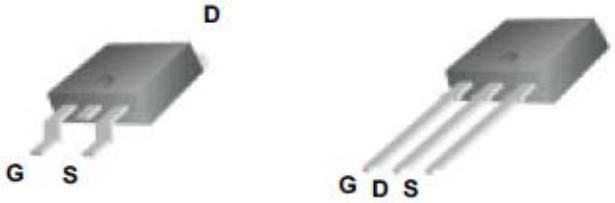
Wisdom Technologies Int'l

WFU4N60/WFD4N60

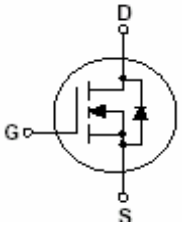
600V N-Channel MOSFET



TO-252 TO-251

Features

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ Unrivalled Gate Charge : 15 nC (Typ.)
- ☐ BVDSS=600V,ID=4A
- ☐ Lower $R_{DS(on)}$: 2.5Ω (Max) @VG=10V
- ☐ 100% Avalanche Tested



G-Gate,D-Drain,S-Sourse

Absolute Maximum Ratings *Tc=25℃ unless other wise noted*

Symbol	Parameter	WFU/D4N60	Units
V_{DSS}	Drain-Sourse Voltage	600	V
I_D	Drain Current -continuous (Tc=25℃)	4	A
	-continuous (Tc=100℃)	1.8	A
V_{GS}	Gate-Sourse Voltage	±30	V
E_{AS}	Single Plused Avanche Energy (Note1)	240	mJ
I_{AR}	Avalanche Current (Note2)	4	A
P_D	Power Dissipation (Tc=25℃)	44	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 ~ +150	℃
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds	300	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	--	2.56	℃/W
$R_{\theta CA}$	Thermal Resistance,Junction to Ambient*	--	50	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	--	110	℃/W

*When mounted on the minimum pad size recommended (PCB mounted)

Electrical Characteristics Tc=25℃ unless other wise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourse Breakdown Voltage	ID=250μA，VGS=0	600	--	--	V
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Conficient	I_D=250μA,Reference to 25℃	--	0.6	--	V/℃
IDSS	Zero Gate Voltage Drain Current	Vds=500V, Vgs=0V	--	--	1	μA
		Vds=480V, Tc=125℃			10	μA
IGSSF	Gate-body leakage Current, Forward	Vgs=+30V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current, Reverse	Vgs=-30V, Vds=0V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Date Threshold Voltage	Id=250uA,Vds=Vgs	2	--	4	V
$R_{DS(on)}$	Static Drain-Sourse On-Resistance	Id=2.0A,Vgs=10V	--	--	2.5	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=25V，VGS=0，f=1.0MHz	--	515	670	pF
Coss	Output Capacitance		--	55	72	pF
Crss	Reverse Transfer Capacitance		--	6.5	8.5	pF
Switching Characteristics						
Td(on)	Turn-On Delay Time	VDD=300V，ID=4A，RG=25Ω (Note 3,4)	--	150	30	nS
Tr	Turn-On Rise Time		--	42	90	nS
Td(off)	Turn-Off Delay Time		--	38	85	nS
Tf	Turn-Off Fall Time		--	46	100	nS
Qg	Total Gate Charge	VDS=480,VGS=10V，ID=4A (Note 3,4)	--	15	19	nC
Qgs	Gate-Sourse Charge		--	2.	--	nC
Qgd	Gate-Drain Charge			6.6	--	nC
Drain-Sourse Diode Characteristics and Maximum Ratings						
I_S	Maximun Continuous Drain-Sourse Diode Forward Current		--	--	4	A
I_{SM}	Maximun Plused Drain-Sourse DiodeForwad Current		--	--	16	A
V_{SD}	Drain-Sourse Diode Forward Voltage	Id=4A	--	--	1.25	V
trr	Reverse Recovery Time	I_S=4A,V_{GS} =0V di_F/dt=100A/μs (Note3)	--	300	--	nS
Qrr	Reverse Recovery Charge		--	2.2	--	μC

*Notes
1, L=27.5mH, IAS=4A, VDD=50V, RG=25Ω, Starting TJ =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

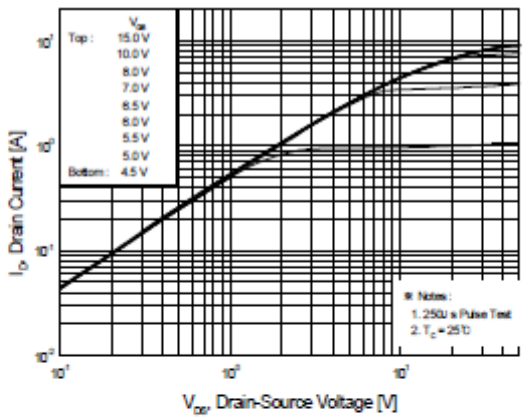


Figure 1. On-Region Characteristics

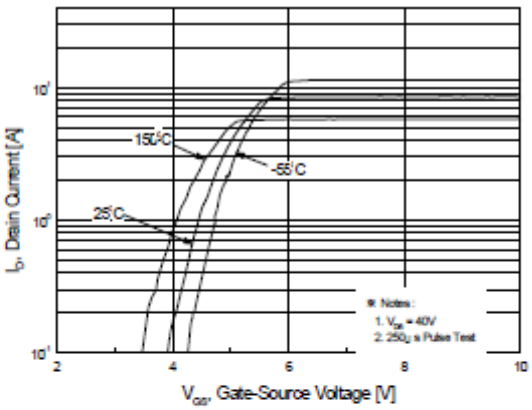


Figure 2. Transfer Characteristics

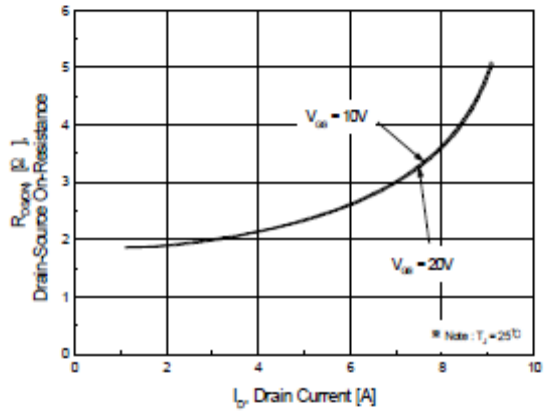


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

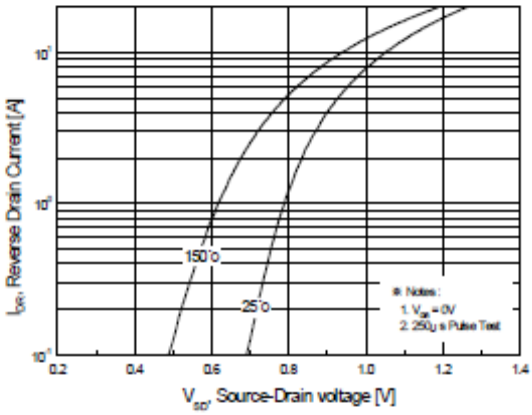


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

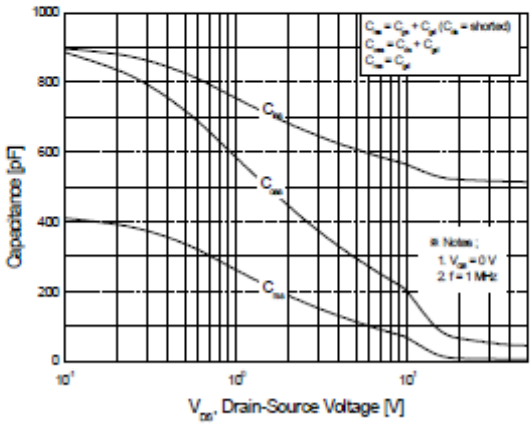


Figure 5. Capacitance Characteristics

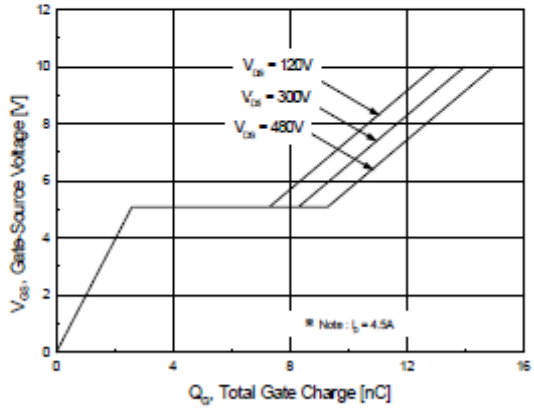


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

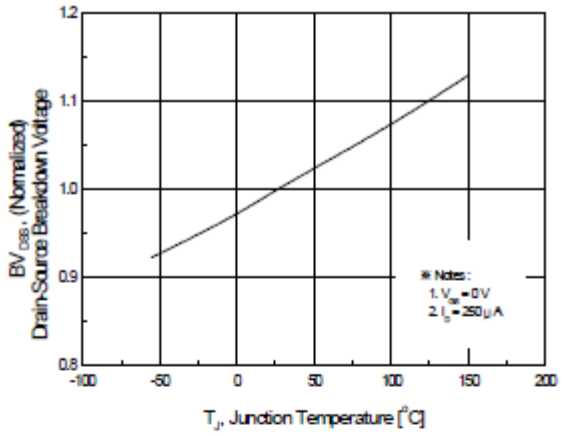


Figure 7. Breakdown Voltage Variation vs Temperature

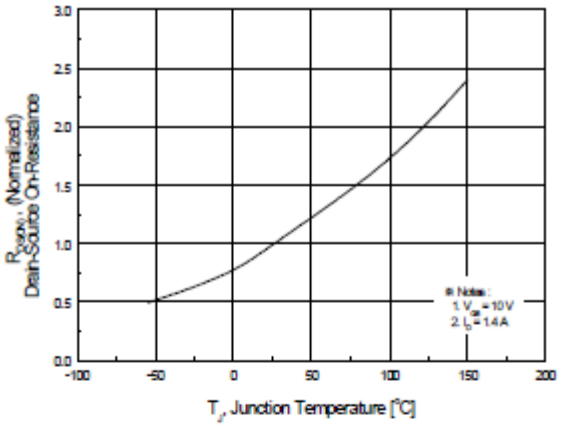


Figure 8. On-Resistance Variation vs Temperature

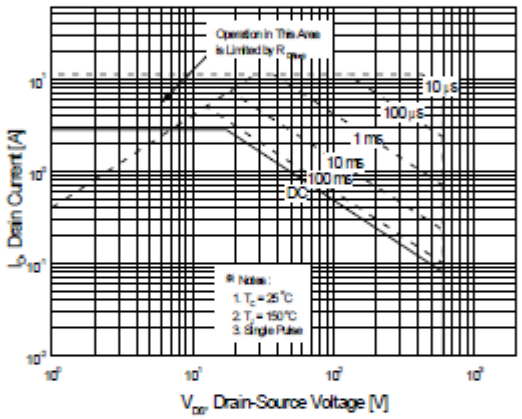


Figure 9. Maximum Safe Operating Area

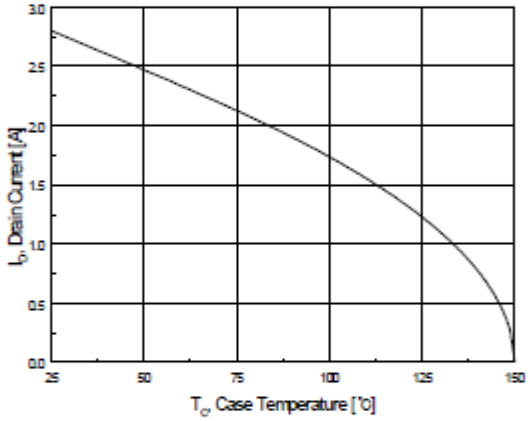


Figure 10. Maximum Drain Current vs Case Temperature

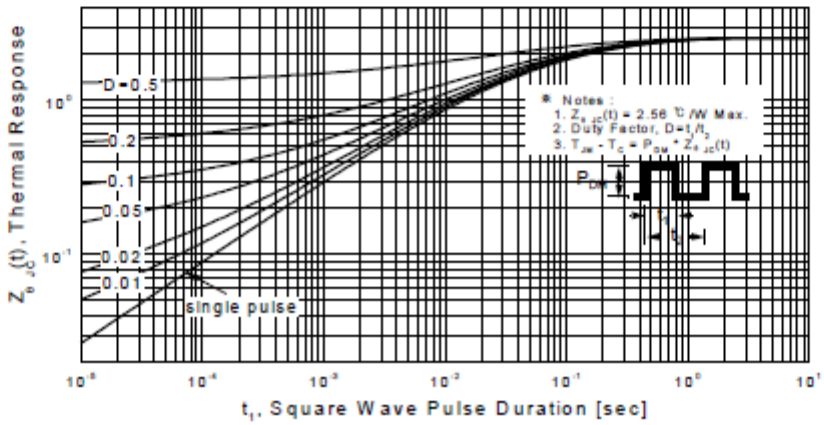
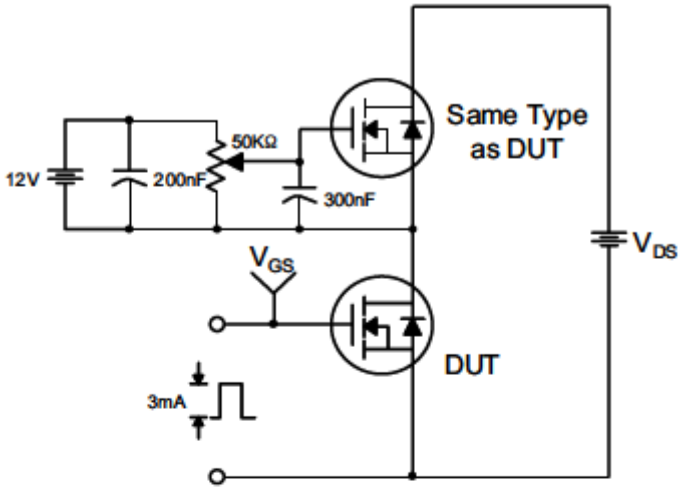
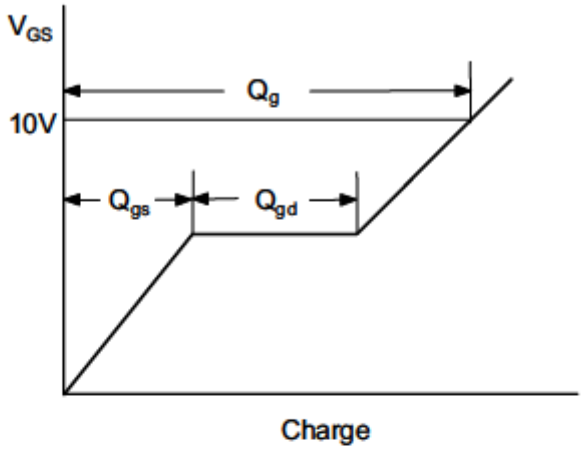


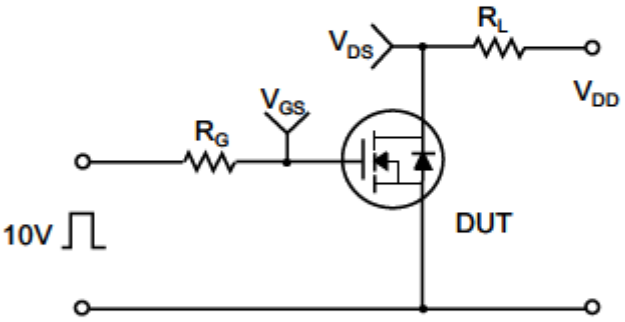
Figure 11. Transient Thermal Response Curve

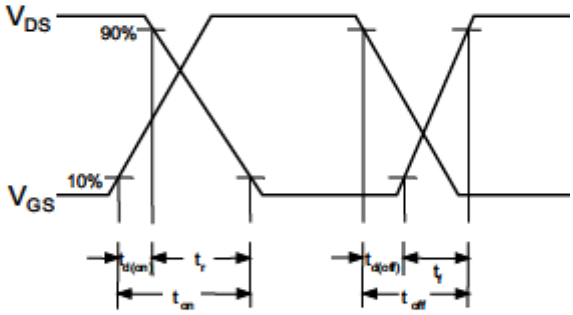
Gate Charge Test Circuit & Waveform



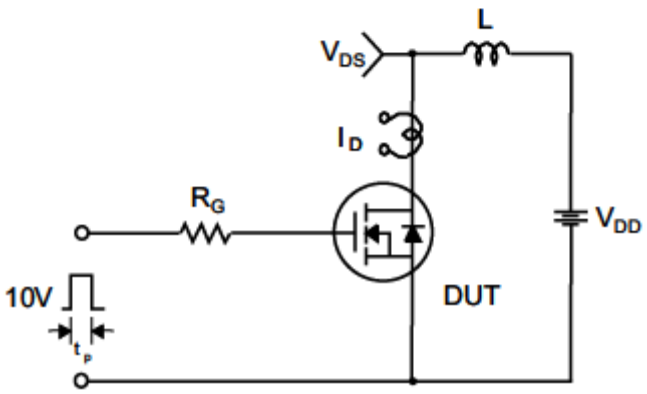


Resistive Switching Test Circuit & Waveforms

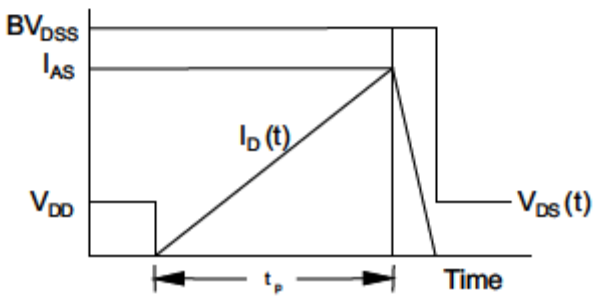




Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms