

WTAT10N020L-HAF

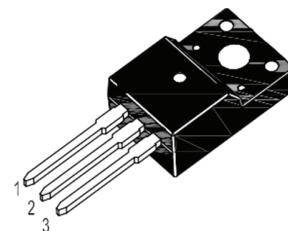
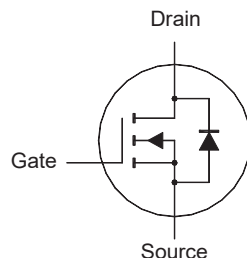
N-Channel Enhancement Mode MOSFET

Features

- High speed switch
- Halogen and Antimony Free(HAF),
RoHS compliant

Applications

- Portable appliances
- Power management



1.Gate 2.Drain 3.Source
TO-220F Plastic Package

Key Parameters

Parameter	Value	Unit
BV_{DS}	100	V
$R_{DS(ON)}$ Max	2.3 @ $V_{GS} = 10\text{ V}$	$m\Omega$
	2.9 @ $V_{GS} = 4.5\text{ V}$	
$V_{GS(th)}$ typ	1.7	V
Q_g typ	217 @ $V_{GS} = 10\text{ V}$	nC

Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	98	A
$T_c = 25^\circ\text{C}$		62	
$T_c = 100^\circ\text{C}$			
Peak Drain Current, Pulsed ¹⁾	I_{DM}	450	A
Power Dissipation	P_D	34.7	W
$T_c = 25^\circ\text{C}$			
Single-Pulse Avalanche Current	I_{AS}	50	A
Single-Pulse Avalanche Energy ²⁾	E_{AS}	625	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	50	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width $\leq 100\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$

²⁾ Limited by $T_{J(MAX)}$, Starting $T_J = 25^\circ\text{C}$, $L = 0.5\text{ mH}$, $I_{AS} = 50\text{ A}$, $V_{GS} = 10\text{ V}$.

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Characteristics at $T_c = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	100	-	-	V
Drain-Source Leakage Current at $V_{DS} = 80\ \text{V}$, $V_{GS} = 0\ \text{V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.2	-	2.5	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 18\ \text{A}$	$R_{DS(on)}$	- -	1.85 -	2.3 2.9	m Ω
DYNAMIC PARAMETERS					
Gate Resistance at $V_{DS} = 0\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	1.5	-	Ω
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	11900	-	pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	6418	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	440	-	pF
Gate Charge Total at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$	Q_g	-	217	-	nC
Gate to Source Charge at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$	Q_{gs}	-	31	-	nC
Gate to Drain Charge at $V_{DS} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $I_D = 20\ \text{A}$	Q_{gd}	-	56	-	nC
Turn-On Delay Time at $I_D = 20\ \text{A}$, $V_{DD} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $R_g = 4.7\ \Omega$	$t_{d(on)}$	-	81	-	ns
Turn-On Rise Time at $I_D = 20\ \text{A}$, $V_{DD} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $R_g = 4.7\ \Omega$	t_r	-	70	-	ns
Turn-Off Delay Time at $I_D = 20\ \text{A}$, $V_{DD} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $R_g = 4.7\ \Omega$	$t_{d(off)}$	-	86	-	ns
Turn-Off Fall Time at $I_D = 20\ \text{A}$, $V_{DD} = 50\ \text{V}$, $V_{GS} = 10\ \text{V}$, $R_g = 4.7\ \Omega$	t_f	-	34	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 1\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}	-	-	1.2	V
Body-Diode Continuous Current	I_S	-	-	98	A
Body Diode Reverse Recovery Time at $I_S = 20\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	t_{rr}	-	127	-	ns
Body Diode Reverse Recovery Charge at $I_S = 20\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	Q_{rr}	-	254	-	nC

Fig.1 Output Characteristics

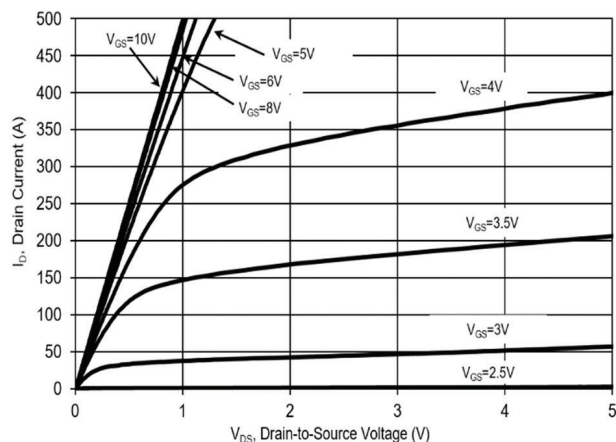


Fig.2 Transfer Characteristics

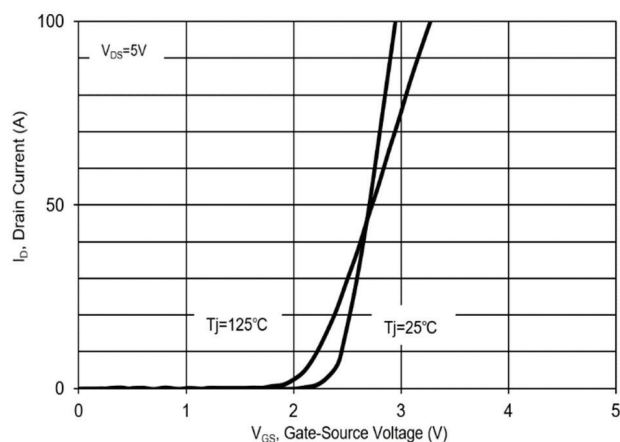


Fig.3 On-Resistance vs Drain Current

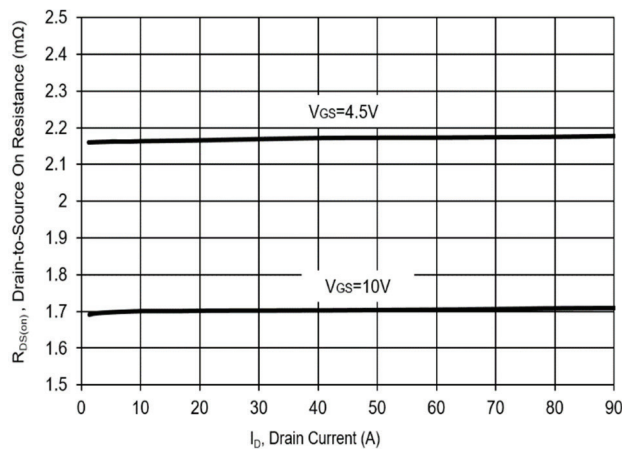


Fig.4 On Resistance vs. Temperature

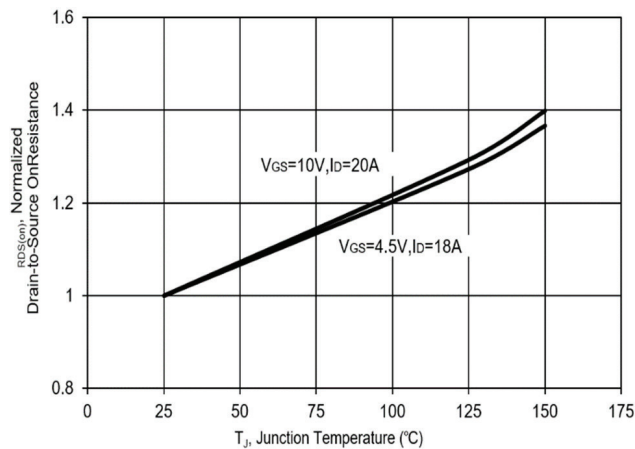


Fig.5 On Resistance vs. V_{GS}

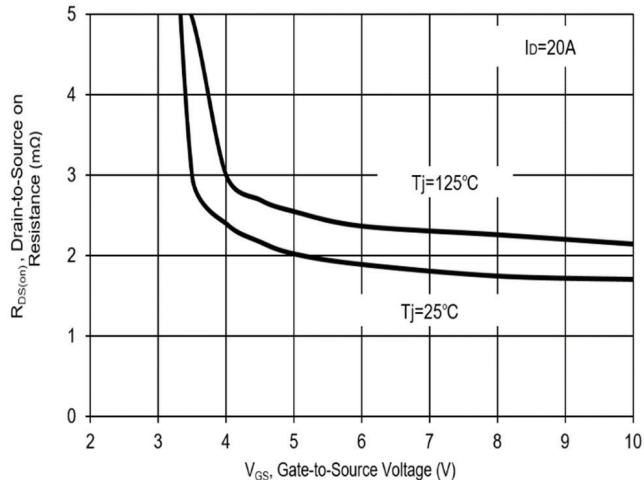
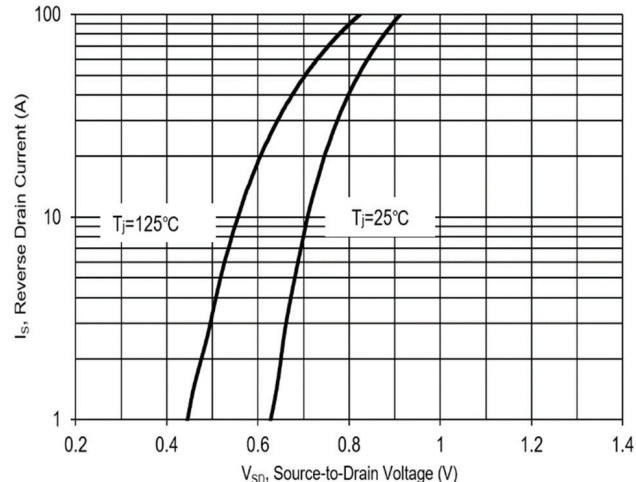


Fig.6 Body Diode Forward Characteristics



Electrical Characteristics Curves

Fig.7 Drain-Source Leakage Current Vs T_j

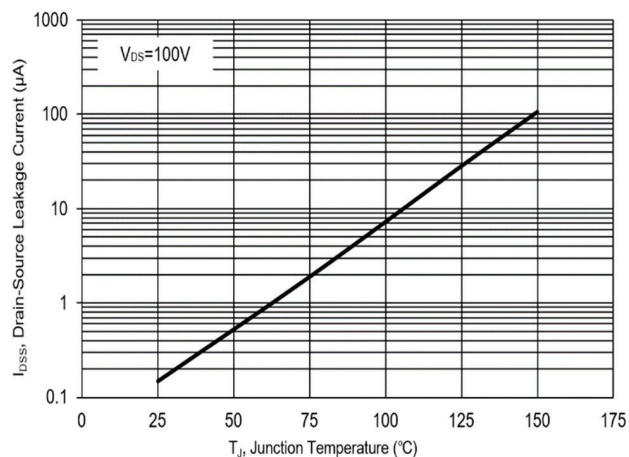


Fig.8 Drain-Source Breakdown Voltage Vs T_j

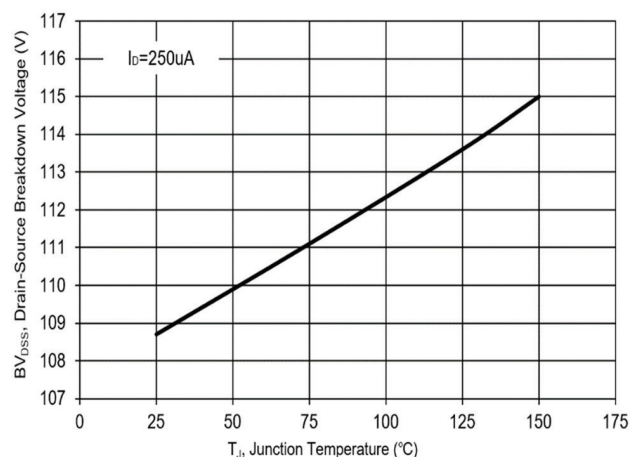


Fig.9 Gate-Source Threshold Voltage Vs T_j

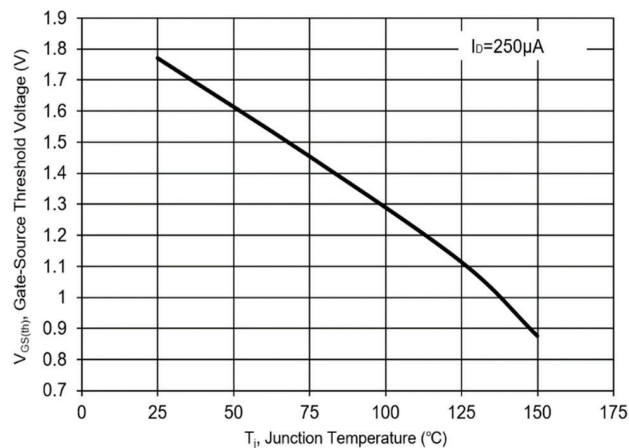


Fig.10 Capacitance Characteristics

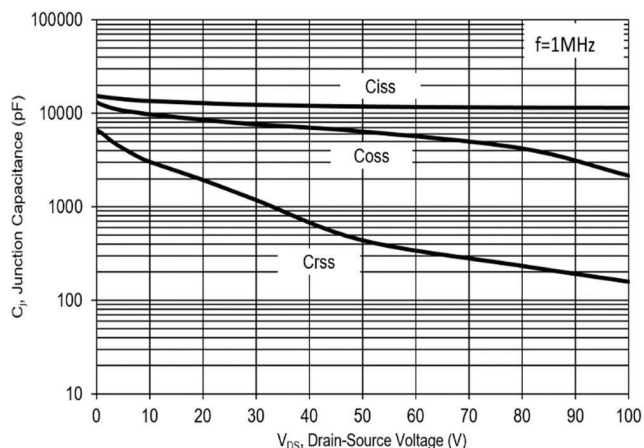


Fig. 11 Gate Charge Characteristics

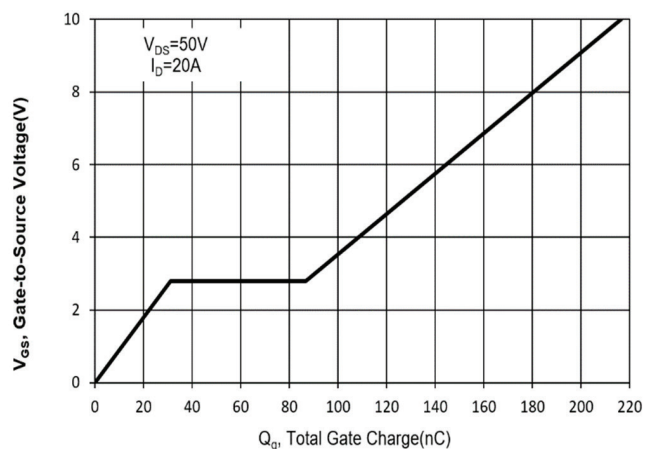
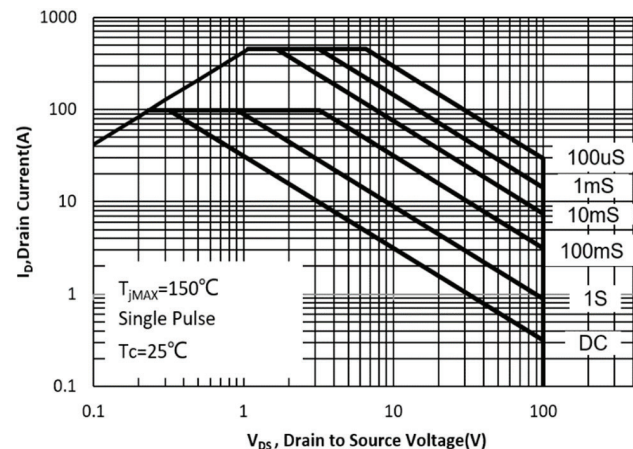


Fig.12 SOA



Electrical Characteristics Curves

Fig.13 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)

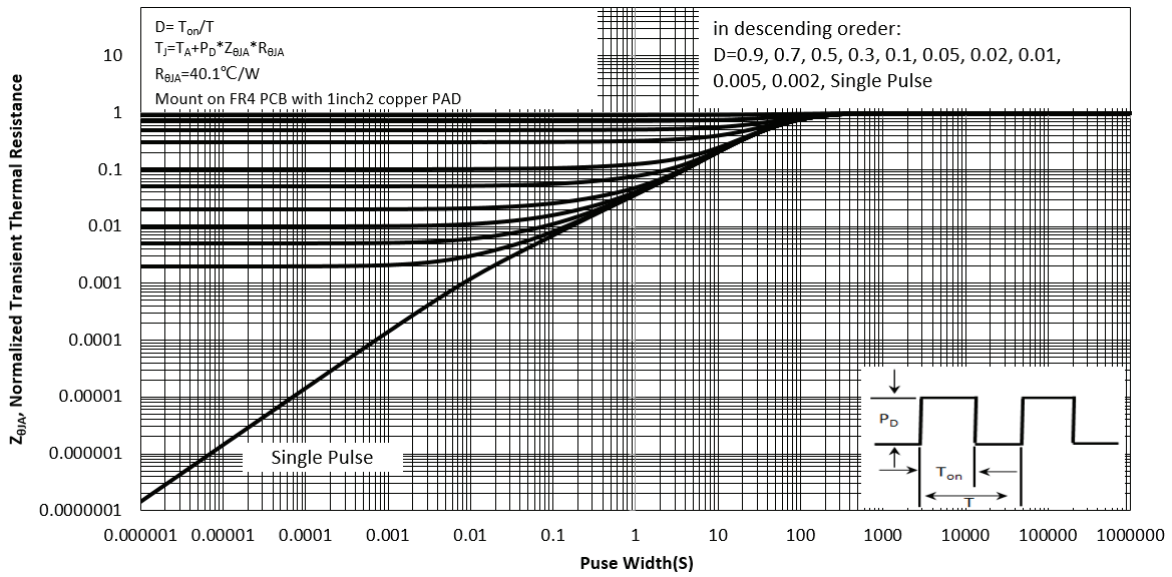
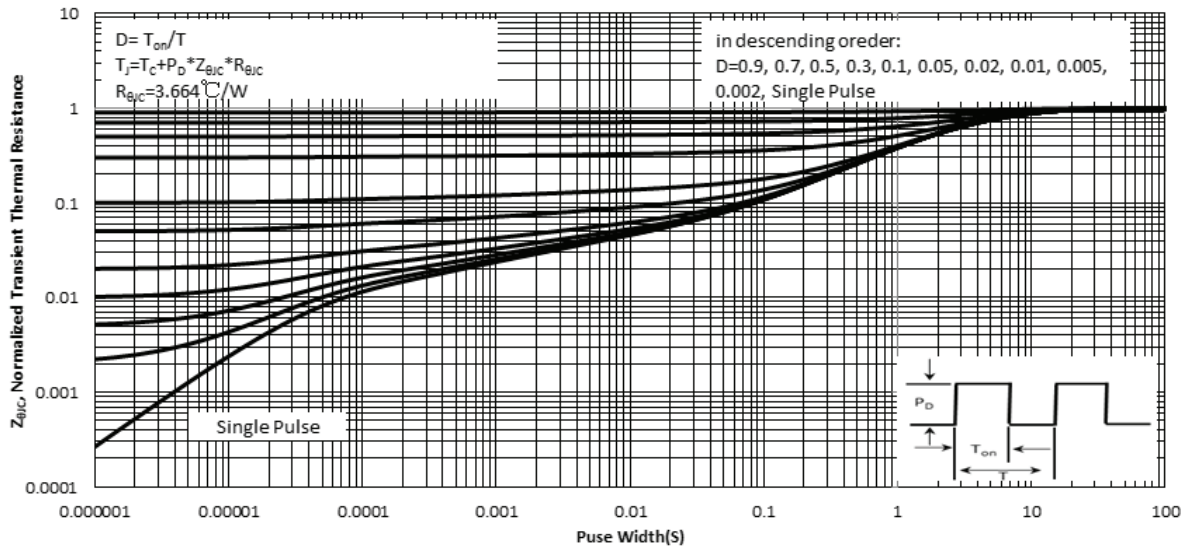


Fig.14 Normalized Maximum Transient Thermal Impedance($z_{\theta JC}$)



Test Circuits

Fig.1-1 Switching times test circuit

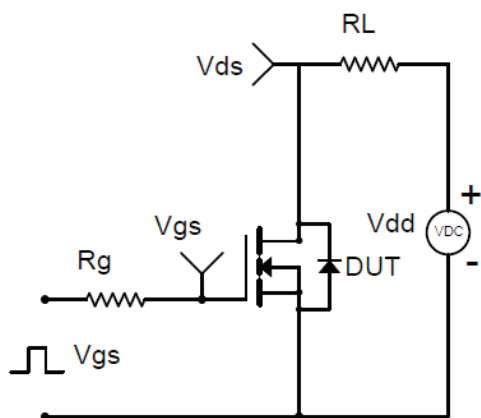


Fig.1-2 Switching Waveform

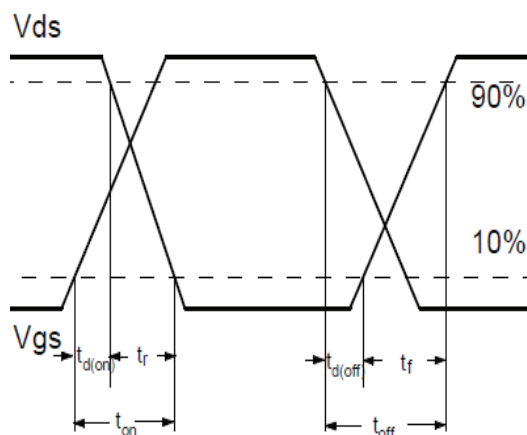


Fig.2-1 Gate charge test circuit

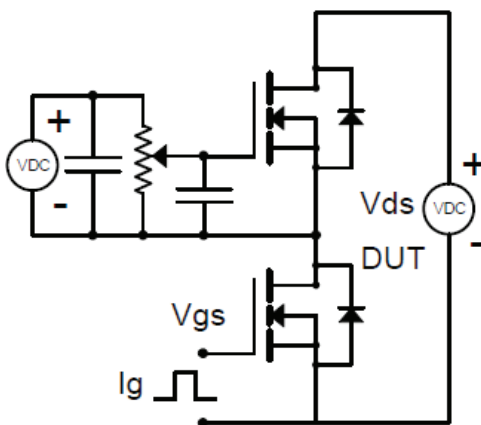


Fig.2-2 Gate charge waveform

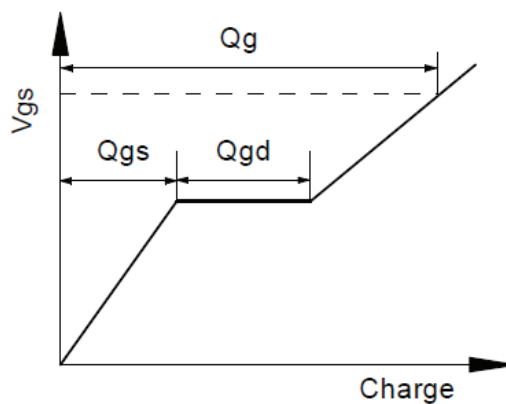


Fig.3-1 Avalanche test circuit

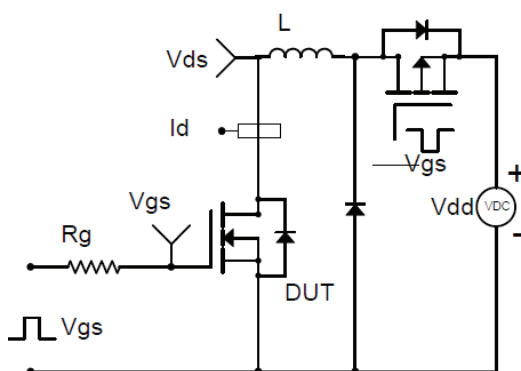
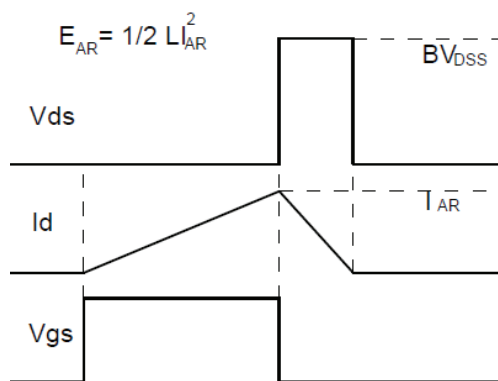
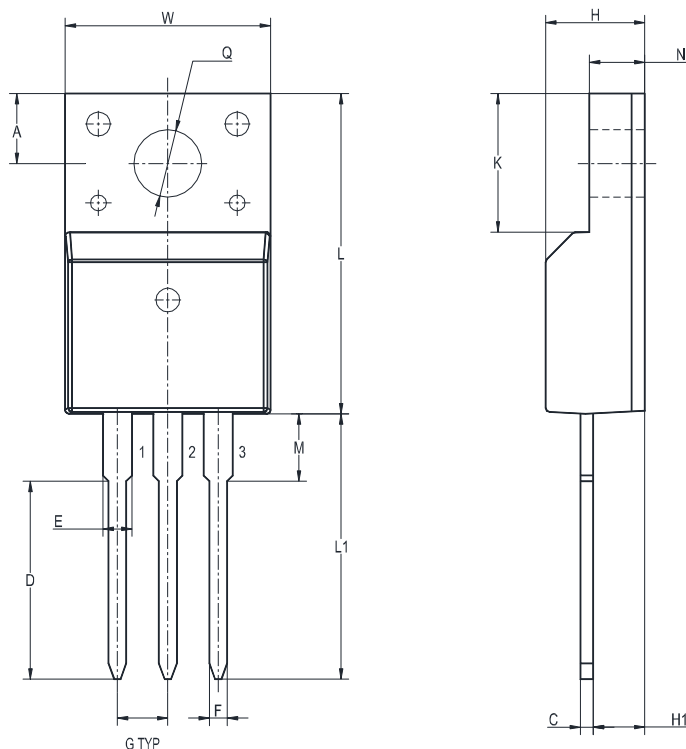


Fig.3-2 Avalanche waveform



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	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	TYP.	9.5	4.5	2.5	2.9	15	12.5	2.9	6.2	2.3

Packing information

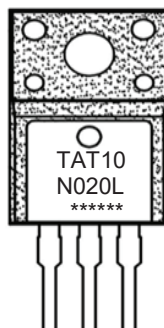
Package	Carton Quantity	Box Quantity	Base Quantity	Delivery Mode
TO-220F	5 K / Carton	1 K / Box	50 pcs / Tube	Tube

Marking information

" TAT10N020L " = Part No.

" ***** " = Date Code Marking

Font type: Arial



Disclaimer: Our company reserve the right to make modifications, enhancements, improvements, corrections or other changes to improve product design, functions and reliability, anytime without notice.