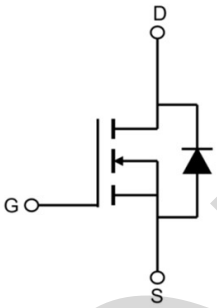
500V N-Channel Power MOSFET

MPR5N50D
TO-252



V_{DS}	500	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	1.55	Ω
I_D	5	A

Features

1、Advanced Planar Process
2、Package TO-252
3、Low Gate Charge Minimize Switching Loss

Applications

1、BLDC Motor Driver
2、Electric Welder
3、Hi gh Efficiency SMPS

Maximum ratings, at T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		500	V
V_{GS}	Gate-Source voltage		±30	V
I_S	Diode continuous forward current	T_C =25°C	5	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	5	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	15	A
E_{AS}	Avalanche energy, single pulsed ②		80	mJ
P_D	Maximum power dissipation		45	W
	Derating Factor above 25℃		0.36	W/°C
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	500	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=500V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=2.5A	--	1.55	--	Ω
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	528	--	pF
C_{oss}	Output Capacitance		--	4	--	pF
C_{rss}	Reverse Transfer Capacitance		--	52	--	pF
Q_g (10V)	Total Gate Charge	V_{DS}=400V,I_D=5A , V_{GS}=0 to 10V	--	13	--	nC
Q_{gs}	Gate-Source Charge		--	3	--	nC
Q_{gd}	Gate-Drain Charge		--	6.2	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=250V, I_D=5A, R_G=25Ω, Tj=25°C	--	14	--	ns
Tr	Turn-on Rise Time		--	15	--	ns
Td(off)	Turn-Off Delay Time		--	29	--	ns
Tf	Turn-Off Fall Time		--	12	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

I_{SD}	Continuous Source Current		--	--	5	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		--	--	15	A
VSD	Forward on voltage	I_{SD}=5A,V_{GS}=0V	--	--	1.5	V
Trr	Reverse Recovery Time	Is=5A , V_{GS}=0V di/dt=100A/μs	--	213	--	ns

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 10mH,V_{GS}=10V. Part not recommended for use above this value.

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 300μs; duty cycle≤ 1%.

Typical Characteristics

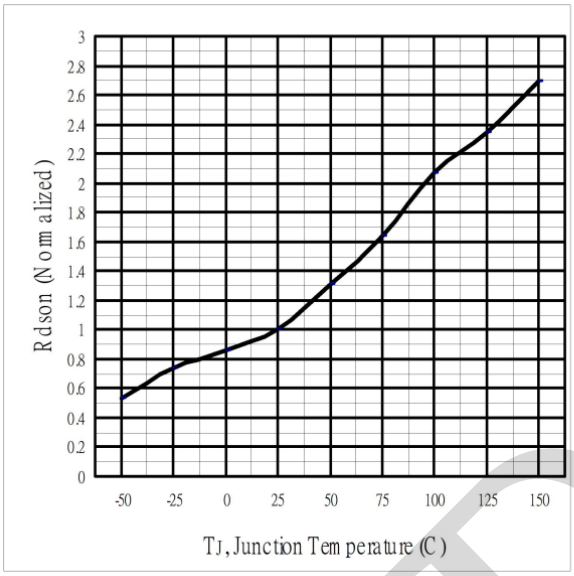


Fig 1. On-Resistance Variation with vs. Temperature

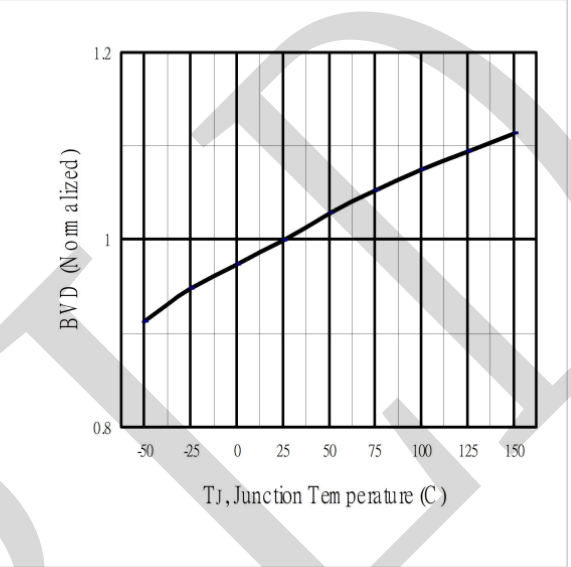


Fig 2. Breakdown Voltage Variation vs. Temperature

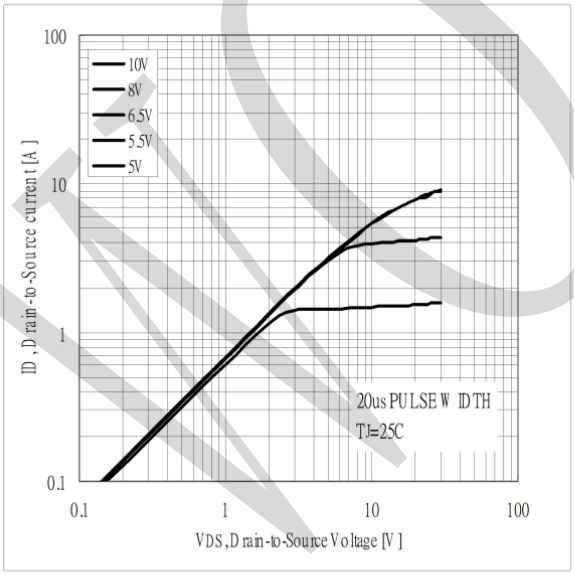


Fig 3. Typical Output Characteristics

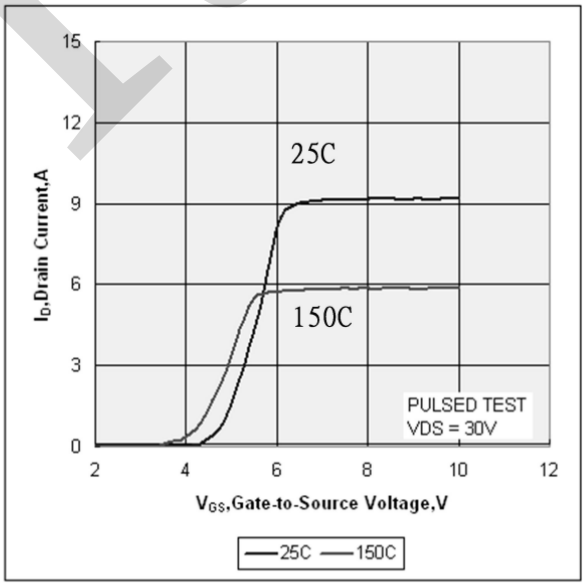


Fig 4. Typical Transfer Characteristics

Typical Characteristics

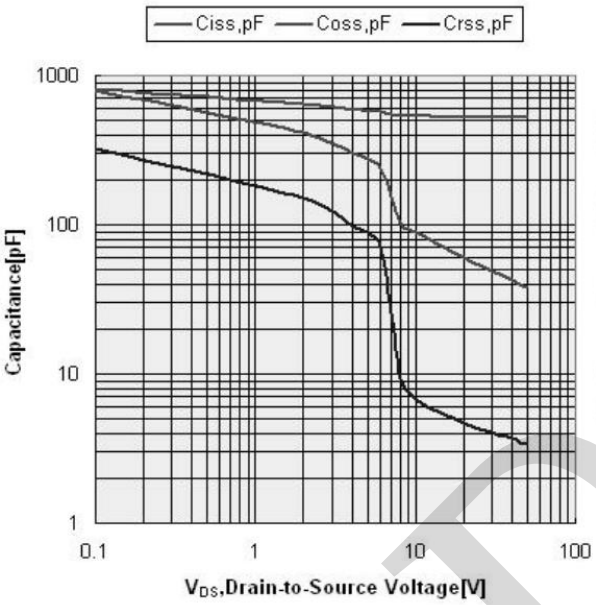


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

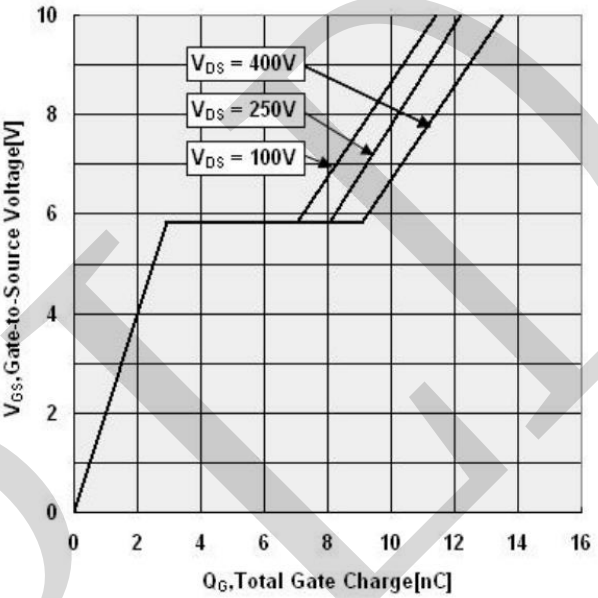
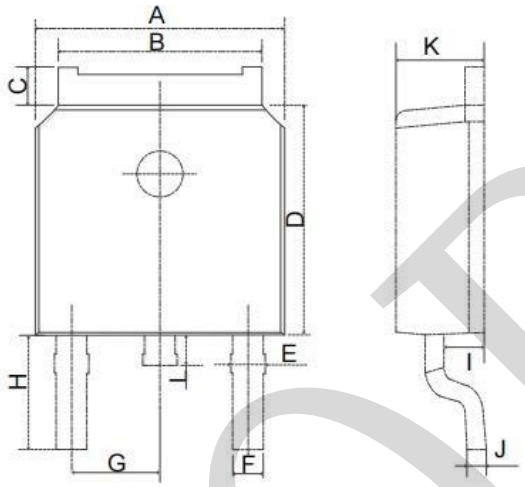


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-252



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00