

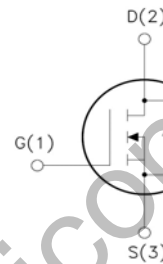
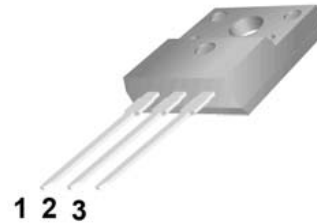


WGF4N80S

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg=6.5nC (Typ.).
- BVDSS=800V, I_D=4 A
- R_{DS(on)} :2.2 Ω (Max) @V_G=10V
- 100% Avalanche Tested

TO-220F



- 1.Gate (G)
- 2.Drain (D)
- 3.Source (S)

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	800	V
I _D	Drain Current -Continuous (TC = 25°C) -Continuous (TC = 100°C)	4 2.5	A
I _{DM}	Drain Current - Pulsed (Note 1)	16	A
V _{GSS}	Gate-Source voltage	±30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	230	mJ
I _{AR}	Avalanche Current (Note 1)	1	A
E _{AR}	Repetitive Avalanche Energy (Note 1)	0.2	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.0	V/ns
dVds/dt	Drain Source voltage slope (Vds=640V)	50	V/ns
P _D	Power Dissipation (TC = 25°C)	35	W
T _J , T _{STG}	Operating and Storage Temperature Range	150,-55 to +150	°C
T _L	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	°C

* Drain current limited by maximum junction temperature. Maximum duty cycle D=0.75.

Thermal Characteristics

Symbol	Parameter	Value	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	3.57	°C/W
R _{θCS}	Thermal Resistance, Case-to-Sink Typ.	0.5	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA, T _J = 25°C	800	-	-	V
		V _{GS} = 0V, I _D = 250μA, T _J = 25 °C	-	850	-	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250μA, Referenced to 25°C		0.9		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 800V, V _{GS} = 0V -T _J = 25 °C	-	-	25 -	μA μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 20V	-	-	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = 20V	-	-	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	2.0		4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10V, I _D = 2A		2.2	2.8	
g _{FS}	Forward Transconductance	V _{DS} = 40V, I _D = 4A	-	4	-	S
R _g	Gate resistance	f=1 MHz, open drain	-	1.5	-	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 100kHz	-	86.5	-	pF
C _{oss}	Output Capacitance		-	82	-	pF
C _{rss}	Reverse Transfer Capacitance			7.5	-	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 400V, I _D = 4A, R _G = 10Ω (Note 4)	-	18	-	ns
t _r	Turn-On Rise Time		-	16	-	ns
t _{d(off)}	Turn-Off Delay Time		-	45	-	ns
t _f	Turn-Off Fall Time		-	14	-	ns
Q _g	Total Gate Charge	V _{DS} = 640V, I _D = 4A, V _{GS} = 10V (Note 4)	-	25		nC
Q _{gs}	Gate-Source Charge		-	4		nC
Q _{gd}	Gate-Drain Charge		-	11.5		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	4	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	16	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0V, I _S = 4A	-	-	1.5	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _S = 4A, dI _F /dt = 100A/μs	-	274	-	ns
Q _{rr}	Reverse Recovery Charge		-	1150	-	nC

NOTES:

- 1.Repetitive rating; pulse width limited by maximum junction temperature
- 2.L=10mH, I_D=6.8A, Start T_J=25°C
- 3.I_{SD} =4A, di/dt ≤ 100A/μs, V_{DD} ≤ BV_{DS}, Start T_J=25 °C

Typical Characteristics

Characteristics Curve:

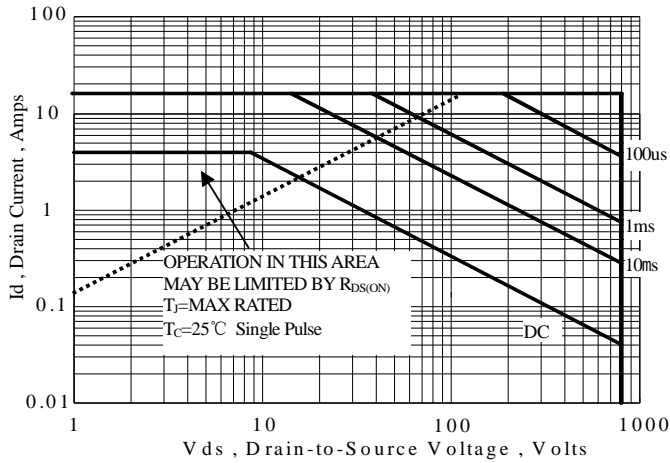


Figure 1 Maximum Forward Bias Safe Operating Area

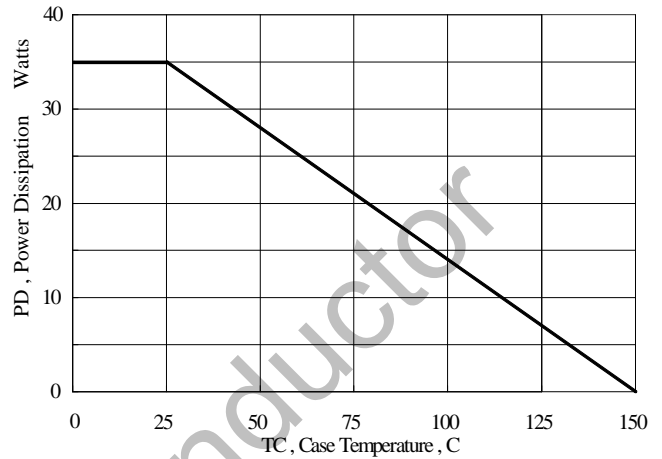


Figure 2 Maximum Power Dissipation vs Case Temperature

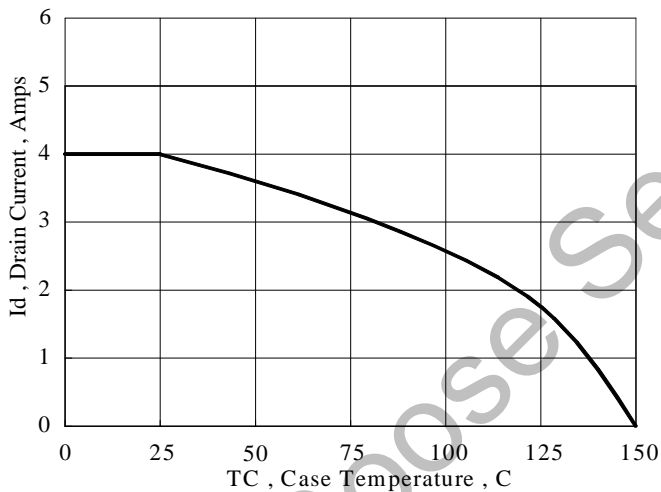


Figure 3 Maximum Continuous Drain Current vs Case Temperature

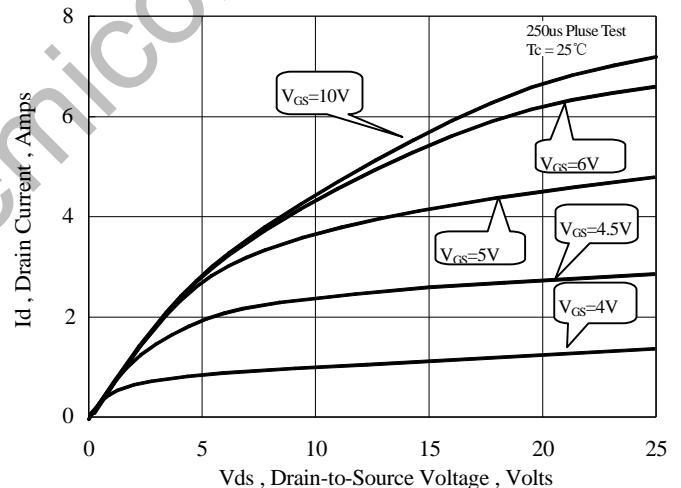


Figure 4 Typical Output Characteristics

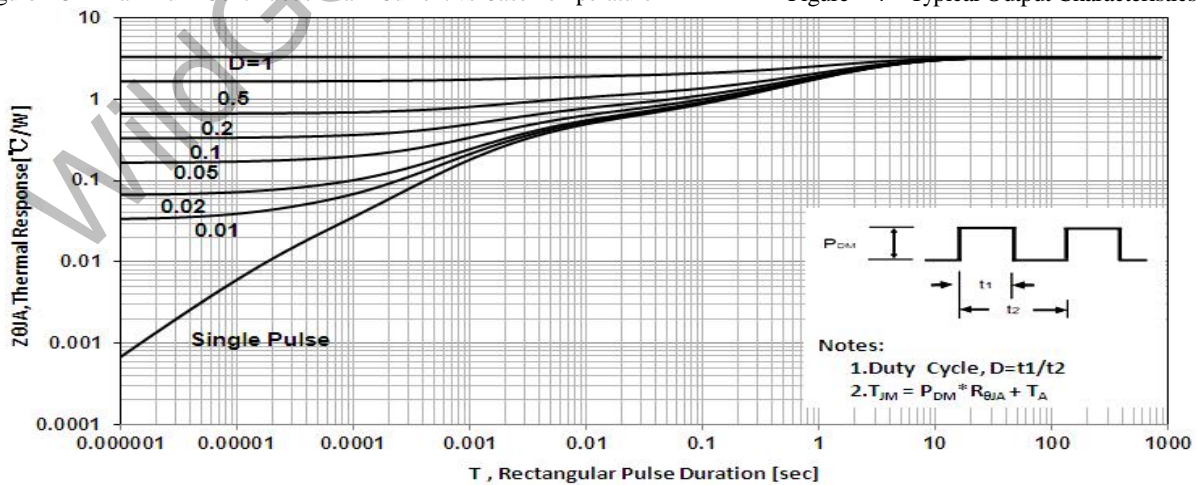


Figure 5 Maximum Effective Thermal Impedance, Junction to Case

Typical Characteristics (Continued)

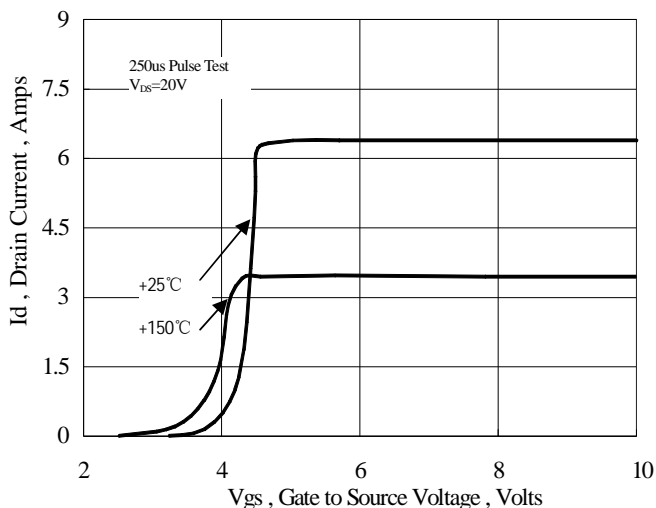


Figure 6 Typical Transfer Characteristics

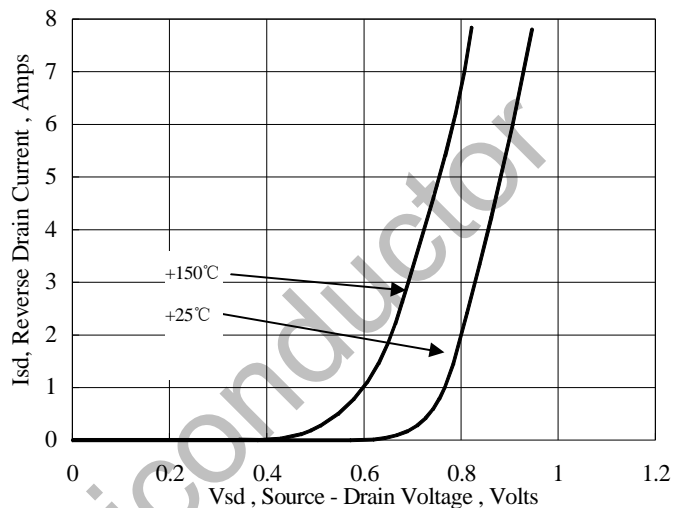


Figure 7 Typical Body Diode Transfer Characteristics

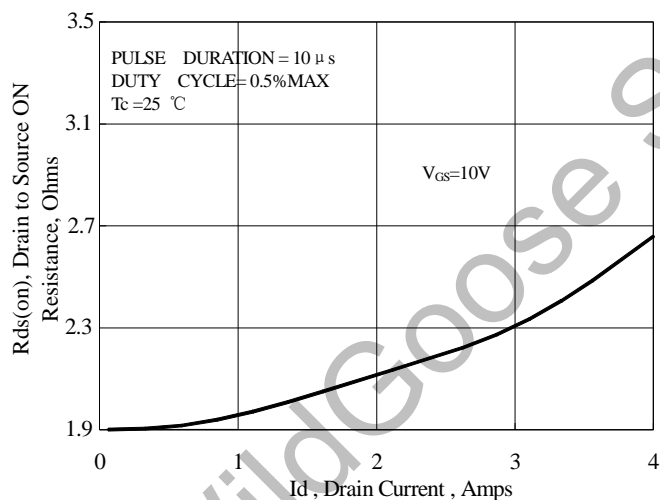


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

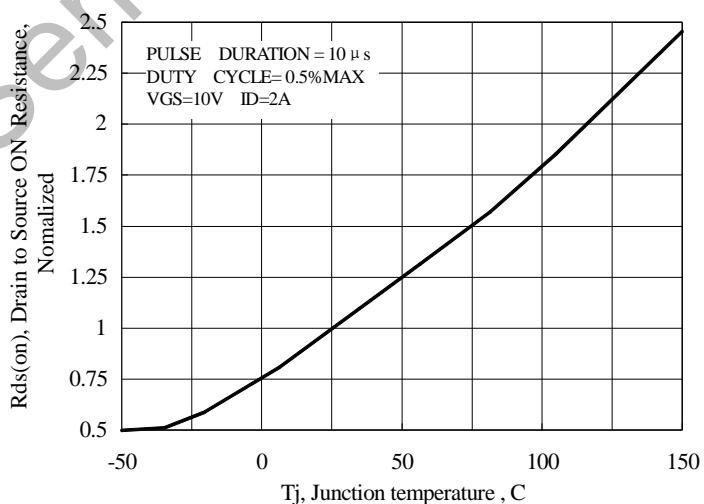


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

Typical Characteristics (Continued)

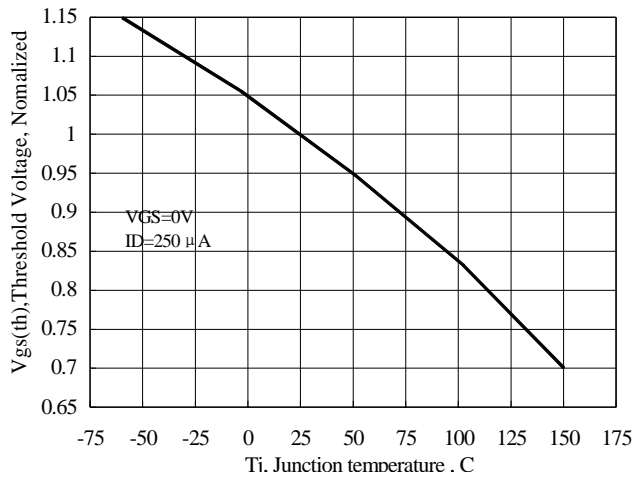


Figure 10 Typical Theshold Voltage vs Junction Temperature

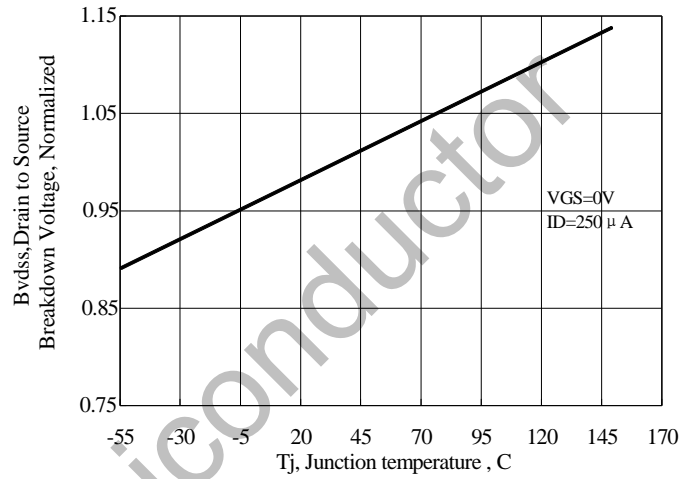


Figure 11 Typical Breakdown Voltage vs Junction Temperature

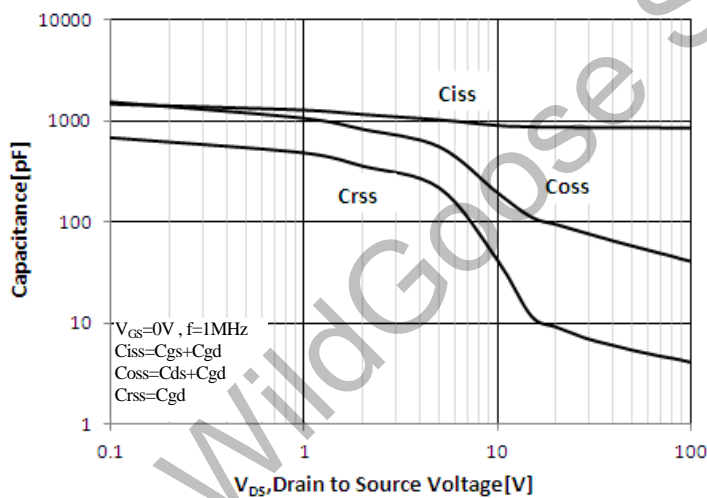


Figure 12 Typical Capacitance vs Drain to Source Voltage

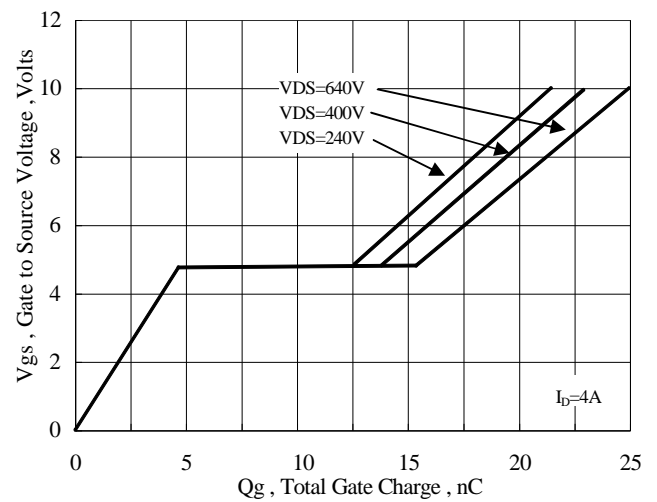


Figure 13 Typical Gate Charge vs Gate to Source Voltage

Test Circuit and Waveform

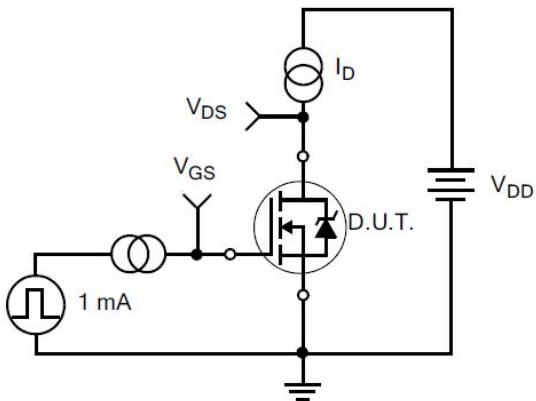


Figure 17. Gate Charge Test Circuit

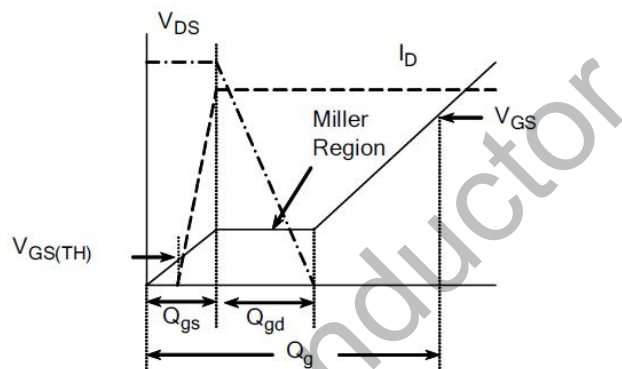


Figure 18. Gate Charge Waveform

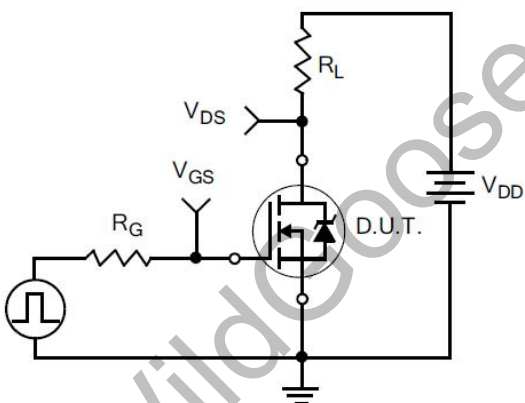


Figure 19. Resistive Switching Test Circuit

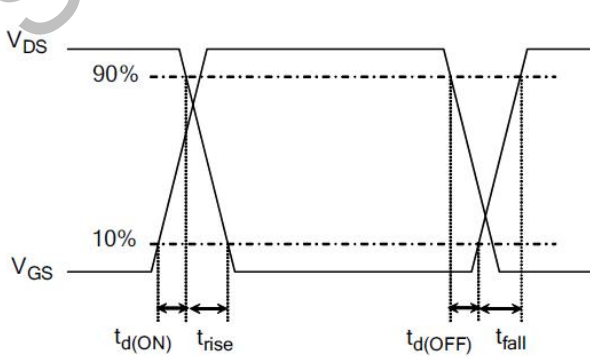


Figure 20. Resistive Switching Waveforms

Test circuit and waveform for diode characteristics

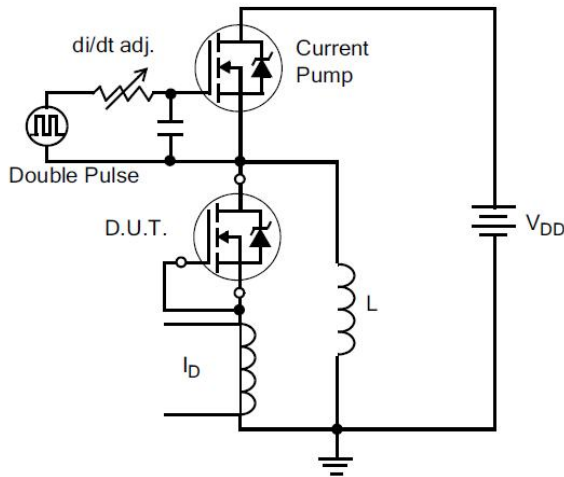


Figure 21. Diode Reverse Recovery Test Circuit

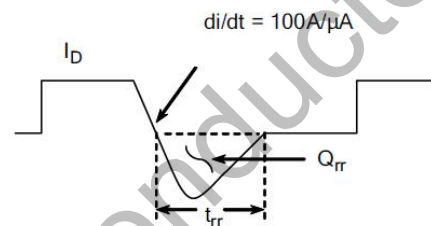


Figure 22. Diode Reverse Recovery Waveform

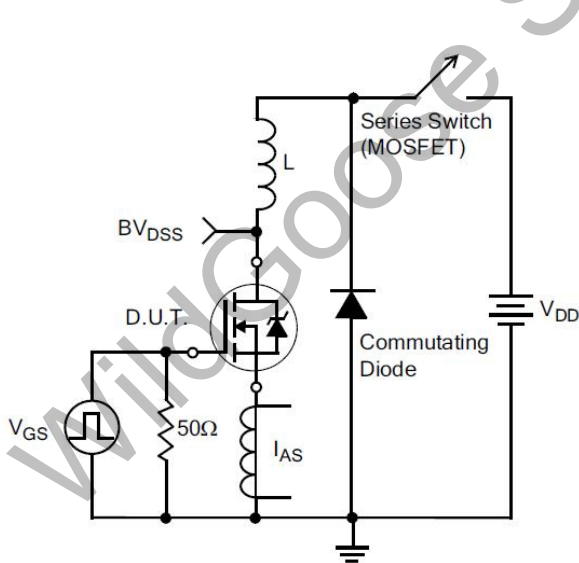


Figure 23. Unclamped Inductive Switching Test Circuit

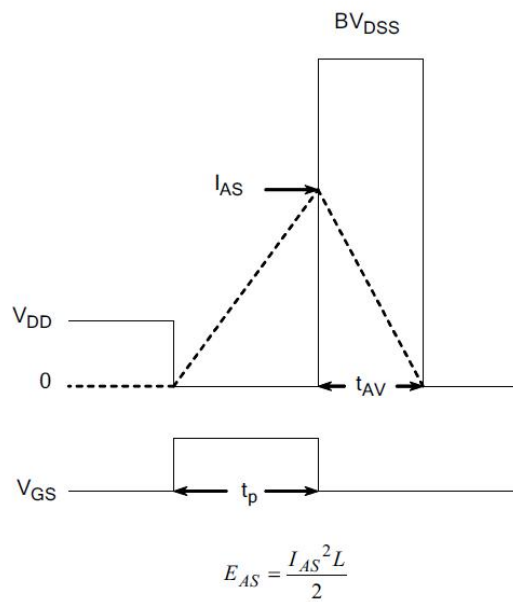
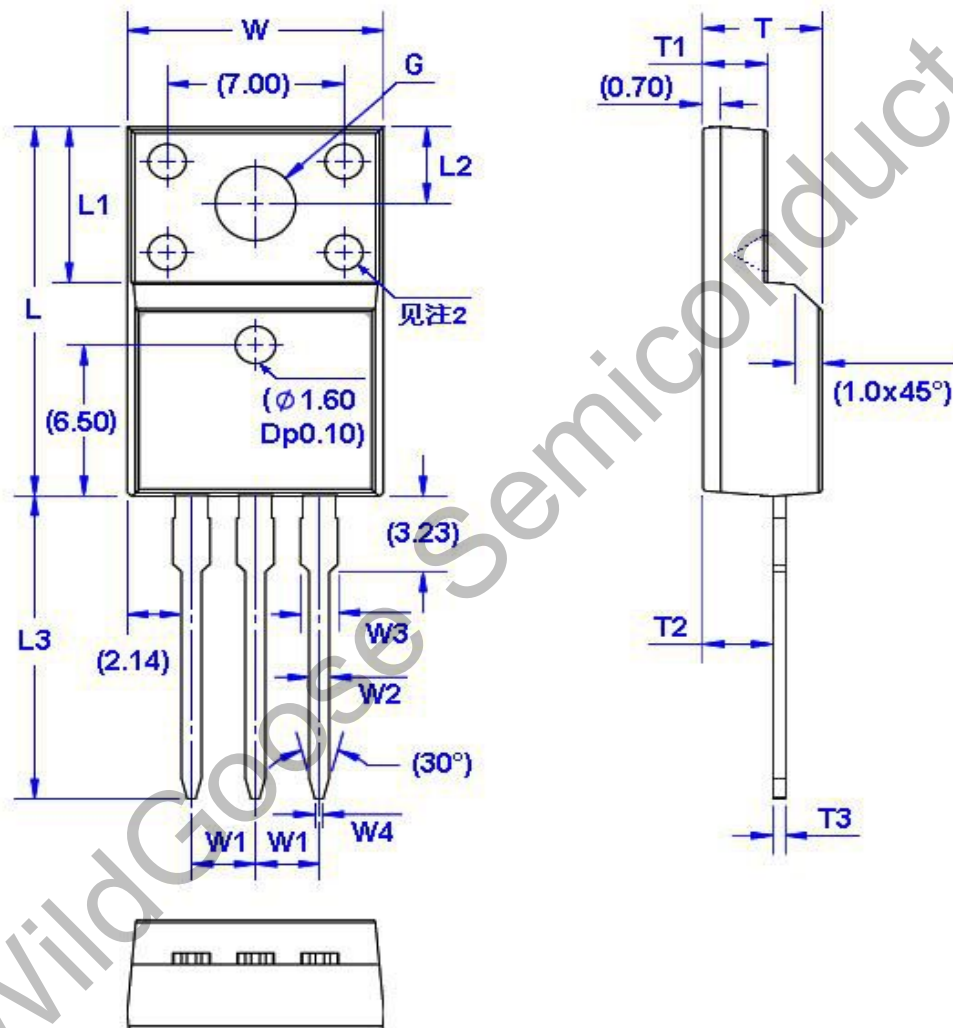


Figure 24. Unclamped Inductive Switching Waveforms

Package Dimension

TO-220F

Unit: mm



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