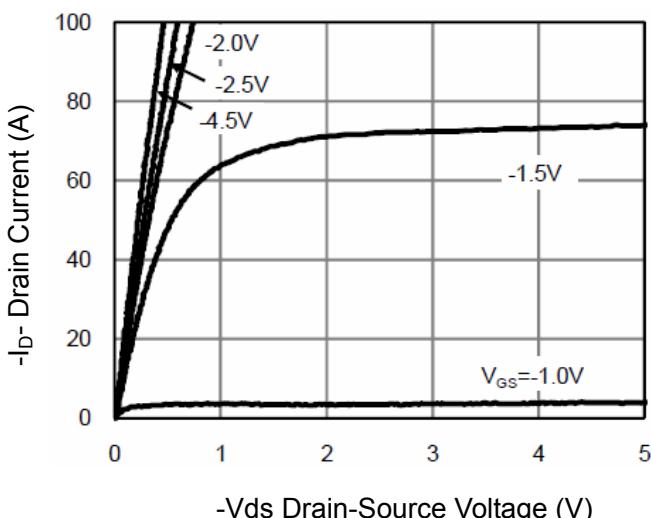


Figure 1 Output Characteristics

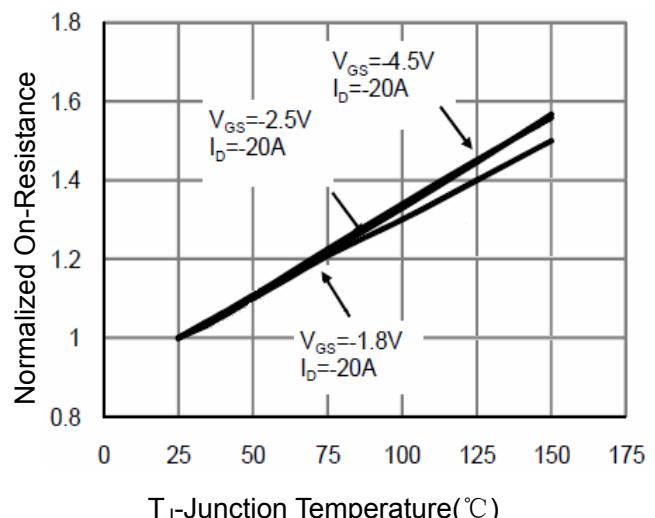


Figure 4 Rdson-Junction Temperature

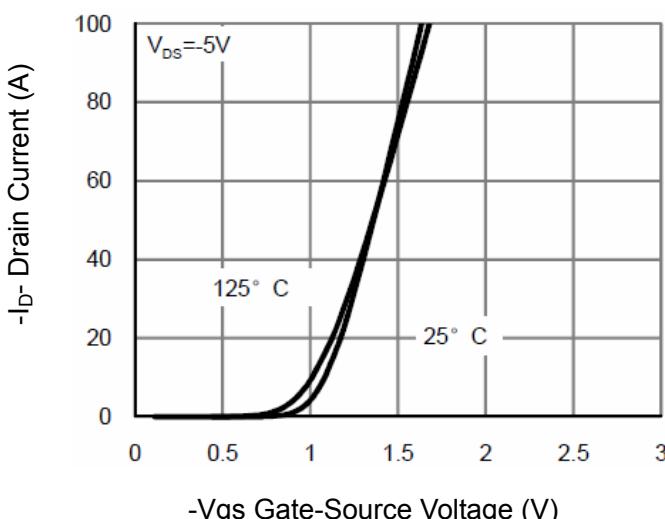


Figure 2 Transfer Characteristics

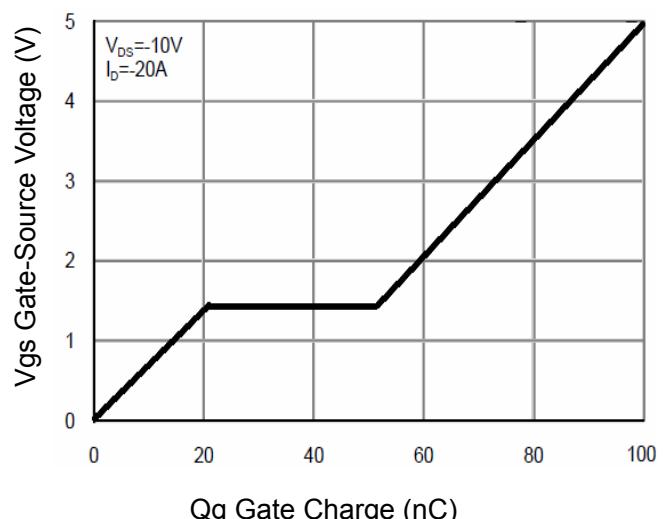


Figure 5 Gate Charge

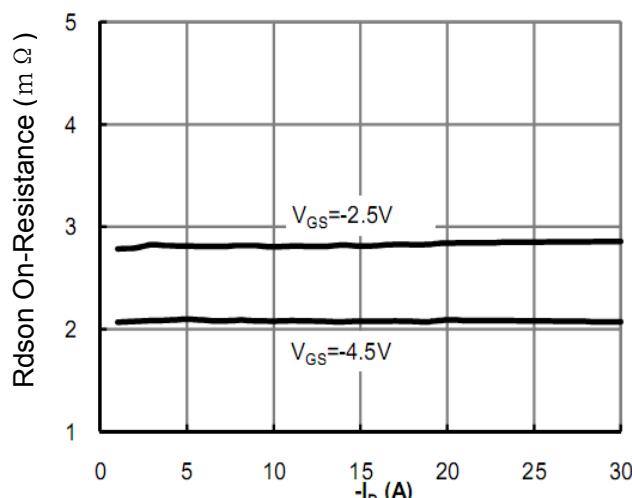


Figure 3 Rdson- Drain Current

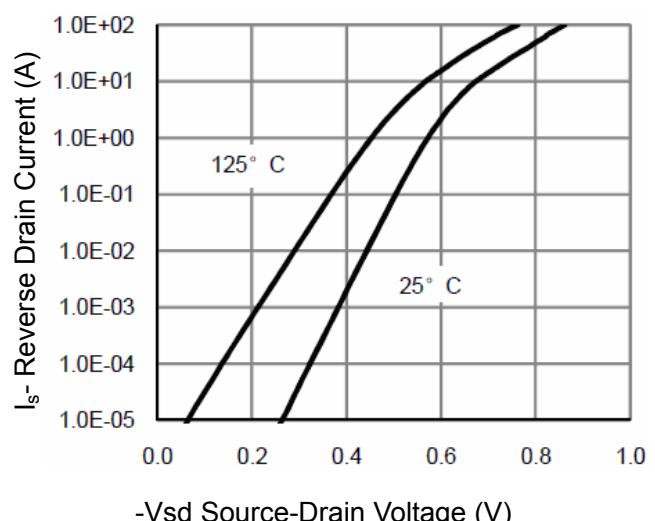
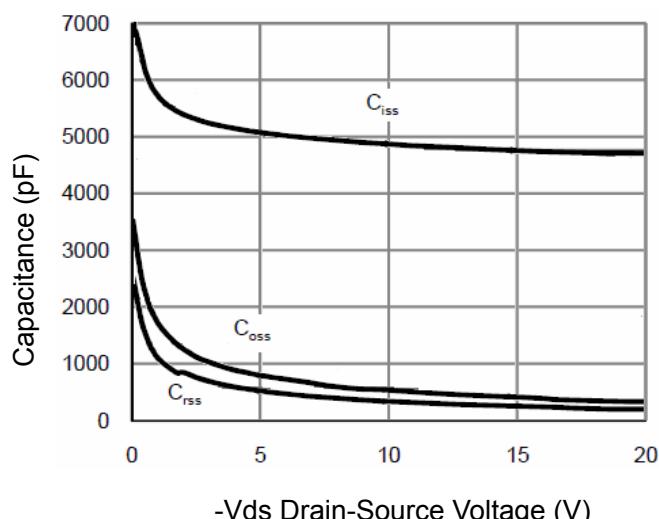
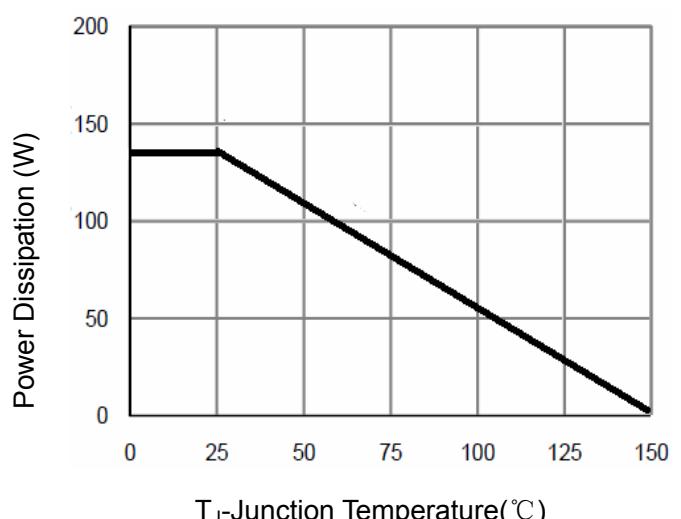
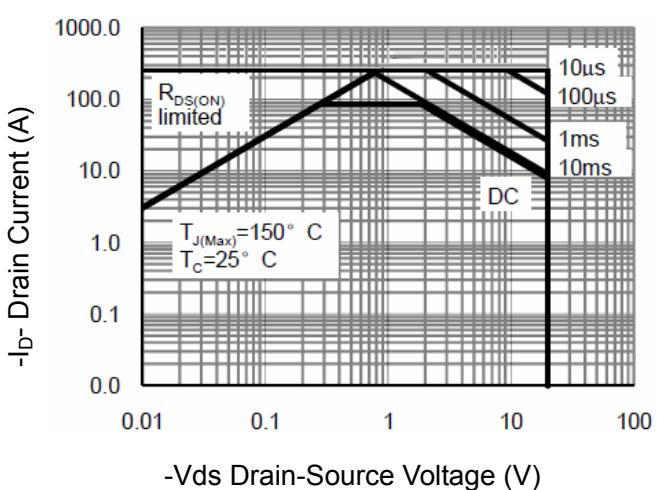
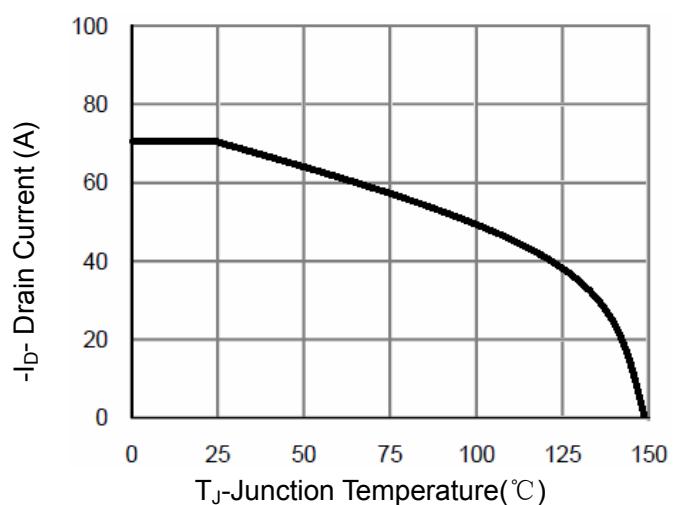
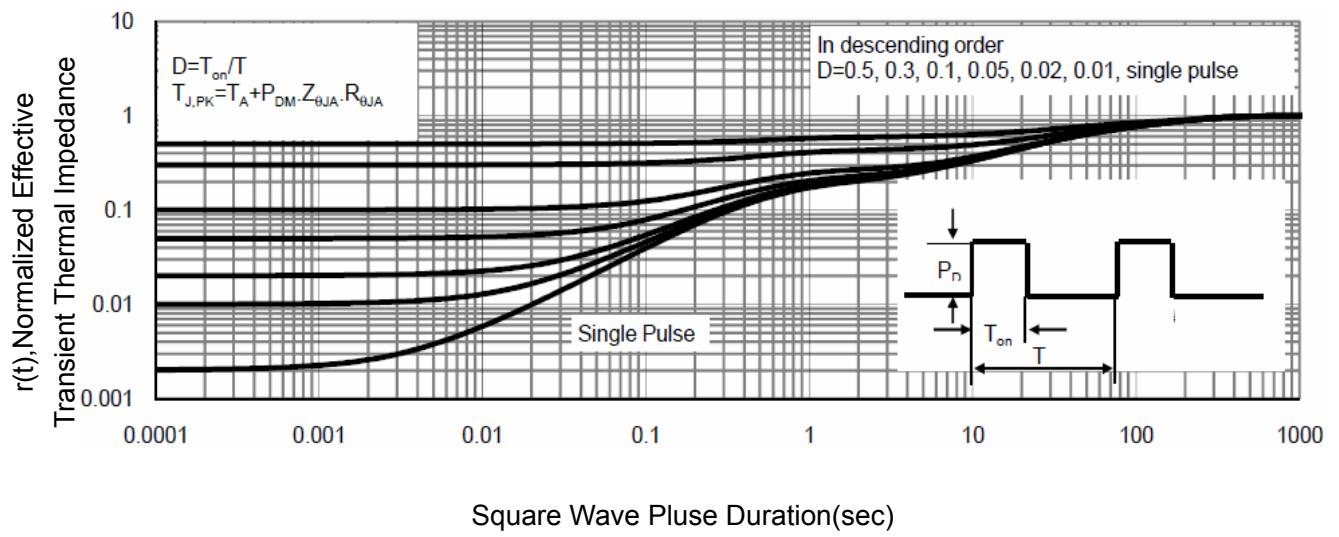
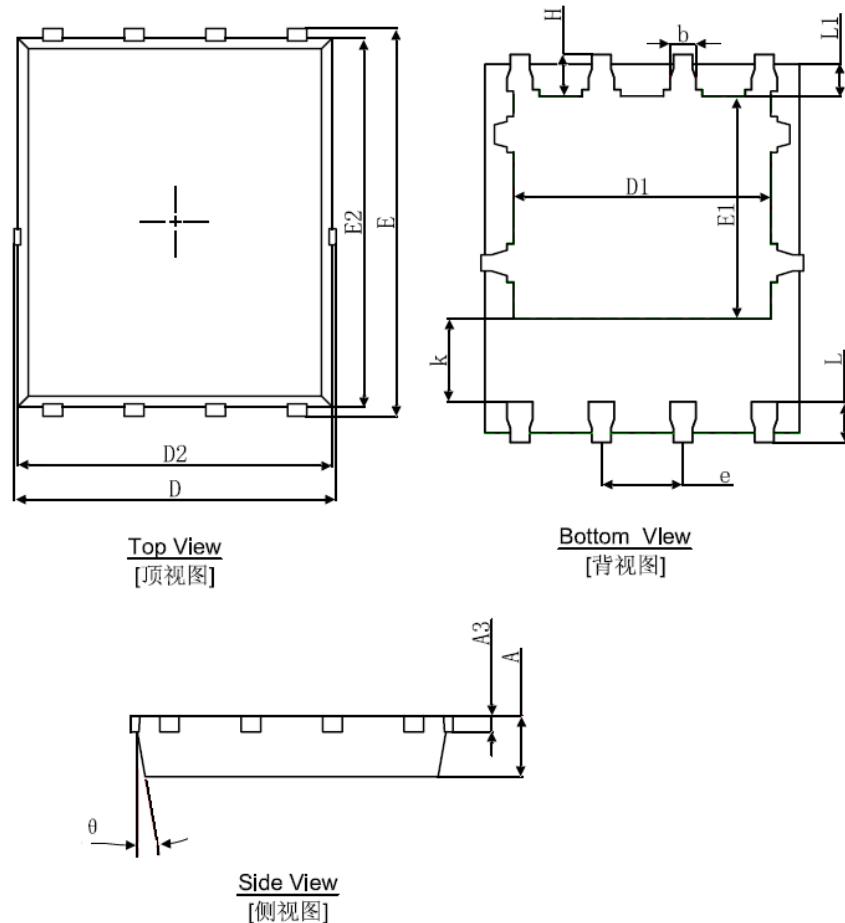


Figure 6 Source- Drain Diode Forward

**Figure 7 Capacitance vs Vds****Figure 9 Power De-rating****Figure 8 Safe Operation Area****Figure 10 -Current De-rating****Figure 11 Normalized Maximum Transient Thermal Impedance**

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
K	1.190	1.390	0.047	0.055
b	0.035	0.450	0.014	0.018
e	1.270(TYP.)		0.050(TYP.)	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°

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