

TM80P04NF

P-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

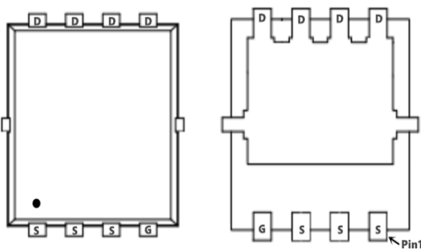
General Features

$V_{DS} = -40V$ $I_D = -80A$

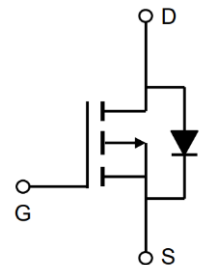
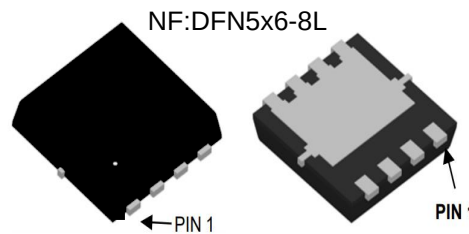
$R_{DS(ON)} = 4.3m\Omega (typ.) @ V_{GS} = -10V$

100% UIS Tested

100% R_g Tested



Marking: 80P04



Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit s
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-80	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^{1,6}$	-56	A
I_{DM}	Pulsed Drain Current ²	-320	A
EAS	Single Pulse Avalanche Energy ³	576	mJ
I_{AS}	Avalanche Current	-56	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	58	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹ ($t \leq 10S$)	---	20	$^\circ C/W$
	Thermal Resistance Junction-ambient ¹ (Steady State)	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case ¹	---	1.6	$^\circ C/W$

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

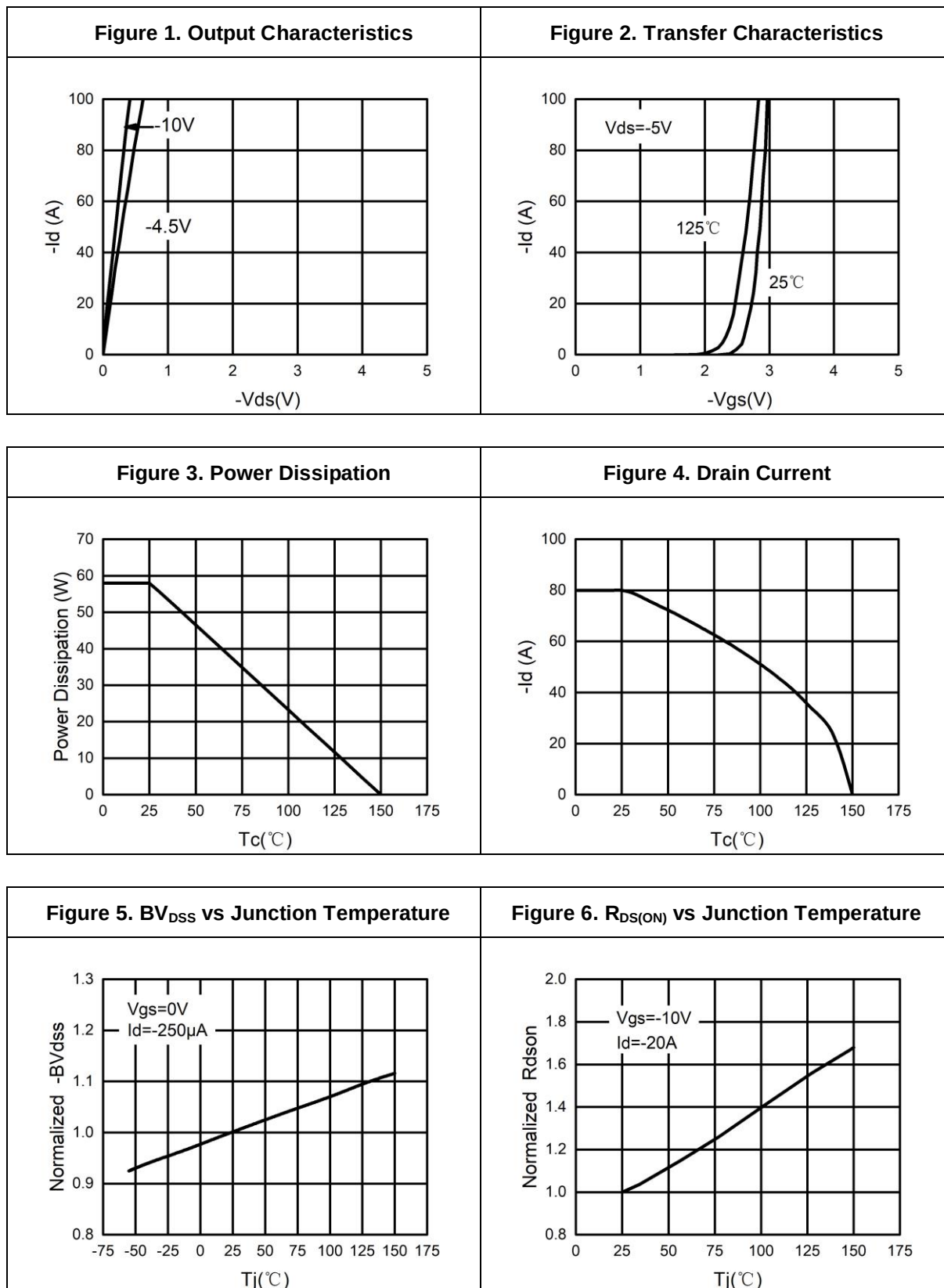
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-40V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.7	-2.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-20A		63		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-20A		4.3	5.3	mΩ
		V _{GS} =-4.5V, I _D =-20A		5.9	7.6	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1.0MHz		6638		pF
C _{oss}	Output Capacitance			545		pF
C _{rss}	Reverse Transfer Capacitance			345		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		2.2		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-20V, R _L =1Ω, R _{GEN} =3Ω		16		nS
t _r	Turn-on Rise Time			17		nS
t _{d(off)}	Turn-Off Delay Time			68		nS
t _f	Turn-Off Fall Time			31		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-20V, I _D =-20A		118		nC
Q _{gs}	Gate-Source Charge			13		nC
Q _{gd}	Gate-Drain Charge			22		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-80	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =-20A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-20A, di/dt=500A/μs		24		ns
Q _{rr}	Reverse Recovery Charge	I _F =-20A, di/dt=500A/μs		140		nC

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

Notes 2. E_{AS} condition: $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=-10V, R_g=25\Omega, L=0.5mH$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)



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Figure 7. Gate Charge Waveforms

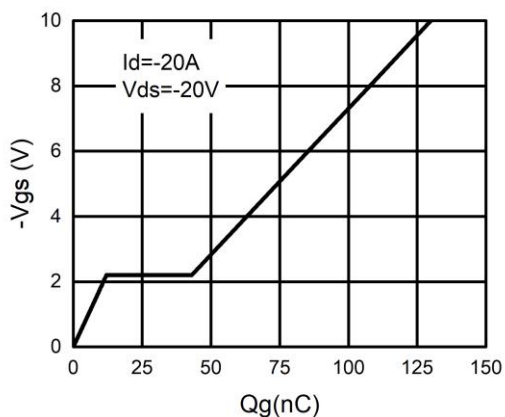


Figure 8. Capacitance

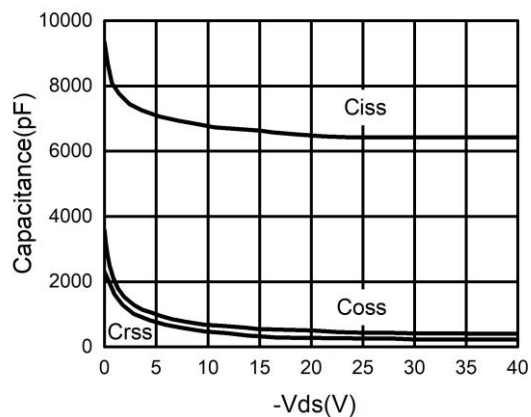


Figure 9. Body-Diode Characteristics

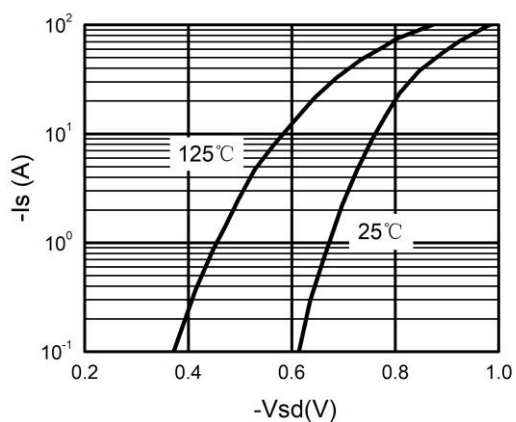
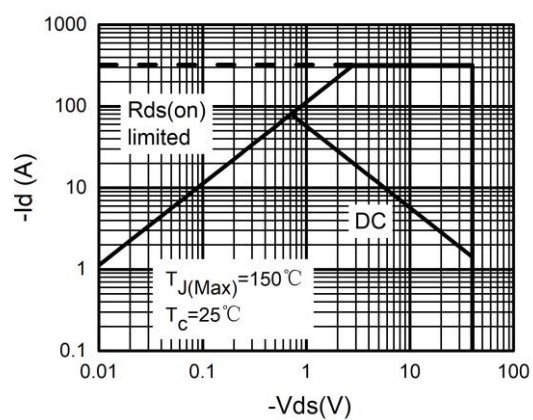


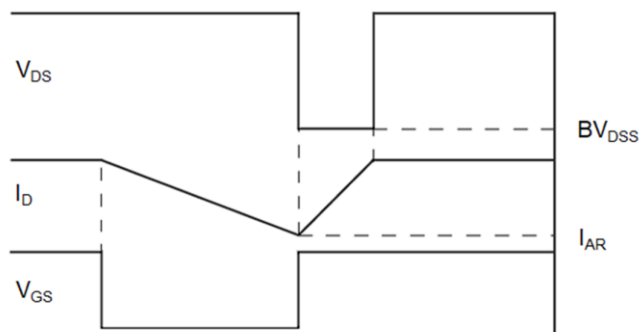
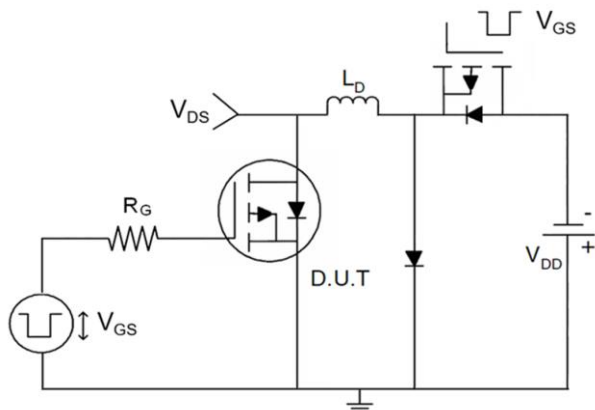
Figure 10. Maximum Safe Operating Area



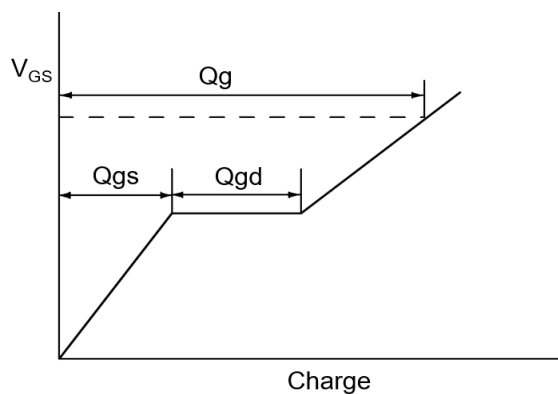
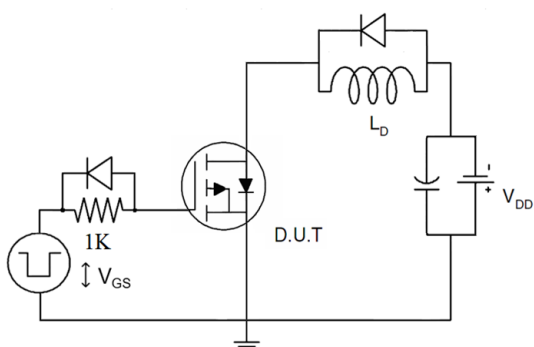
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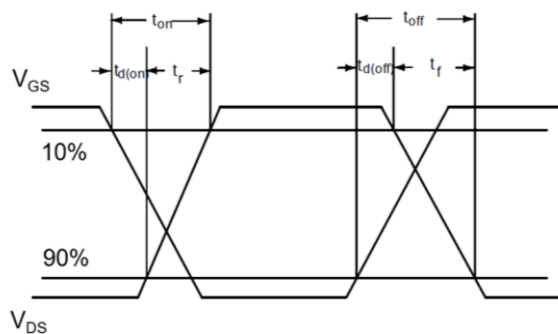
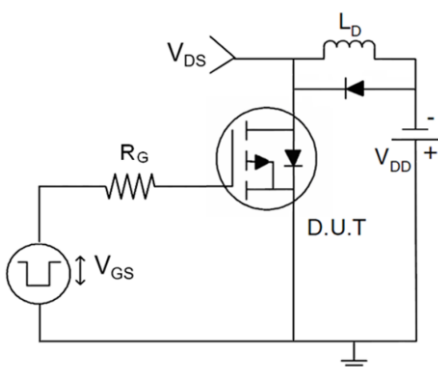
1) E_{AS} Test Circuits



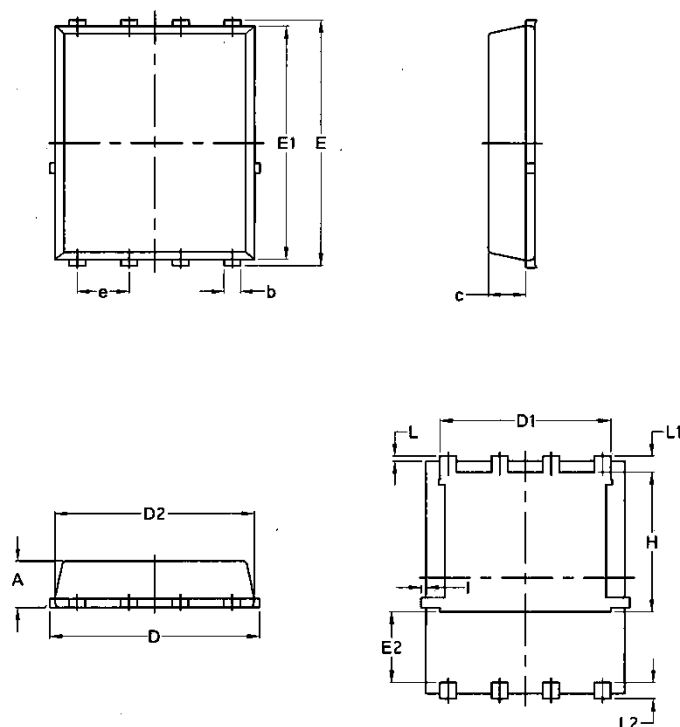
2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Package Mechanical Data: DFN5x6-8L



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070