

PFP140N10S

100V N-Channel MOSFET

FEATURES

- ❑ 100% EAS Test
- ❑ Super high density cell design
- ❑ Extremely Low Intrinsic Capacitances
- ❑ Remarkable Switching Characteristics
- ❑ Extended Safe Operating Area
- ❑ Lower $R_{DS(ON)}$: 10.0 mΩ (Typ.) @ $V_{GS}=10V$

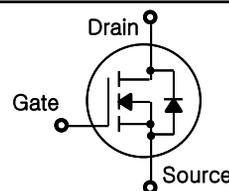
APPLICATION

- ❑ DC Motor control for E-bike & Power tools
- ❑ Amplifier and car booster
- ❑ Load Switch
- ❑ DC-DC converters

$BV_{DSS} = 100\text{ V}$

$R_{DS(on)} = 10\text{ m}\Omega$

$I_D = 105\text{ A}$



TO-220



1. Gate 2. Drain 3. Source

Absolute Maximum Ratings $T_J=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	100	V
V_{GSS}	Gate-Source Voltage	± 25	V
I_D	Continuous Drain Current ($T_C = 25^\circ\text{C}$)	105	A
	Continuous Drain Current ($T_C = 100^\circ\text{C}$)	74	A
I_{DM}	Pulsed Drain Current	419	A
E_{AS}	Single Pulsed Avalanche Energy	620	mJ
P_D	Maximum Power Dissipation ($T_C = 25^\circ\text{C}$)	250	W
	Maximum Power Dissipation ($T_C = 70^\circ\text{C}$)	175	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.6	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Electrical Characteristics $T_C=25\text{ }^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\ \text{V}, I_D = 40\ \text{A}$	--	10	12	m Ω

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\ \text{V}, I_D = 250\ \mu\text{A}$	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 100\ \text{V}, V_{GS} = 0\ \text{V}$	--	--	1	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 25\ \text{V}, V_{DS} = 0\ \text{V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -25\ \text{V}, V_{DS} = 0\ \text{V}$	--	--	-100	nA
V_{SD}	Diode Forward Voltage	$I_S = 40\ \text{A}, V_{GS} = 0\ \text{V}$	--	0.8	1.0	V

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS}=30\ \text{V}, V_{GS}=0\ \text{V}, f=1.0\ \text{MHz}$	--	3900	--	pF
C_{oss}	Output Capacitance		--	300	--	pF
C_{riss}	Reverse Transfer Capacitance		--	170	--	pF
R_g	Gate Resistance	$V_{DS}=30\ \text{V}, V_{GS}=0\ \text{V}, f=1.0\ \text{MHz}$	--	1.0	--	Ω

Switching Characteristics

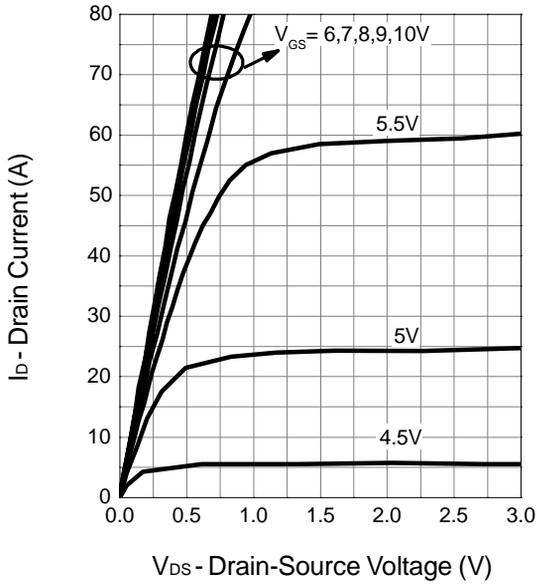
$t_{d(on)}$	Turn-On Time	$V_{DS} = 30\ \text{V}, R_L = 30\ \Omega$ $V_{GS} = 10\ \text{V}, R_G = 6\ \Omega$	--	38	--	ns
t_r	Turn-On Rise Time		--	65	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	218	--	ns
t_f	Turn-Off Fall Time		--	72	--	ns
Q_g	Total Gate Charge	$V_{DS}=30\ \text{V}, I_D=40\ \text{A}, V_{GS}=10\ \text{V}$	--	154	--	nC
Q_{gs}	Gate-Source Charge		--	43	--	nC
Q_{gd}	Gate-Drain Charge		--	45	--	nC

Notes ;

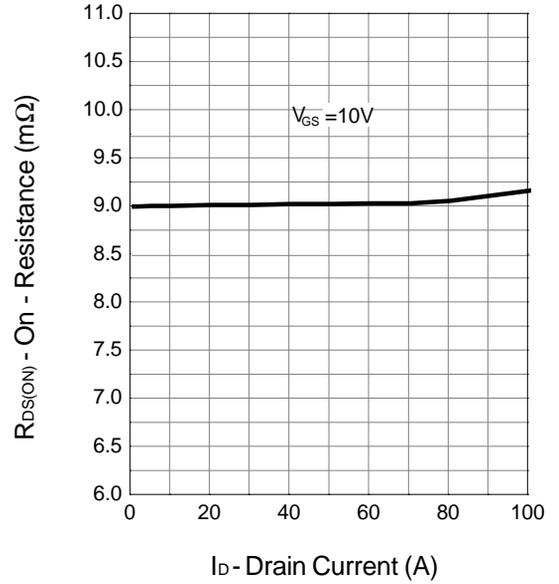
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. Pulse Test : Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$
3. Essentially Independent of Operating Temperature

Typical Characteristics

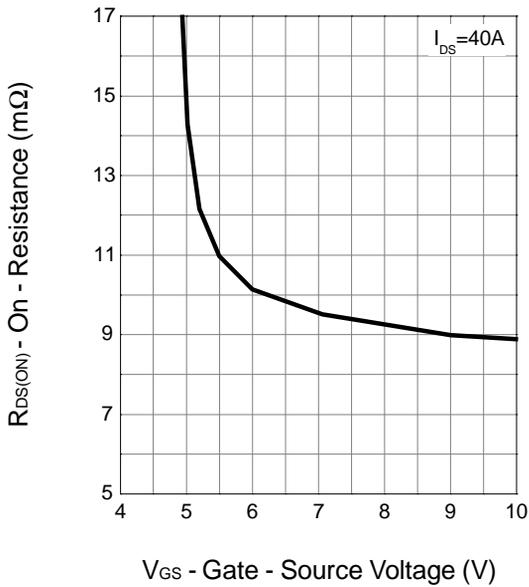
Output Characteristics



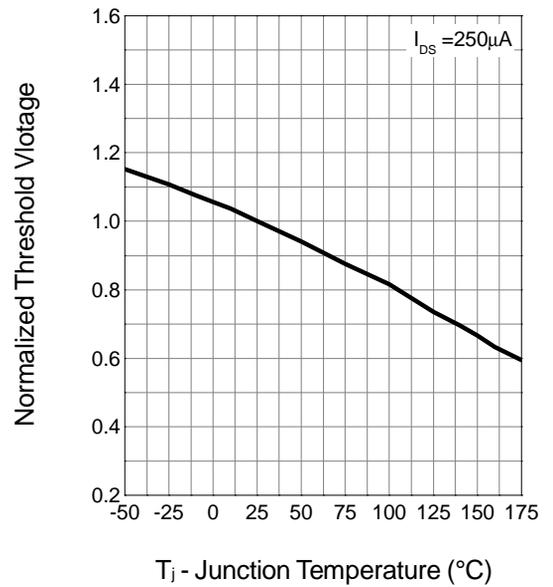
Drain-Source On Resistance



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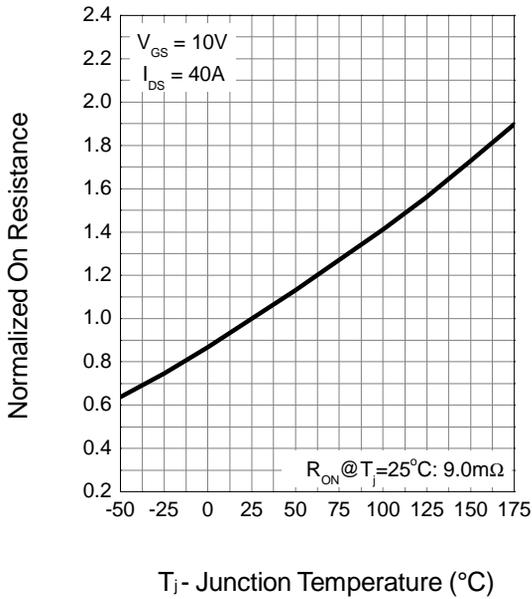


Gate Threshold Voltage

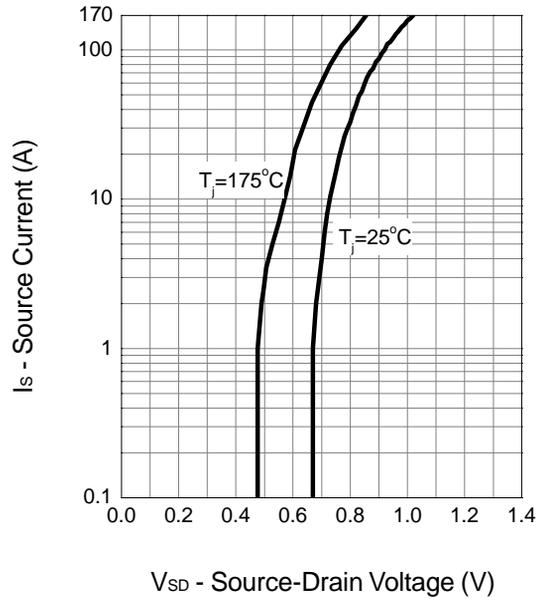


Typical Characteristics (continued)

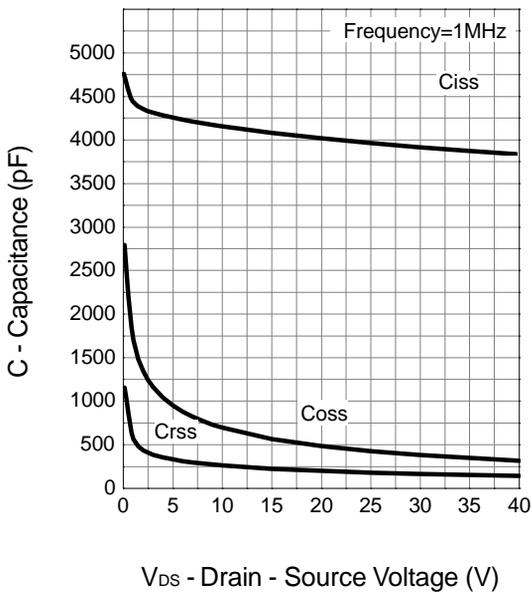
Drain-Source On Resistance



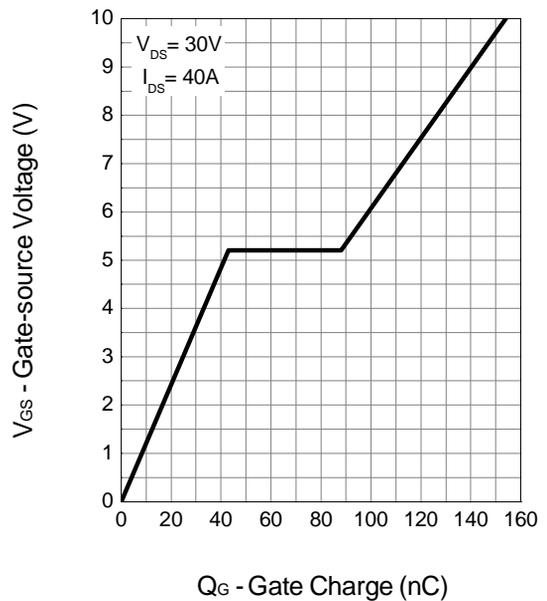
Source-Drain Diode Forward



Capacitance

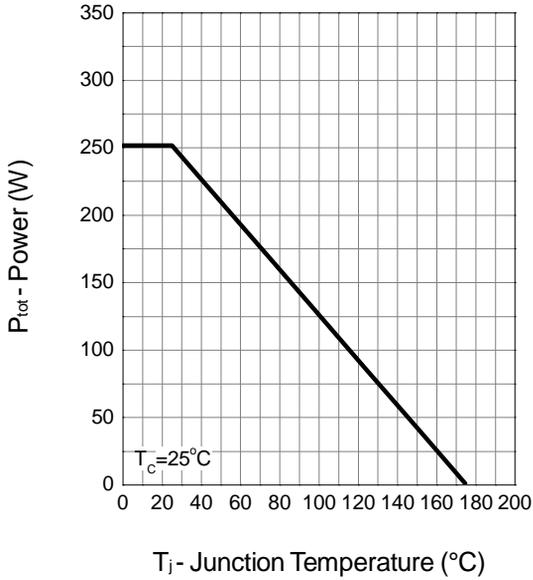


Gate Charge

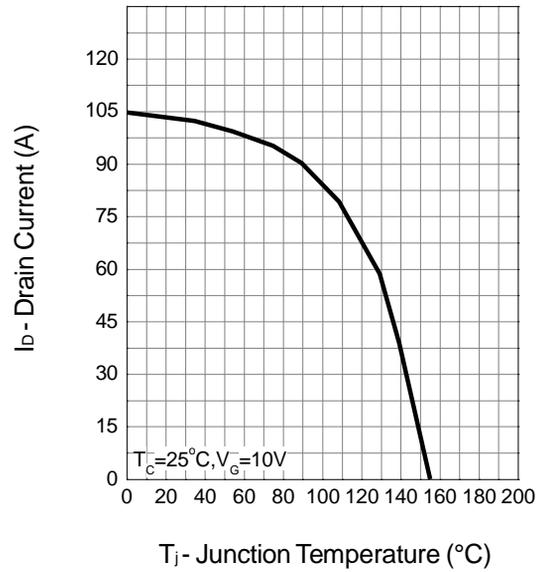


Typical Characteristics (continued)

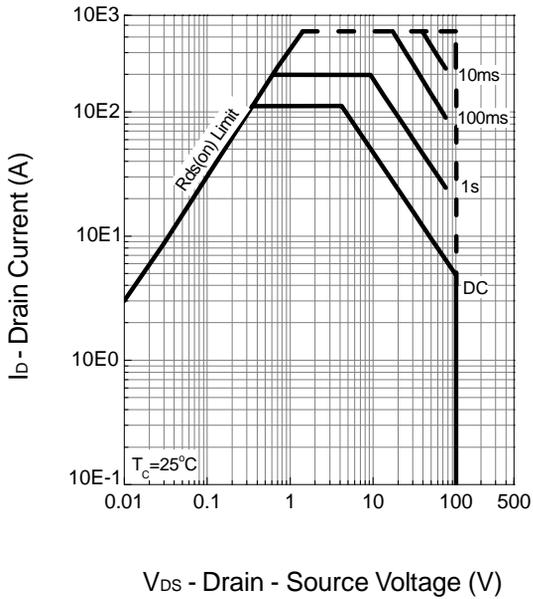
Power Dissipation



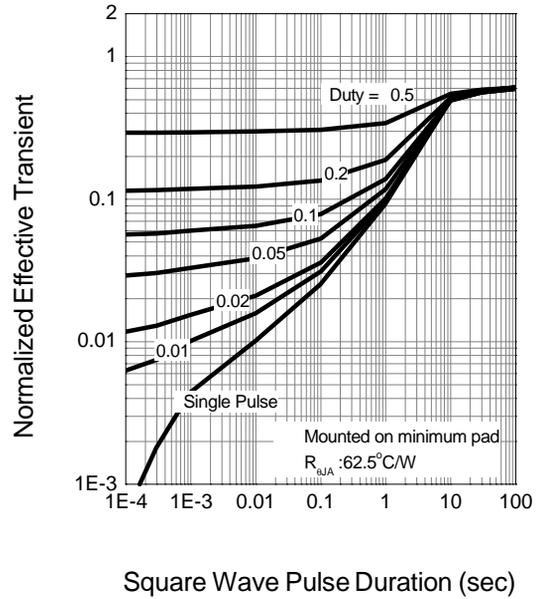
Drain Current



Safe Operation Area



Thermal Transient Impedance



Package Dimension

TO-220

