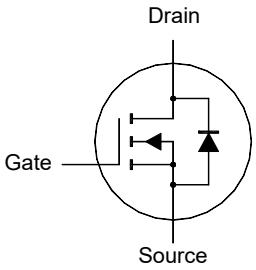
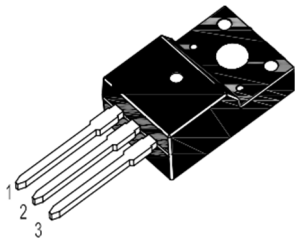
WDAT06N022L-HAF

N-Channel Enhancement Mode MOSFET





1.Gate 2.Drain 3.Source

TO-220F Plastic Package

Features

- Low Switching charge
- Low Miller Capacitance
- Halogen and Antimony Free(HAF), RoHS compliant

Applications

- Battery powered circuits
- Synchronous rectifier applications

Key Parameters

Parameter	Value	Unit
BV_{DSS}	60	V
$R_{DS(ON)}$ Max	3 @ V_{GS} = 10 V	mΩ
	3.6 @ V_{GS} = 4.5 V	
$V_{GS(th)}$ typ	1.5	V
Q_g typ	91 @ V_{GS} = 10 V	nC

Absolute Maximum Ratings (at T_a = 25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	T_c = 25℃ T_c = 100℃	I_D	75 47	A
Peak Drain Current, Pulsed [1]		I_{DM}	500	A
Avalanche Current		I_{AS}	58.1	A
Single Pulsed Avalanche Energy [2]		E_{AS}	168.7	mJ
Power Dissipation	T_c = 25℃	P_D	26.7	W
Operating Junction and Storage Temperature Range		T_J,T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.6	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	45	℃/W

[1] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$ = 150°C.

[2] Limited by $T_{J(MAX)}$, starting T_J = 25 °C, L = 0.1 mH, R_g = 25 Ω, I_D = 58.1 A, V_{GS} = 10 V.

Dated: 19/08/2021 Rev: 01

Characteristics at T_a = 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 µA	$V_{(BR)DSS}$	60	-	-	V
Drain-Source On-State Current at V_{DS} = 48 V	I_{DSS}	-	-	10	µA
Gate-Source Leakage Current at V_{GS} = ± 20 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D = 250 µA	$V_{GS(th)}$	1	-	2.5	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 50 A at V_{GS} = 4.5 V, I_D = 20 A	$R_{DS(ON)}$	- -	2.4 -	3 3.6	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 5 V, I_D = 50 A	g_{fs}	-	62	-	S
Gate Resistance at V_{GS} = 0 V, V_{DS} = 0 V, f = 1 MHz	R_g	-	1	-	Ω
Input Capacitance at V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz	C_{iss}	-	5174	-	pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz	C_{oss}	-	2127	-	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz	C_{rss}	-	40	-	pF
Total Gate Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 50 A at V_{GS} = 4.5 V, V_{DS} = 30 V, I_D = 50 A	Q_g	- -	91 45	- -	nC
Gate-Source Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 50 A	Q_{gs}	-	16	-	nC
Gate-Drain Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 50 A	Q_{gd}	-	20	-	nC
Turn-On Delay Time at V_{GS} = 10 V, V_{DD} = 31 V, I_D = 50 A, R_g = 3.3 Ω	$t_{d(on)}$	-	33	-	ns
Turn-On Rise Time at V_{GS} = 10 V, V_{DD} = 31 V, I_D = 50 A, R_g = 3.3 Ω	t_r	-	73	-	ns
Turn-Off Delay Time at V_{GS} = 10 V, V_{DD} = 31 V, I_D = 50 A, R_g = 3.3 Ω	$t_{d(off)}$	-	31	-	ns
Turn-Off Fall Time at V_{GS} = 10 V, V_{DD} = 31 V, I_D = 50 A, R_g = 3.3 Ω	t_f	-	36	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = 1 A, V_{GS} = 0 V	V_{SD}	-	-	1.2	V
Body-Diode Continuous Current	I_S	-	-	75	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	500	A
Body Diode Reverse Recovery Time at I_S = 30 A, di/dt = 100 A / µs	t_{rr}	-	54	-	ns
Body Diode Reverse Recovery Charge at I_S = 30 A, di/dt = 100 A / µs	Q_{rr}	-	65	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

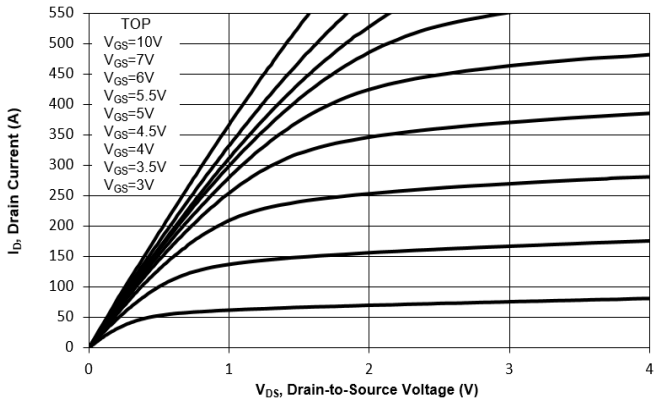


Fig. 2 Typical Transfer Characteristics

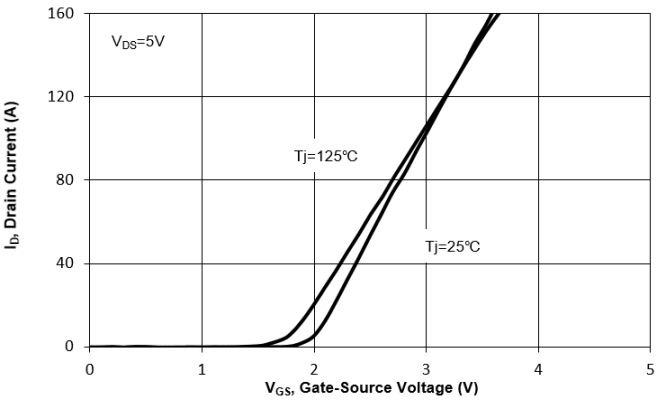


Fig. 3 On-Resistance vs. Drain Current

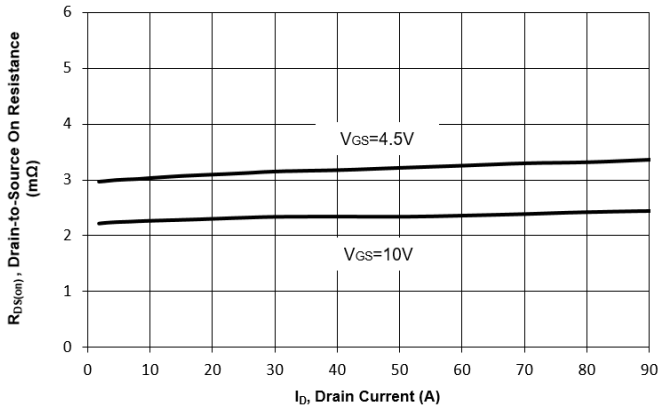


Fig. 4 On-Resistance vs. Gate Voltage

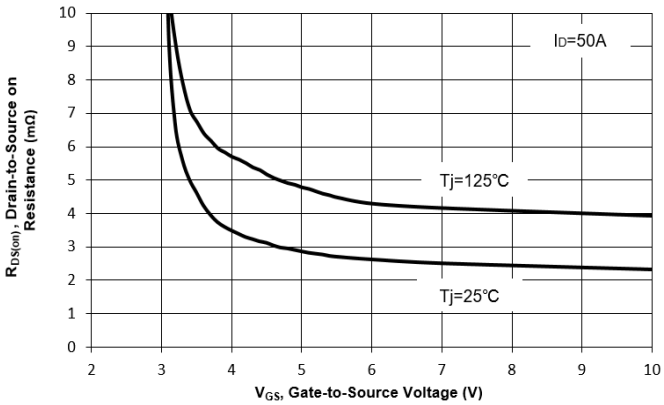


Fig. 5 On-Resistance vs.T_j

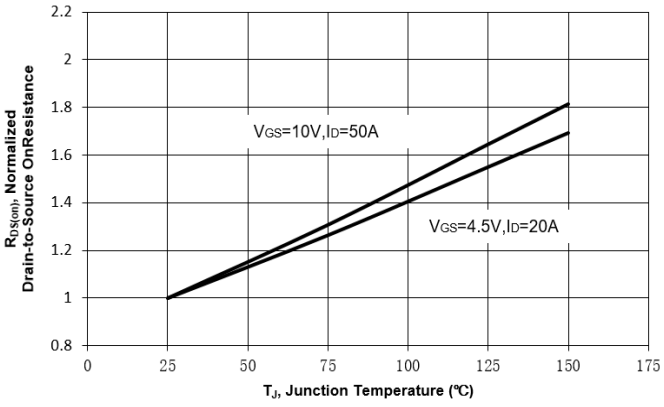
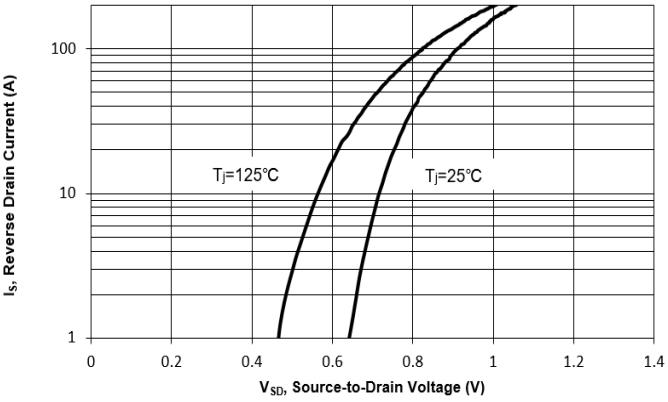


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

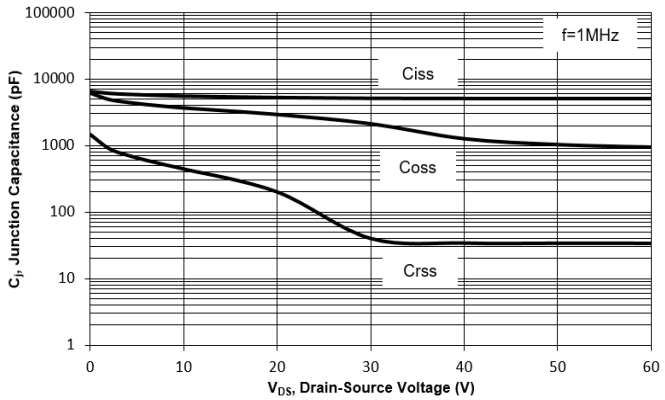


Fig. 8 Drain-Source Leakage Current vs. T_j

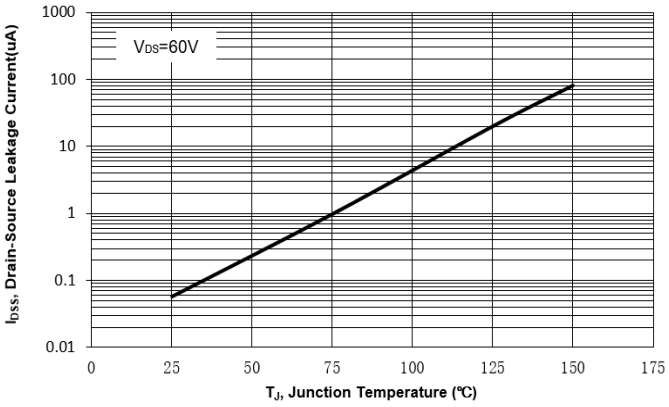


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

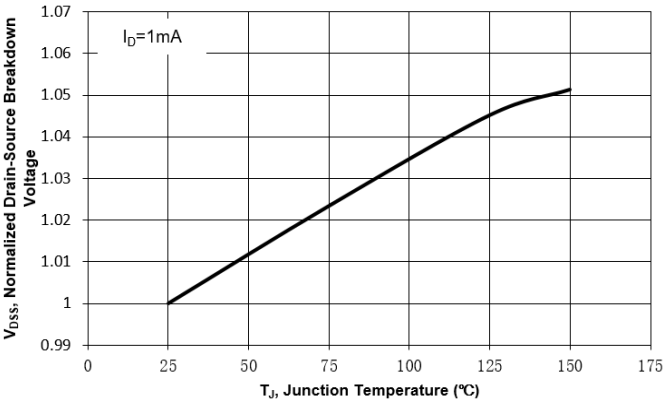


Fig. 10 Gate Threshold Variation vs. T_j

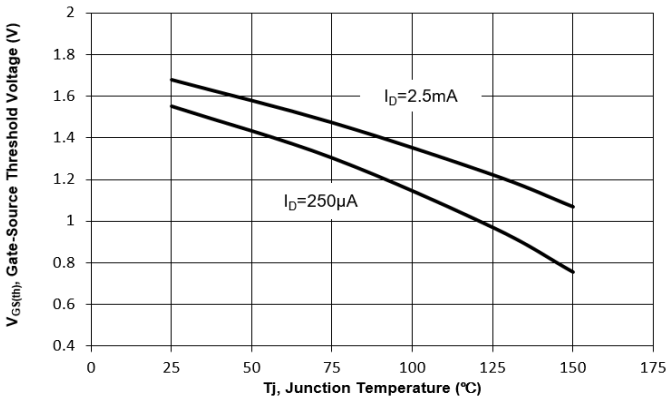


Fig. 11 Gate Charge

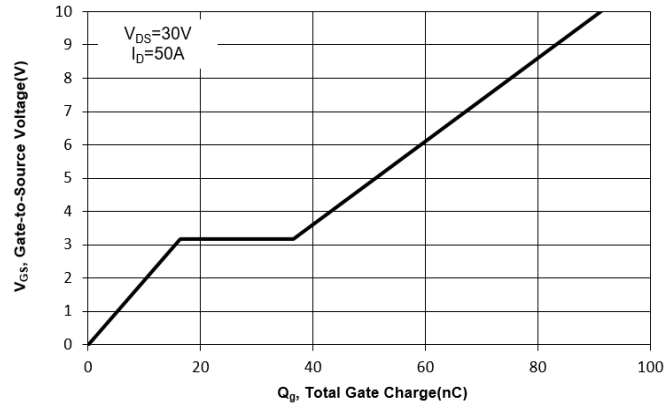
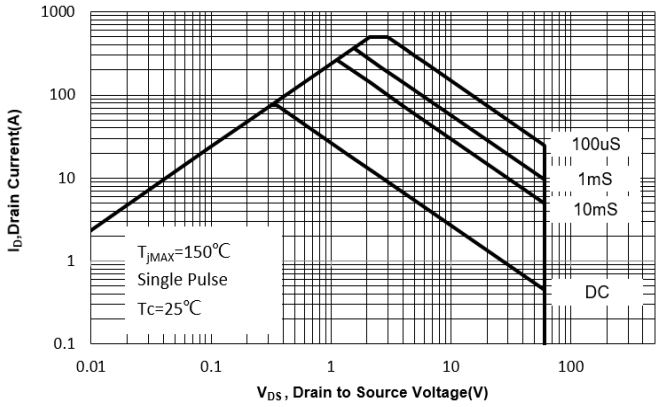


Fig. 12 Safe Operation Area



Electrical Characteristics Curves

Fig. 13 Normalized Maximum Transient Thermal Impedance($z_{\Theta JC}$)

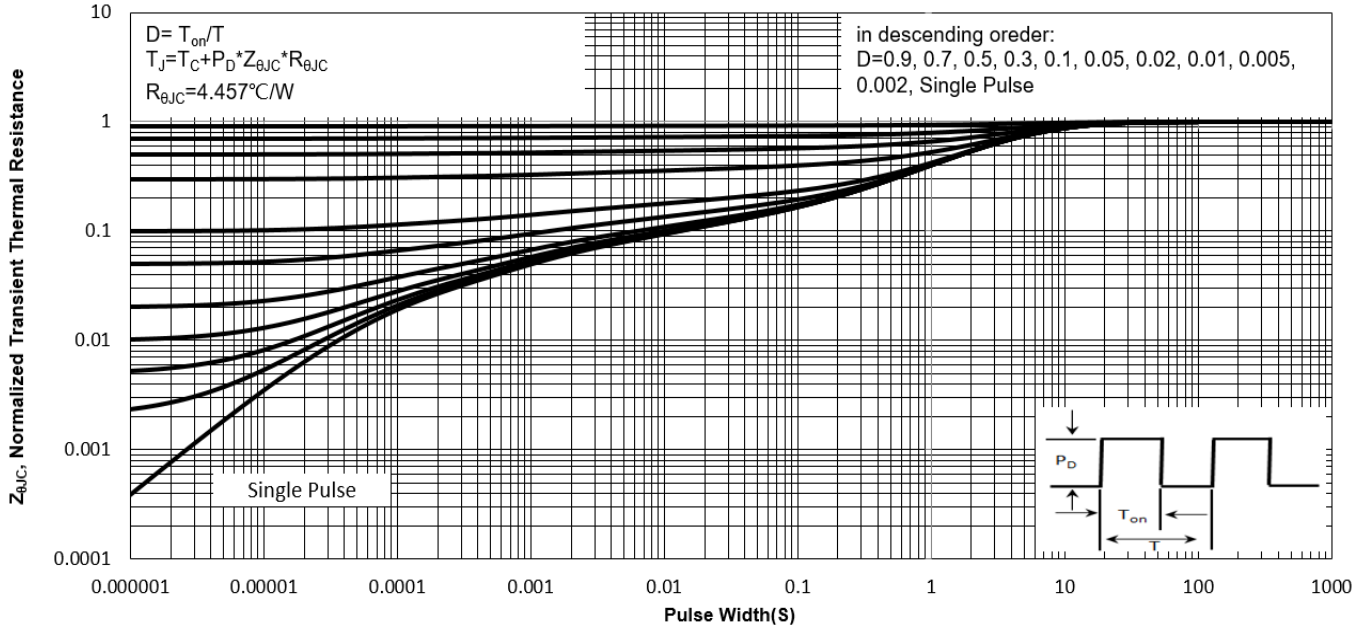
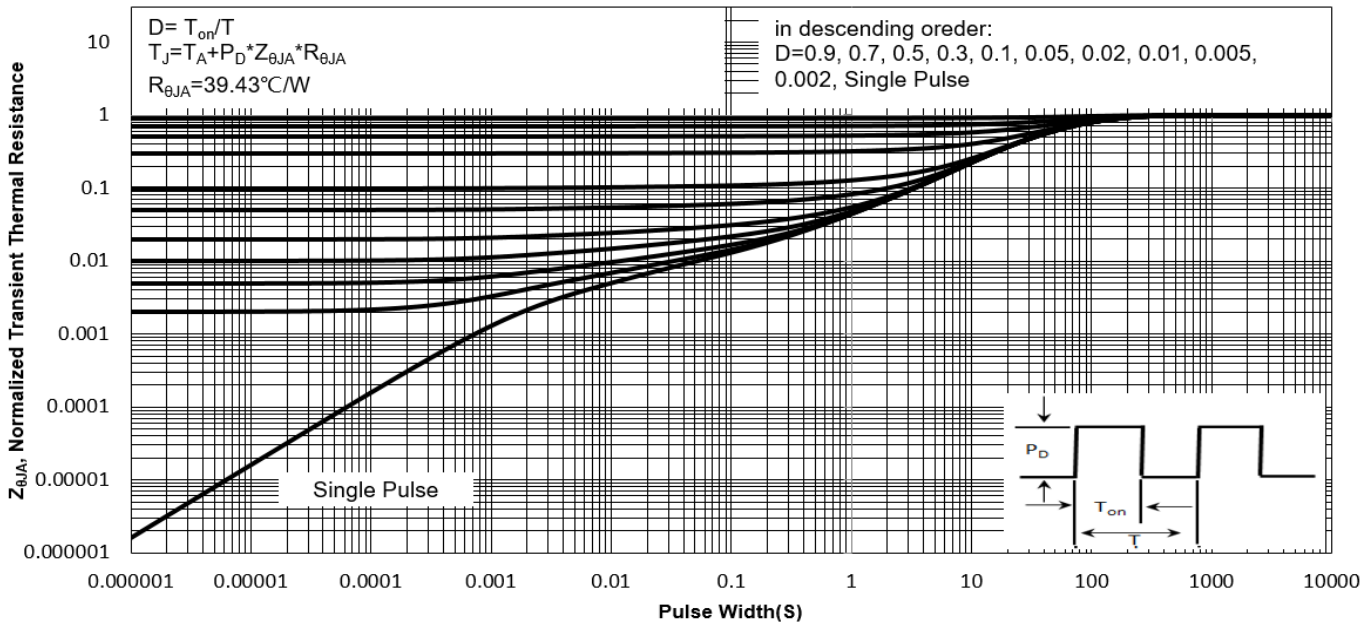


Fig. 14 Normalized Maximum Transient Thermal Impedance($z_{\Theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

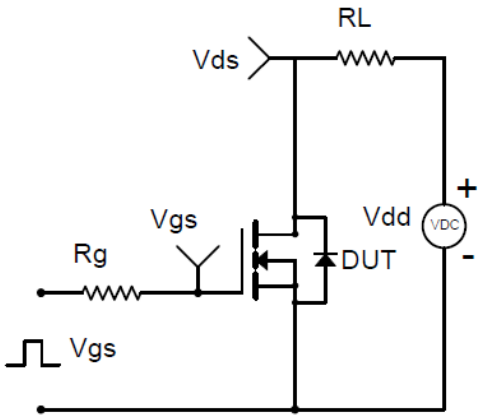


Fig.1-2 Switching Waveform

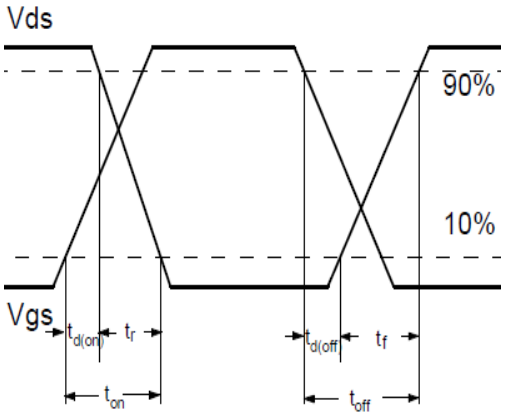


Fig.2-1 Gate charge test circuit

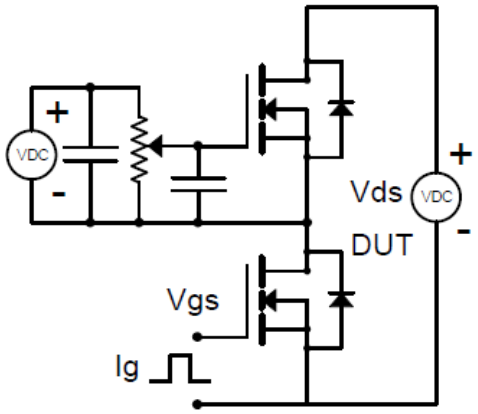


Fig.2-2 Gate charge waveform

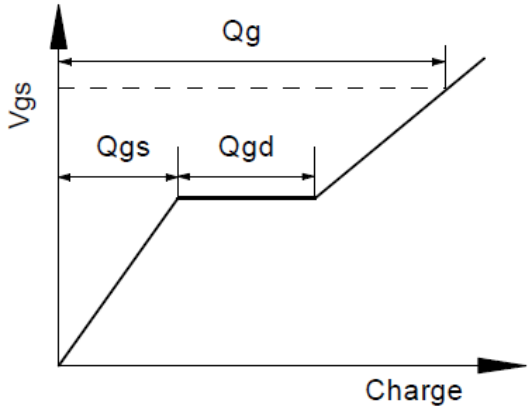


Fig.3-1 Avalanche test circuit

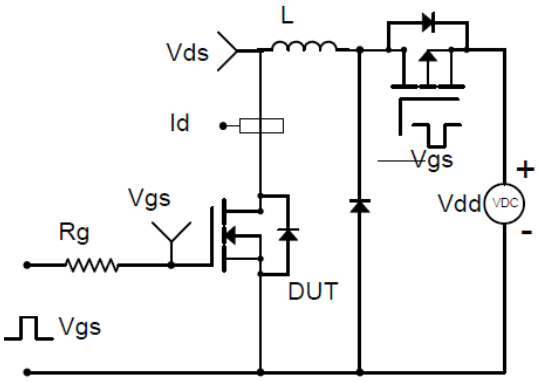
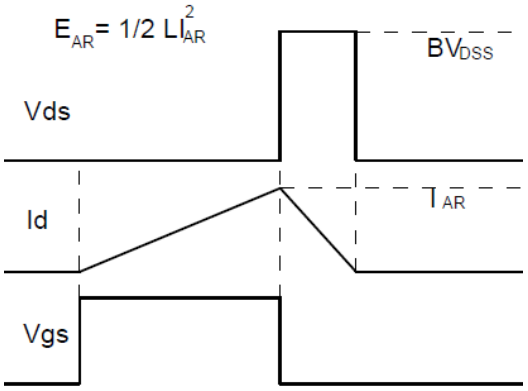
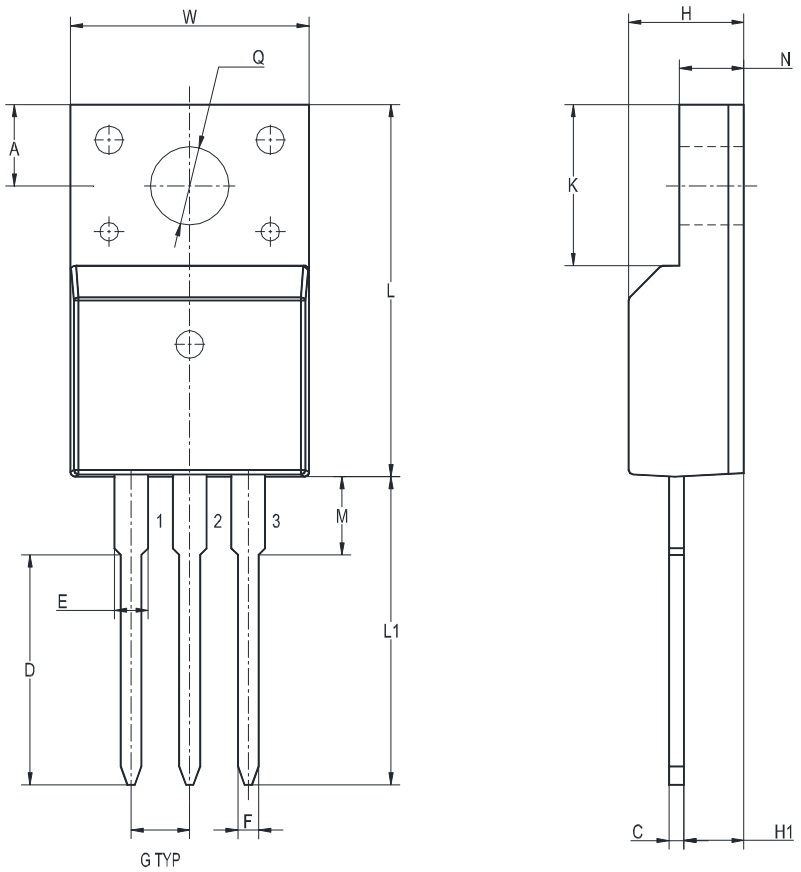


Fig.3-2 Avalanche waveform



Package Outline Dimensions (Units: mm) TO-220F



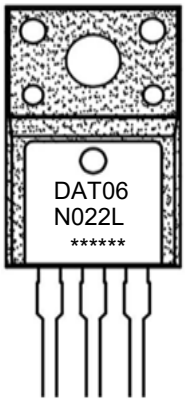
UNIT	A	C	D	E	F	G	W	H	H1	Q	L	L1	M	K	N
mm	3.5	0.7	10.3	1.5	0.9	2.54 TYP	10.5	4.9	2.9	3.4	16	13.5	3.5	6.7	2.8
	2.8	0.4	9.7	1.1	0.7		9.5	4.5	2.5	2.9	15	12.5	2.9	6.2	2.3

Marking information

" DAT06N022L " = Part No.

" ****** " = Date Code Marking

Font type: Arial



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