

WTAT08N040S-HAF

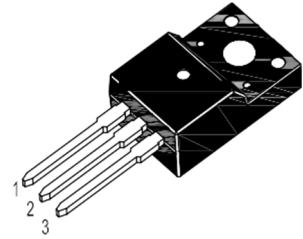
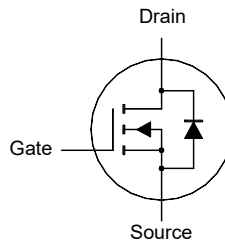
N-Channel Enhancement Mode MOSFET

Features

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

Application

- Power management



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

Key Parameters

Parameter	Value	Unit
BV_{DSS}	80	V
$R_{DS(ON)}$ Max	4.2 @ $V_{GS} = 10$ V	m Ω
	4.9 @ $V_{GS} = 7$ V	
$V_{GS(th)}$ typ	2.8	V
Q_g typ	89 @ $V_{GS} = 10$ V	nC

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

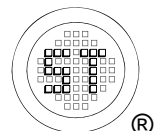
Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	80	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Drain Current	I_D	$T_c = 25^\circ\text{C}$	65	A
		$T_c = 100^\circ\text{C}$	42	A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	400	A	
Avalanche Current	I_{AS}	22	A	
Single Pulse Avalanche Energy ²⁾	E_{AS}	121	mJ	
Power Dissipation	P_{tot}	34.7	W	
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	$R_{\theta JC}$	3.6	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	50	$^\circ\text{C/W}$

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

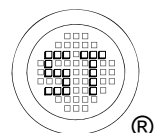
²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 0.5$ mH, $R_g = 25$ Ω , $I_{AS} = 22$ A, $V_{GS} = 10$ V.



WTAT08N040S-HAF

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$	BV_{DSS}	80	-	-	V
Drain-Source Leakage Current at $V_{DS} = 64 \text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20 \text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}$ at $V_{GS} = 7 \text{ V}, I_D = 20 \text{ A}$	$R_{DS(on)}$	- -	3.3 -	4.2 4.9	$\text{m}\Omega$
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5 \text{ V}, I_D = 20 \text{ A}$	g_{fs}	-	41	-	S
Gate Resistance at $V_{GS} = 0 \text{ V}, V_{DS} = 0 \text{ V}, f = 1 \text{ MHz}$	R_g	-	1.1	-	Ω
Input Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 40 \text{ V}, f = 1 \text{ MHz}$	C_{iss}	-	5500	-	pF
Output Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 40 \text{ V}, f = 1 \text{ MHz}$	C_{oss}	-	833	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 40 \text{ V}, f = 1 \text{ MHz}$	C_{rss}	-	63	-	pF
Gate charge total at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}$	Q_g	-	89	-	nC
Gate to Source Charge at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}$	Q_{gs}	-	25	-	nC
Gate to Drain Charge at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}$	Q_{gd}	-	20	-	nC
Turn-On Delay Time at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}, R_g = 3.3 \Omega$	$t_{d(on)}$	-	35.5	-	ns
Turn-On Rise Time at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}, R_g = 3.3 \Omega$	t_r	-	50	-	ns
Turn-Off Delay Time at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}, R_g = 3.3 \Omega$	$t_{d(off)}$	-	29	-	ns
Turn-Off Fall Time at $V_{DS} = 40 \text{ V}, I_D = 30 \text{ A}, V_{GS} = 10 \text{ V}, R_g = 3.3 \Omega$	t_f	-	11	-	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	-	-	65	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	400	A
Body Diode Reverse Recovery Time at $I_S = 30 \text{ A}, V_{DD} = 50 \text{ V}, di/dt = 200 \text{ A} / \mu\text{s}$	t_{rr}	-	43.5	-	ns
Body Diode Reverse Recovery Charge at $I_S = 30 \text{ A}, V_{DD} = 50 \text{ V}, di/dt = 200 \text{ A} / \mu\text{s}$	Q_{rr}	-	98.8	-	nC



Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

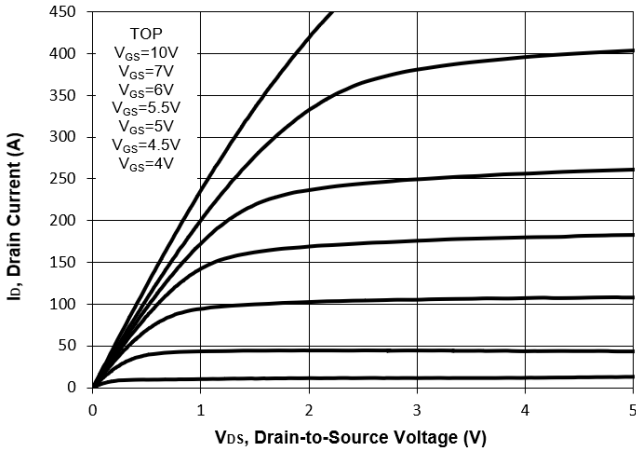


Fig. 2 Typical Transfer Characteristics

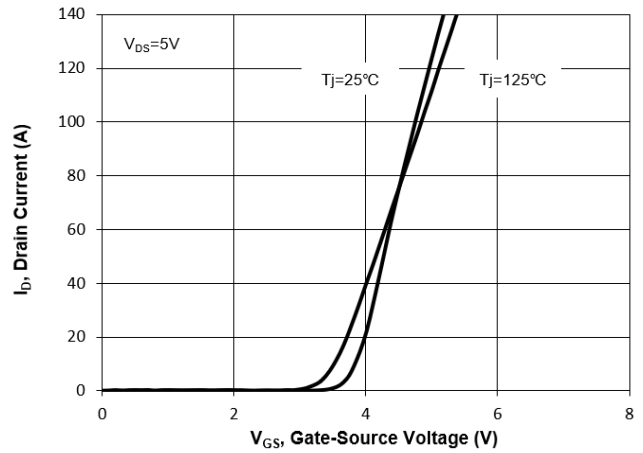


Fig. 3 on-Resistance vs Drain Current

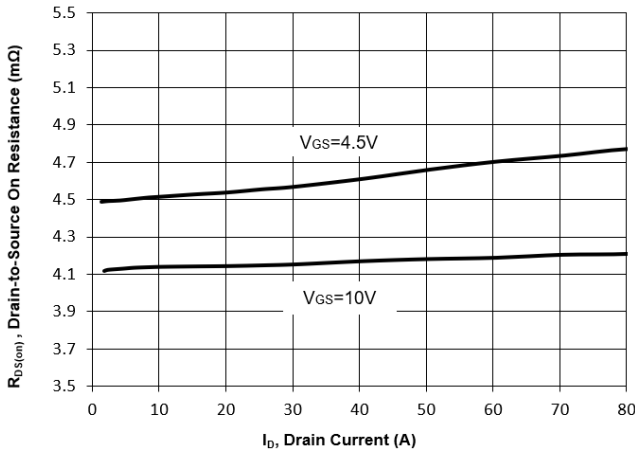


Fig. 4 on-Resistance vs. Gate to Source Voltage

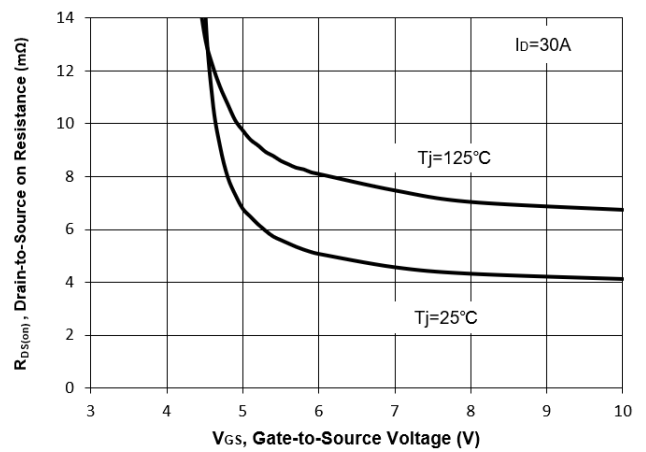


Fig. 5 on-Resistance vs. T_J

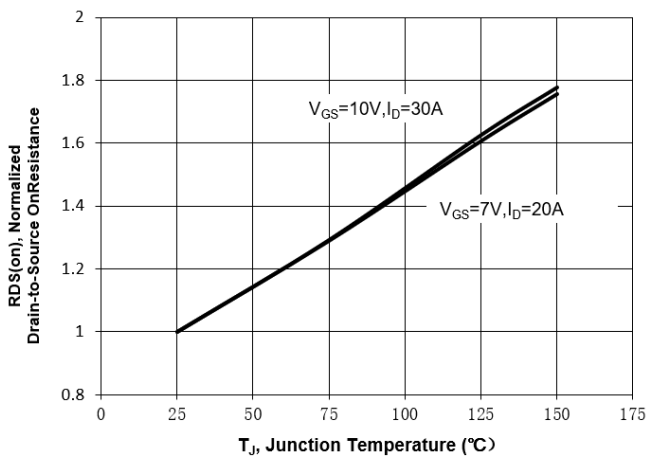
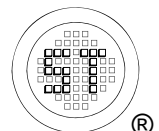
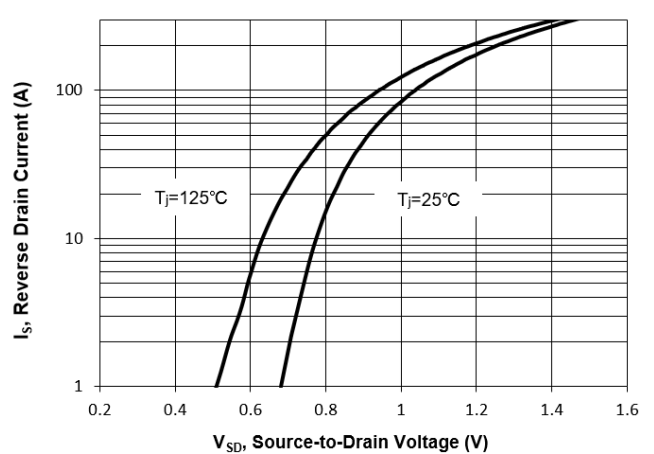


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

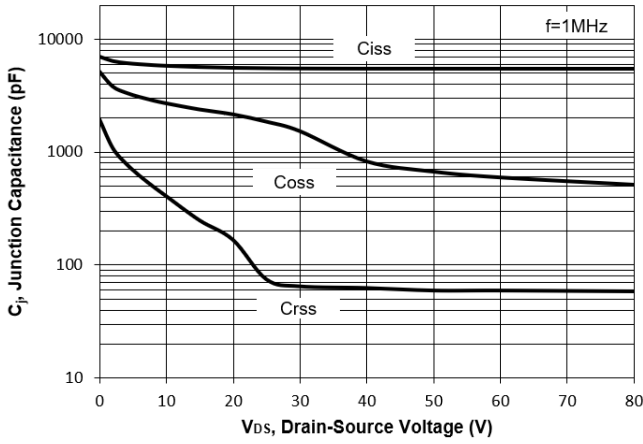


Fig. 8 Drain-Source Leakage Current vs. T_j

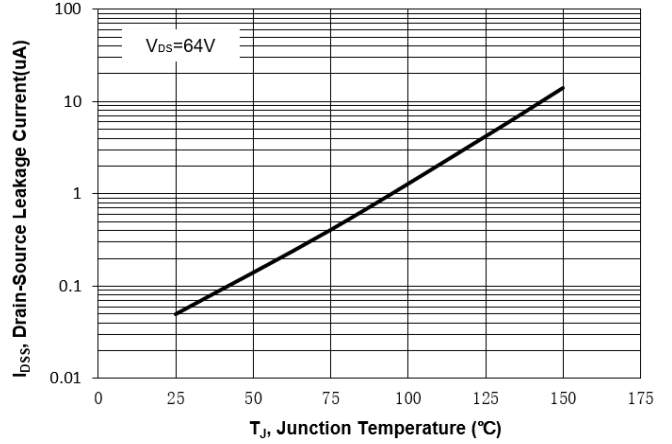


Fig. 9 V_{(BR)DSS} vs. Junction Temperature

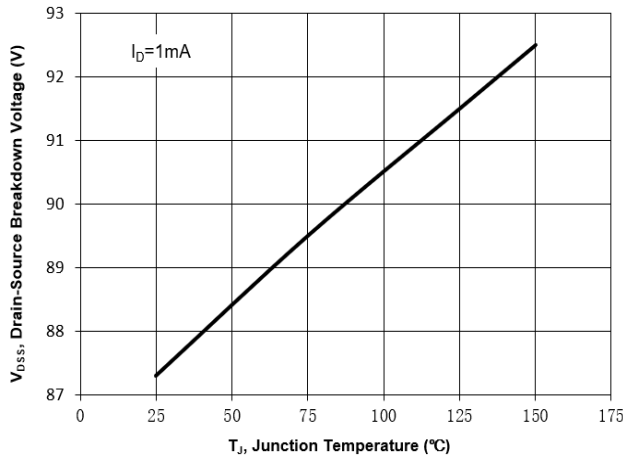


Fig. 10 Gate Threshold Variation vs. T_j

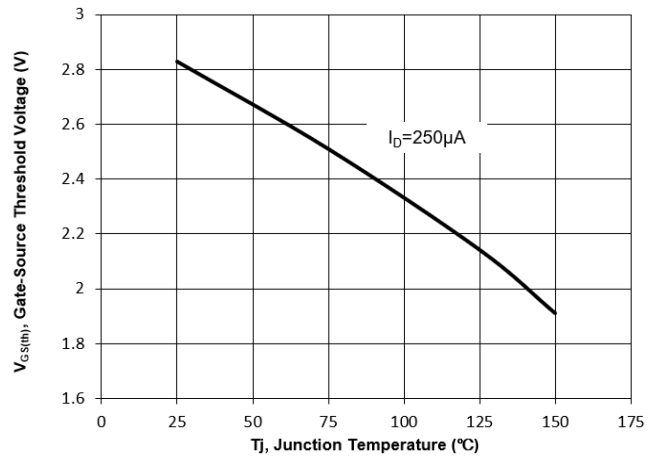


Fig. 11 Gate Charge

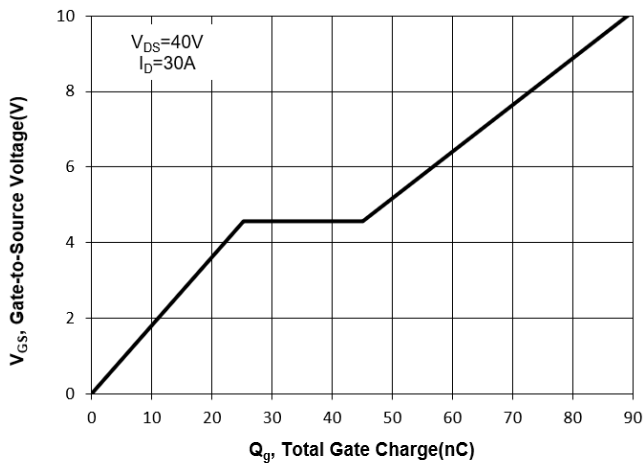
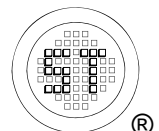
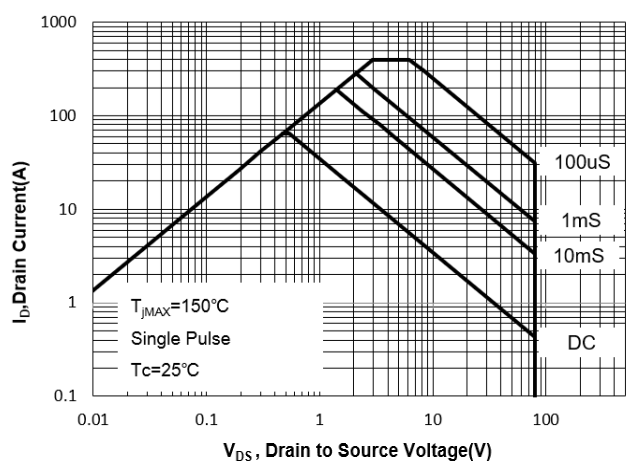


Fig. 12 Safe Operation Area



Electrical Characteristics Curves

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

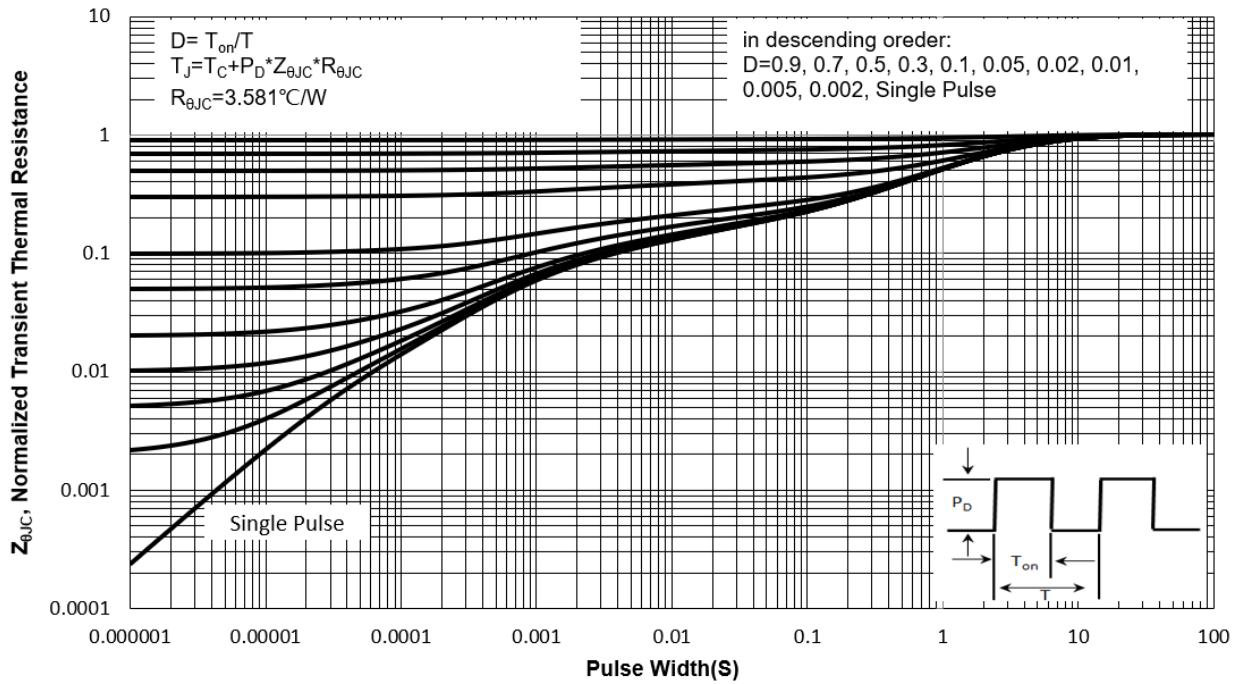
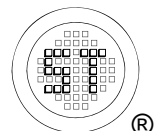
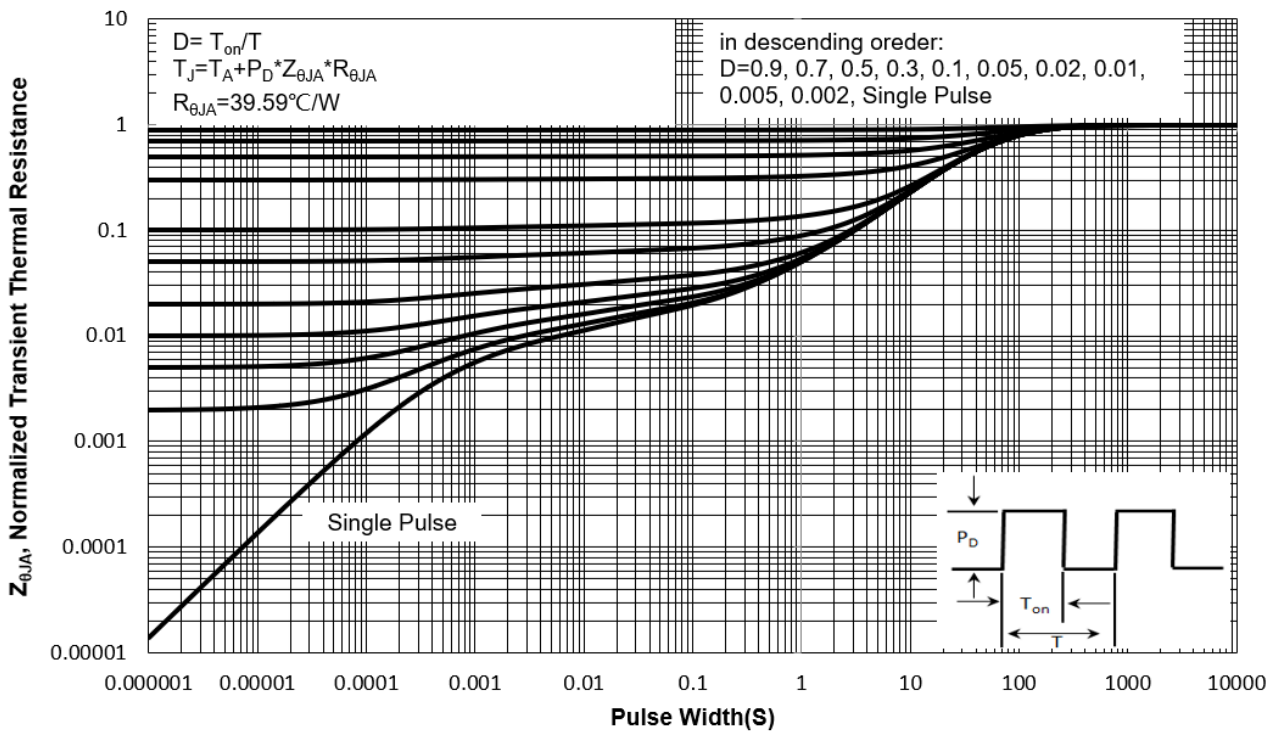


Fig.14 Normalized Maximum Transient Thermal Impedance($z_{\theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

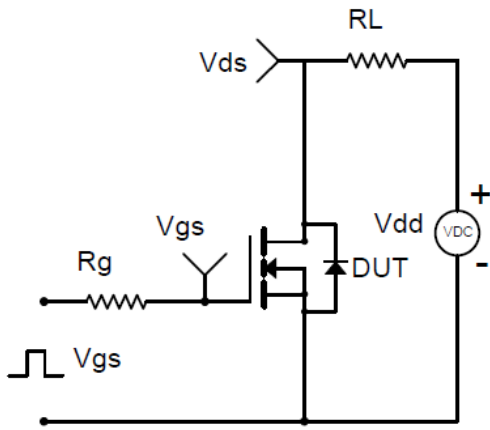


Fig.1-2 Switching Waveform

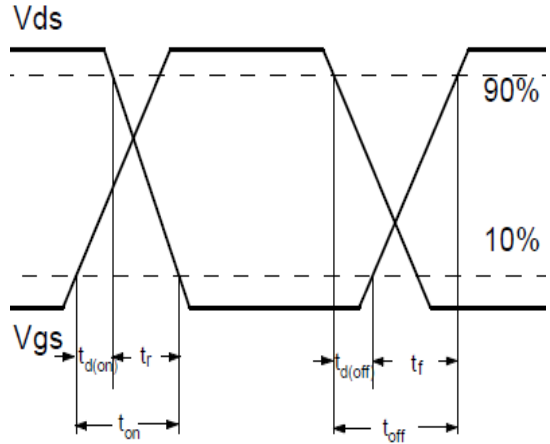


Fig.2-1 Gate charge test circuit

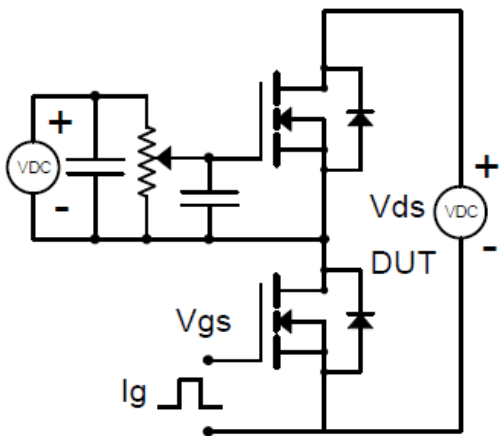


Fig.2-2 Gate charge waveform

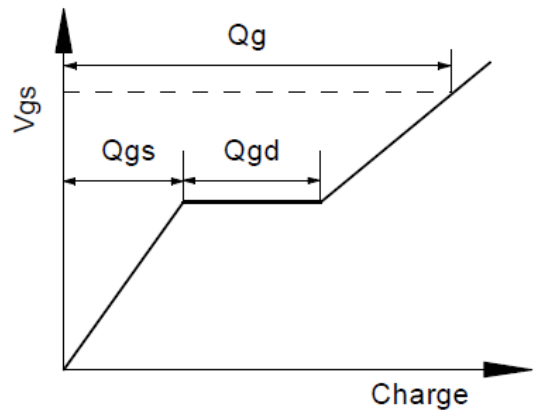


Fig.3-1 Avalanche test circuit

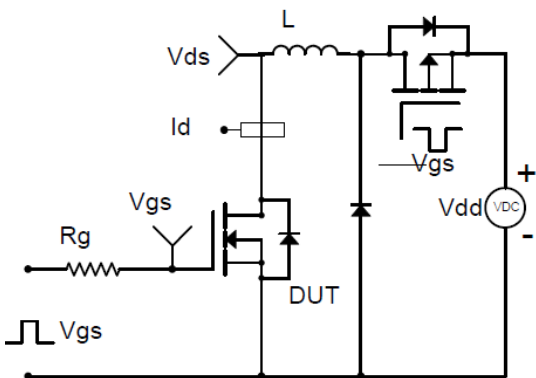
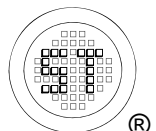
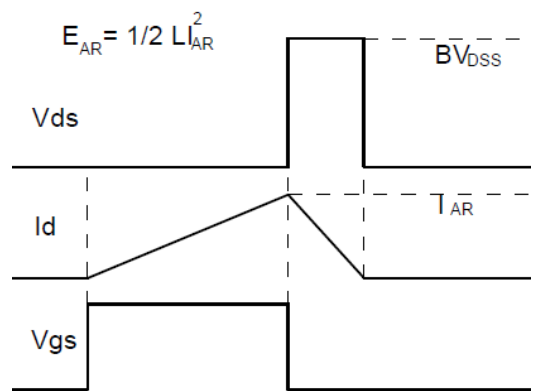


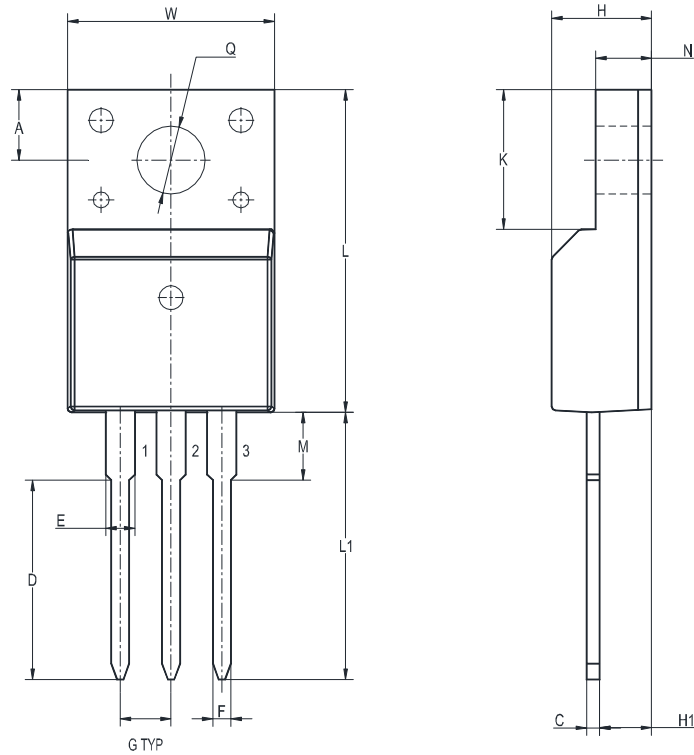
Fig.3-2 Avalanche waveform



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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

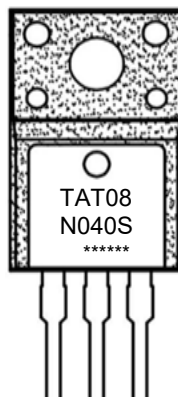
Package	Carton Quantity	Box Quantity	Base Quantity	Delivery Mode
TO-220F	5 K / Carton	1 K / Box	50 pcs / Tube	Tube

Marking information

" TAT08N040S " = Part No.

" ***** " = Date Code Marking

Font type: Arial



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