



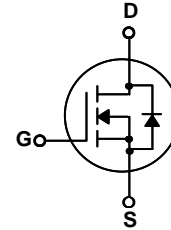
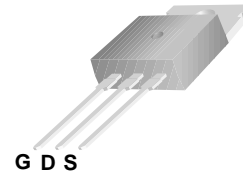
Technologies Int'l

## WFP10N60

600V N-Channel MOSFET

### Features

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Unrivalled Gate Charge :Qg= 33nC (Typ.)
- BVDSS=600V, ID=10A
- R<sub>DS(on)</sub> :0.73 Ω (Max) @VG=10V
- 100% Avalanche Tested



TO-220

G-Gate,D-Drain,S-Source

### Absolute Maximum Ratings *T<sub>c</sub>=25°C unless other wise noted*

Symbol	Parameter	WFP10N60	Units
V <sub>DSS</sub>	Drain-Source Voltage	600	V
I <sub>D</sub>	Drain Current -continuous (T <sub>c</sub> =25°C)	10	A
	-continuous (T <sub>c</sub> =100°C)	3.4	A
V <sub>GS</sub>	Gate-Source Voltage	± 30	V
E <sub>AS</sub>	Single Pulsed Avanche Energy (Note1)	520	mJ
I <sub>AR</sub>	Avalanche Current (Note2)	10	A
P <sub>D</sub>	Power Dissipation (T <sub>c</sub> =25°C)	156	W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 ~ +150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	°C

### Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	--	0.8	°C/W
R <sub>θCS</sub>	Thermal Resistance, Case to Sink	0.5	--	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	--	62.5	°C/W

<b>Electrical Characteristics</b> Tc=25°C unless other wise noted						
Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	ID=250 μ A, VGS=0	600	--	--	V
ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> =250 μ A, Reference to 25°C	--	0.7	--	V/°C
IDSS	Zero Gate Voltage Drain Current	Vds=600V, Vgs=0V	--	--	1	μ A
		Vds=480V, Tc=125°C			10	μ A
IGSSF	Gate-body leakage Current, Forward	Vgs=+30V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current, Reverse	Vgs=-30V, Vds=0V	--	--	-100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	I <sub>D</sub> =250μA, Vds=Vgs	2	--	4	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	I <sub>D</sub> =5A, Vgs=10V	--	--	0.73	Ω
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	VDS=25V, VGS=0, f=1.0MHz	--	1570	2040	pF
C <sub>oss</sub>	Output Capacitance		--	166	215	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	18	24	pF
<b>Switching Characteristics</b>						
Td(on)	Turn-On Delay Time	VDD=300V, ID=10A RG=25 Ω (Note 3,4)	--	23	55	nS
Tr	Turn-On Rise Time		--	66	150	nS
Td(off)	Turn-Off Delay Time		--	144	300	nS
Tf	Turn-Off Fall Time		--	77	165	nS
Qg	Total Gate Charge	VDS=480, VGS=10V, ID=10A (Note 3,4)	--	44	57	nC
Qgs	Gate-Source Charge		--	6.7	--	nC
Qgd	Gate-Drain Charge			18.5	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current		--	--	10	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current		--	--		A
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	I <sub>D</sub> =10A	--	--	1.4	V
trr	Reverse Recovery Time	I <sub>S</sub> =10A, V <sub>GS</sub> =0V	--	340	--	nS
Qrr	Reverse Recovery Charge	di <sub>F</sub> /dt=100A/ μ S (Note3)	--	3.2	--	μ C
*Notes	1, L=10.6mH, IAS=9.5A, VDD=50V, RG=25Ω, Starting T <sub>J</sub> =25°C 2, Repetitive Rating : Pulse width limited by maximum junction temperature 3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2% 4, Essentially Independent of Operating Temperature					

# Typical Characteristics

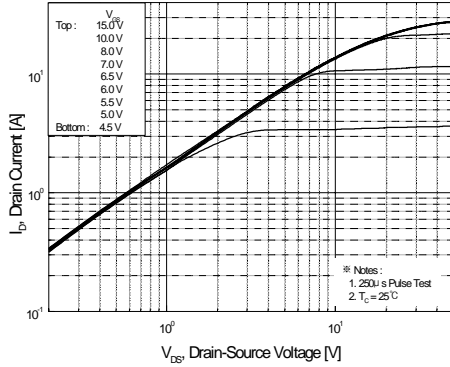


Figure 1. On-Region Characteristics

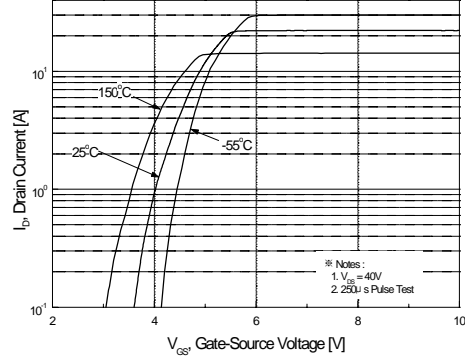


Figure 2. Transfer Characteristics

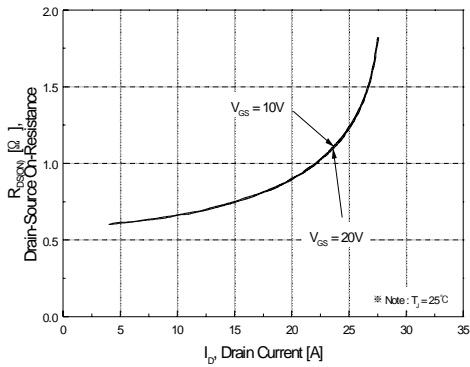


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

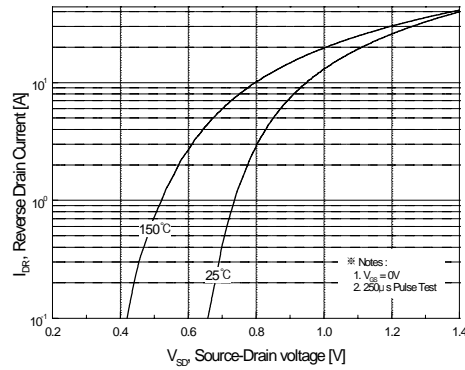


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

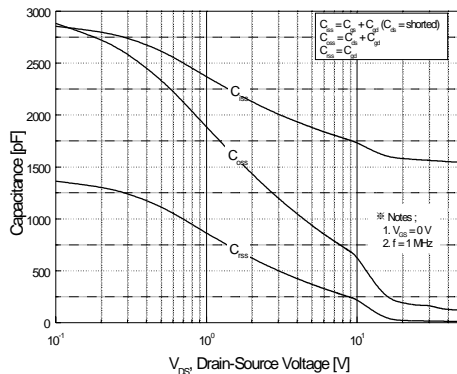


Figure 5. Capacitance Characteristics

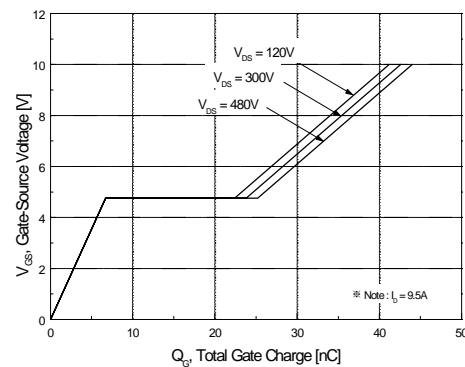
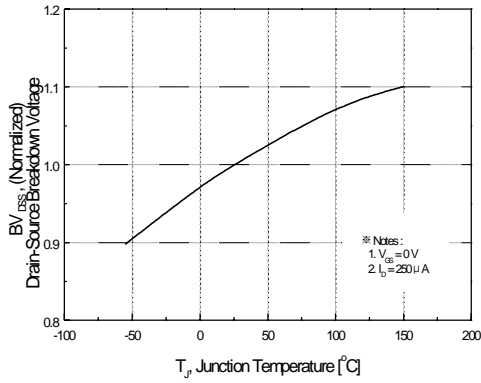
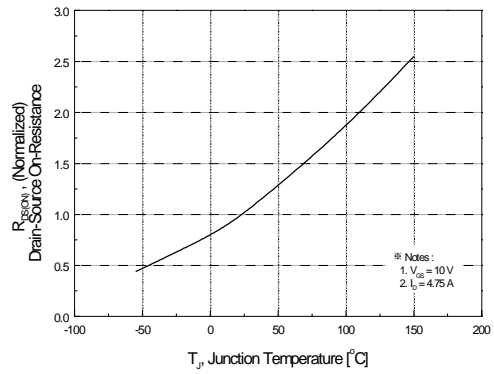


Figure 6. Gate Charge Characteristics

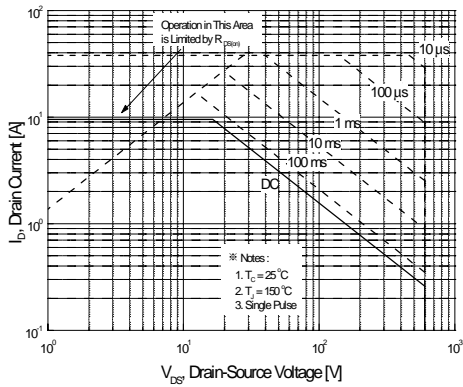
# Typical Characteristics (Continued)



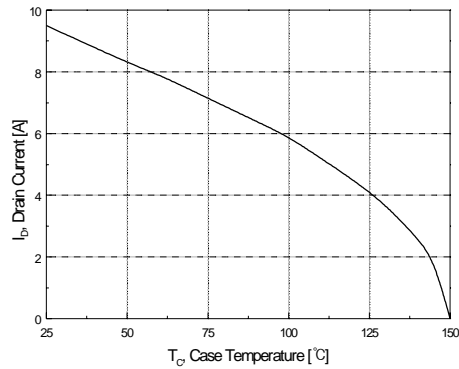
**Figure 7. Breakdown Voltage Variation vs Temperature**



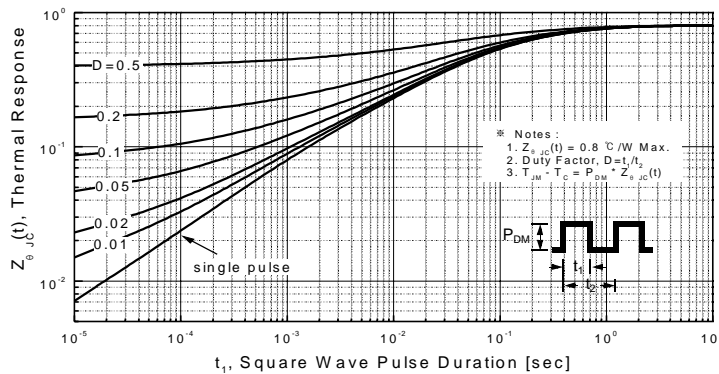
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9-1. Maximum Safe Operating Area for WFP10N60**

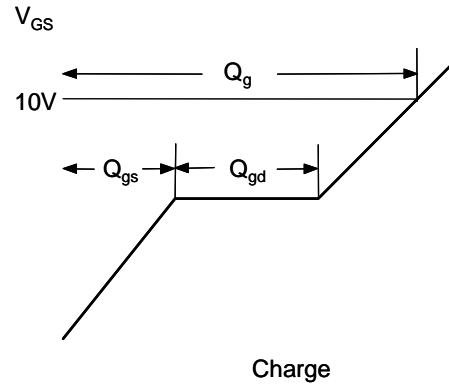
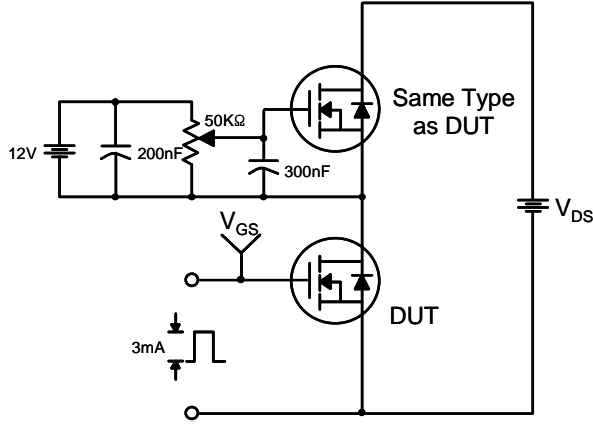


**Figure 10. Maximum Drain Current vs Case Temperature**

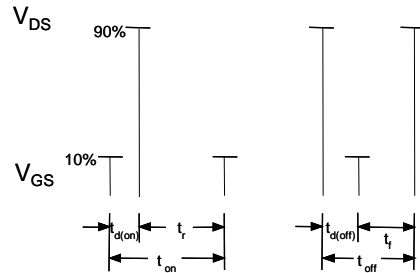
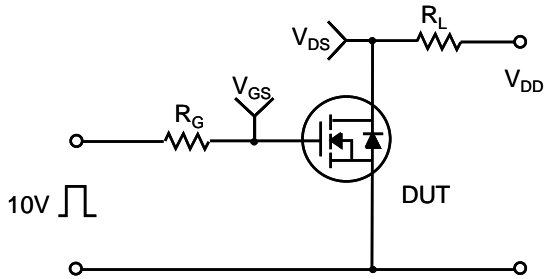


**Figure 11-1. Transient Thermal Response Curve for WFP10N60**

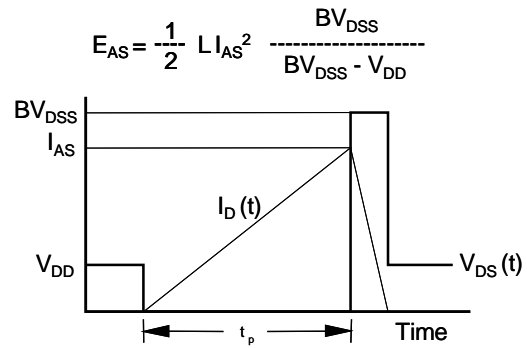
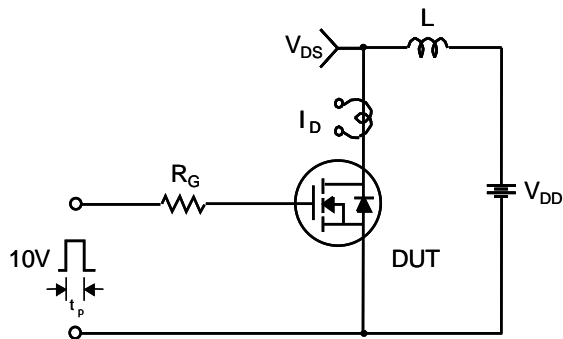
**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**



Peak Diode Recovery dv/dt Test Circuit & Waveforms

