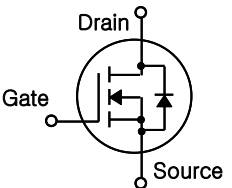
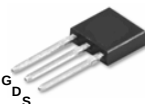
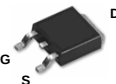


PFU90R1K2G/PFD90R1K2G

N-Channel Super Junction MOSFET

FEATURES

- ❑ New technology for high voltage device
- ❑ Low $R_{DS(on)}$ low conduction losses
- ❑ Small package
- ❑ Ultra low gate charge cause lower driving requirement
- ❑ 100% avalanche tested
- ❑ Halogen Free

$BV_{DSS} = 900\text{ V}$ $R_{DS(on)} = 1.0\ \Omega$ $I_D = 5.3\text{ A}$	
I-PAK(TO-251) 	D-PAK(TO-252) 

APPLICATION

- ❑ Power Factor Correction(PFC)
- ❑ Switched mode power supply (SMPS)
- ❑ Uninterruptible Power Supply (UPS)

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage ($V_{GS}=0\text{V}$)	900	V
I_D	Drain Current – Continuous ($T_c = 25^\circ\text{C}$)	5.3	A
	Drain Current – Continuous ($T_c = 100^\circ\text{C}$)	3.4	A
$I_{DM(pulse)}$	Drain Current – Pulsed * Note 1	15.9	A
V_{GS}	Gate-Source Voltage ($V_{DS}=0\text{V}$)	± 30	V
E_{AS}	Single Pulsed Avalanche Energy * Note 2	75	mJ
I_{AR}	Avalanche Current * Note 1	2.5	A
E_{AR}	Repetitive Avalanche Energy * Note 1	0.4	mJ
dv/dt	Drain Source Voltage Slope, $V_{DS} \leq 480\text{V}$	50	V/ns
	Reverse Diode dv/dt, $V_{DS} \leq 480\text{V}$	5	V/ns
P_D	Maximum Power Dissipation ($T_c = 25^\circ\text{C}$)	81	W
	Derate above 25°C	0.65	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

* Limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Junction-to-Case (Maximum)	1.54	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient (Maximum)	62	

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

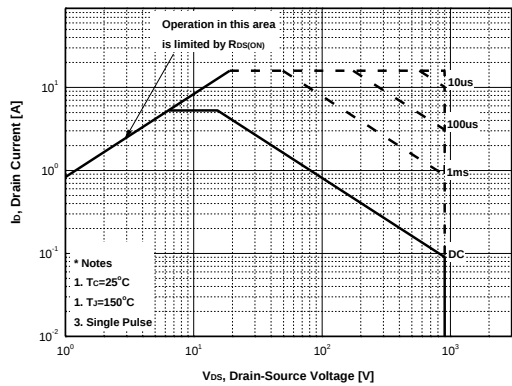
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 uA	2.5	3.0	4.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 2.5 A	--	1000	1200	m.ohm
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 uA	900	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 900 V, V _{GS} = 0 V	--	--	10	uA
		V _{DS} = 720 V, T _c =125 °C	--	--	100	uA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
g _{FS}	Forward Transconductance	V _{DS} = 20V, I _D = 6.0A	--	6.0	--	S
R _G	Intrinsic Gate Resistance	f = 1.0 MHz, open drain	--	2.0	--	ohm
C _{iss}	Input Capacitance	V _{DS} = 50 V, V _{GS} = 0 V, f = 1.0 MHz	--	680	--	pF
C _{oss}	Output Capacitance		--	55	--	pF
C _{rss}	Reverse Transfer Capacitance		--	3.5	--	pF
Q _g	Total Gate Charge	V _{DS} = 720 V, I _D = 6.0 A, V _{GS} = 10 V	--	15.9	21	nC
Q _{gs}	Gate-Source Charge		--	3.8	--	nC
Q _{gd}	Gate-Drain Charge		--	6.1	--	nC
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{DS} = 450 V, I _D = 3.0 A, R _G = 15 Ω, V _{GS} = 10V	--	7	--	ns
t _r	Turn-On Rise Time		--	5	--	ns
t _{d(off)}	Turn-Off Delay Time		--	70	85	ns
t _f	Turn-Off Fall Time		--	9	15	ns
Source-Drain Diode Maximum Ratings and Characteristics						
I _S	Continuous Source-Drain Diode Forward Current		--	--	5.0	A
I _{SM}	Pulsed Source-Drain Diode Forward Current		--	--	15.0	
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 5.0 A, V _{GS} = 0 V	--	0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _S = 5.0 A	--	260	--	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100 A/μs	--	2.6	--	μC

Notes ;

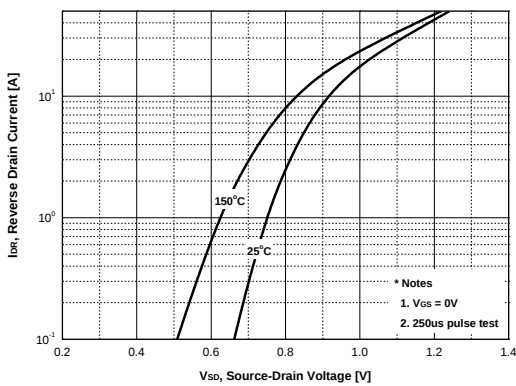
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L=22.4\text{ mH}$, $I_{as}=2.5$, $V_{D0}=50\text{ V}$, $R_G=25\text{ }\Omega$, Starting $T_J=25\text{ }^{\circ}\text{C}$

Typical Characteristics

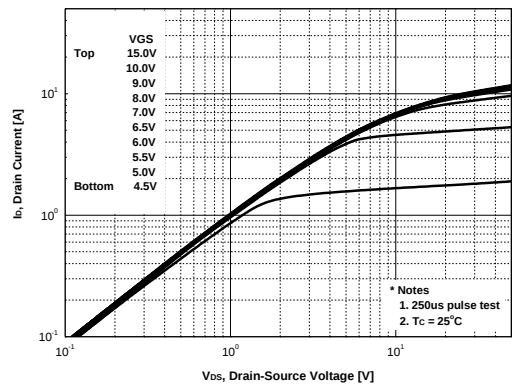
Safe Operation Area



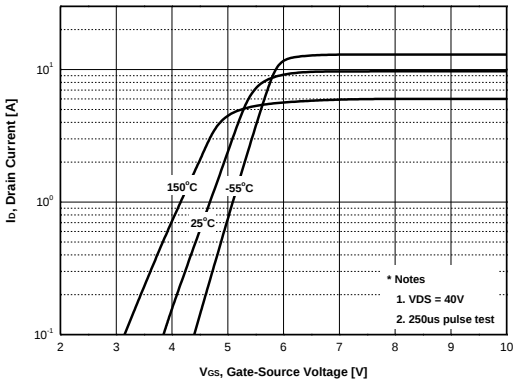
Source-Drain Diode Forward Voltage



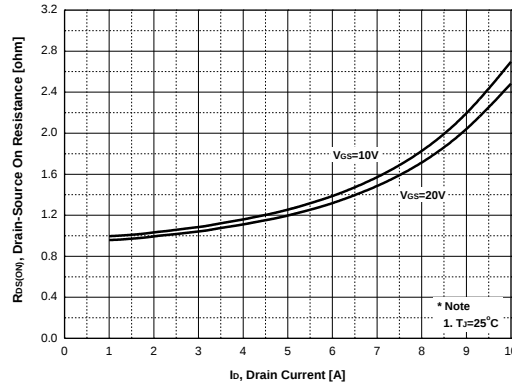
Output Characteristics



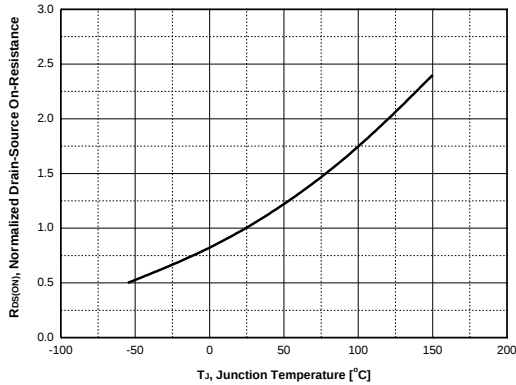
Transfer Characteristics



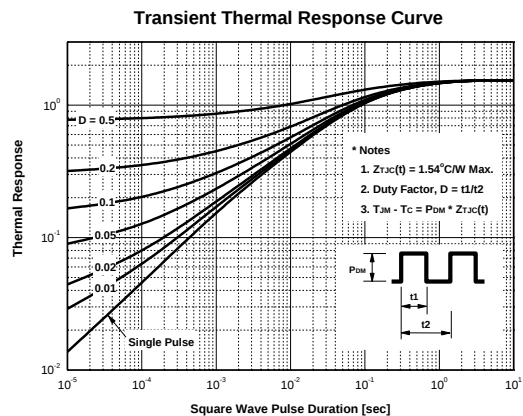
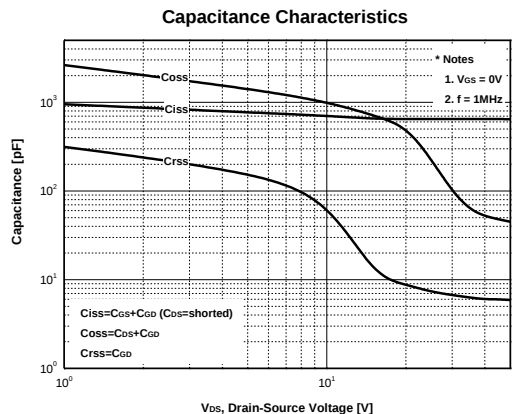
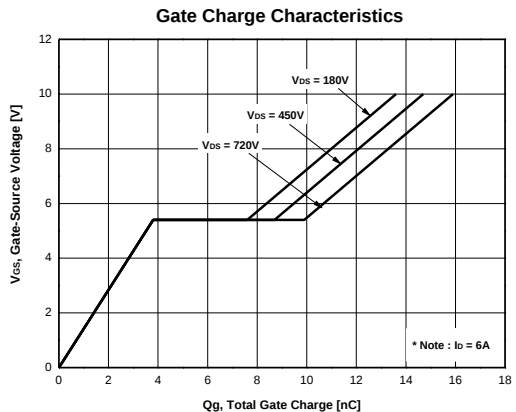
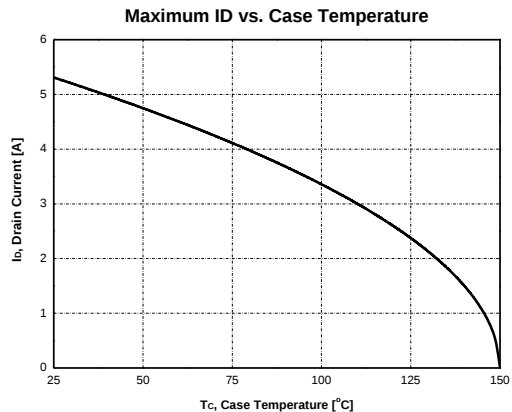
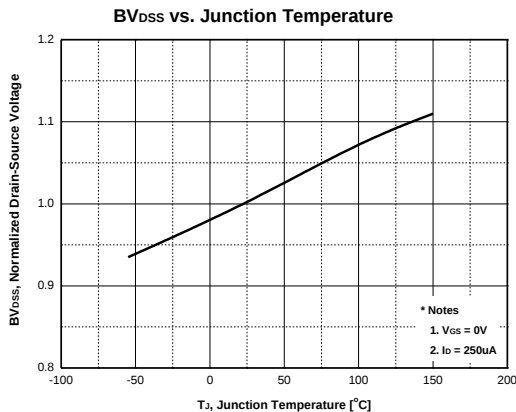
Static Drain-Source On Resistance



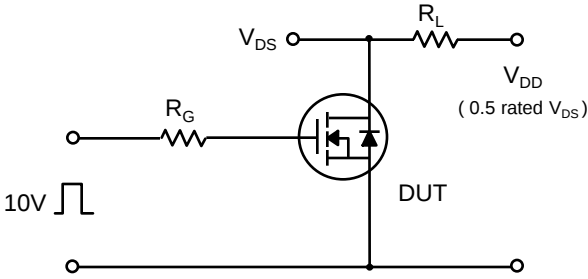
$R_{DS(ON)}$ vs. Junction Temperature



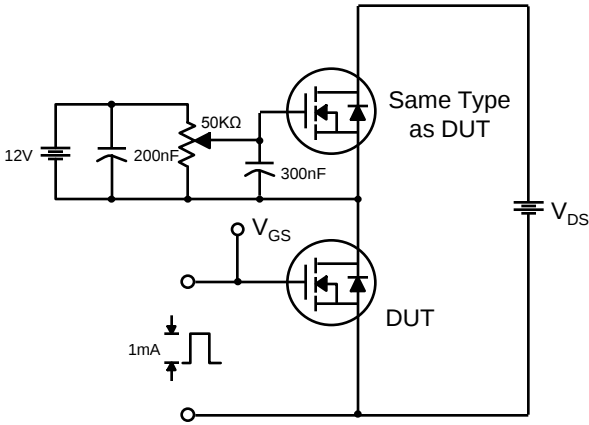
Typical Characteristics (continued)



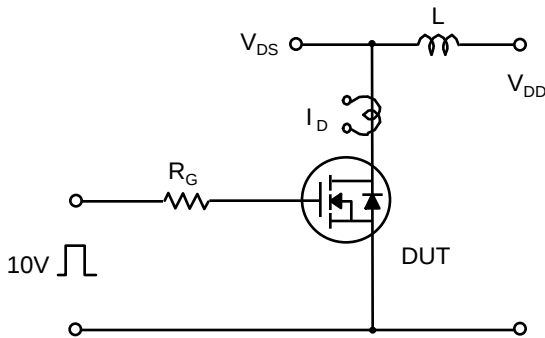
Characteristics Test Circuit & Waveform



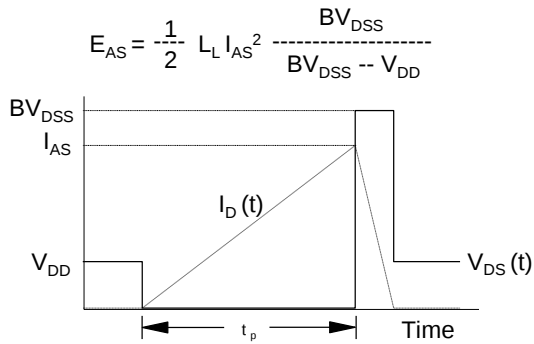
Switching Time Test Circuit & Waveforms



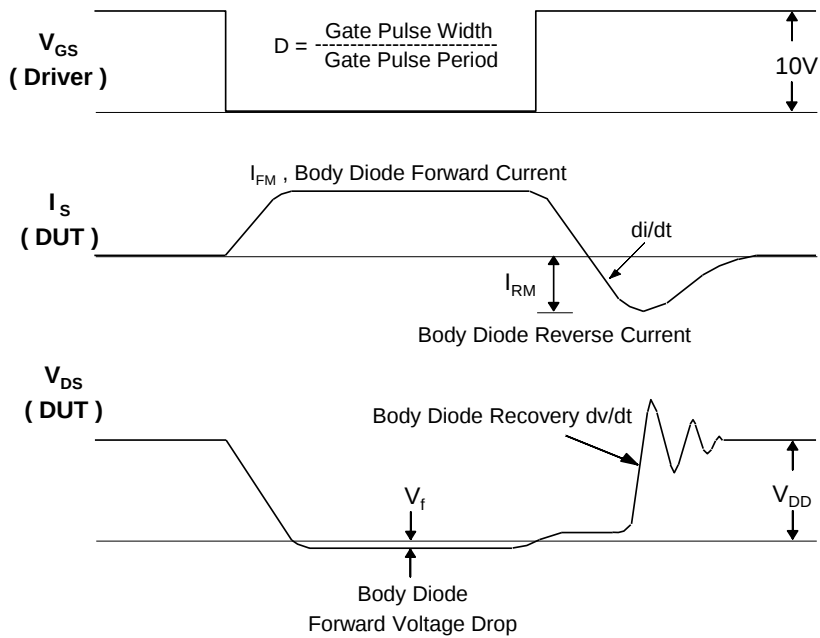
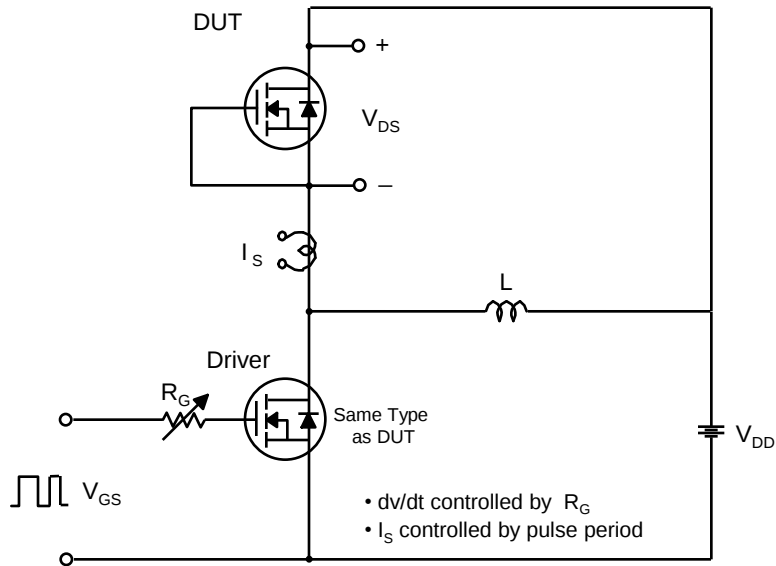
Gate Charge Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveforms



Characteristics Test Circuit & Waveform (continued)



Peak Diode Recovery dv/dt Test Circuit & Waveforms