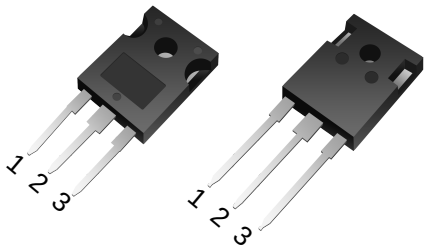
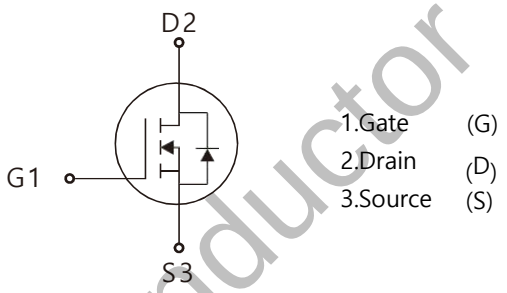
WGA65R041W

Features:

- ☐ Super Junction technology
- ☐ Much lower Ron*A Performance for On-state efficiency
- ☐ Better efficiency due to very low FOM
- ☐ Ultra Low Gate Charge:Qg=172nC (Typ.)
- ☐ VDSS=650V, ID=62A
- ☐ Rds(on):34mΩ(Typ.) @VG=10V
- ☐ 100% Avalanche Tested

TO-247S TO-247 RoHS COMPLIANT





Maximum Ratings(T_A = 25℃ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current - Continuous (T_C = 25°C) (Note 1)	62	A
	Drain Current -Continuous (T_C = 100°C) (Note 1)	39	A
I_{DM}	Drain Current - Pulsed (Note 1,2)	248	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	1656	mJ
dV/dT	MOSFET dv/dt ruggedness	40	V/ns
	Reverse diode dv/dt	40	V/ns
dI/dT	Maximum diode commutation current	800	A/μs
P_D	Power Dissipation (T_C = 25°C)	416	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Steady-State	0.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady State (Note 4)	35	°C/W

Electrical Characteristics (T_J = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA	650			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V, T_J = 25°C			3.5	μA
		V_{DS} = 650 V, V_{GS} = 0 V, T_J = 150°C		1000		
I_{GSS}	Gate Leakage Current	V_{GS} = ± 30 V, V_{DS} = 0 V			± 100	nA
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 3.3 mA	3	4	4.5	V
$R_{DS(ON)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 33.1 A		34	41	mΩ
G_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 25 A		40		S
Dynamic Characteristics						
C_{ISS}	Input capacitance	V_{DS} = 100 V, V_{GS} = 0 V, F = 1 MHz		6715		pF
C_{OSS}	Output capacitance			245		pF
C_{RSS}	Reverse capacitance			1.64		pF
R_G	Gate resistance	F = 1 MHz		1.8		Ω
Switching Characteristics						
$T_{D(ON)}$	Turn On Delay Time	V_{DS} = 400 V, I_D = 40 A, V_{GS} = 10 V, R_{GEN} = 2.2 Ω		28		ns
T_R	Rise Time			44		ns
$T_{D(OFF)}$	Turn Off Delay Time			106		ns
T_F	Fall Time			42		ns
Q_G	Total Gate Charge	V_{DS} = 480 V, I_D = 49.6 A, V_{GS} = 10 V		172		nC
Q_{GS}	Gate-Source Charge			40		nC
Q_{GD}	Gate-Drain Charge			83		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Body-Diode Forward Current				62	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current				248	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V, I_S = 49.6 A		0.92		V
Q_{RR}	Reverse recovery charge	V_{DS} = 400V, I_D = 49.6A di/dt = 100A/μS		1291		nC
T_{RR}	Reverse recovery time			177		ns
I_{RRM}	Peak Reverse Recovery Current			13.7		A

Notes:

1. The max drain current rating limited by package and maximum junction temperature
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 23 mH, V_{DD} = 150 V, I_{AS}= 12 A, R_G = 25 Ω. Starting T_J = 25 °C, guarantee by design
4. Mount on minimum PCB layout

Typical Performance Characteristics

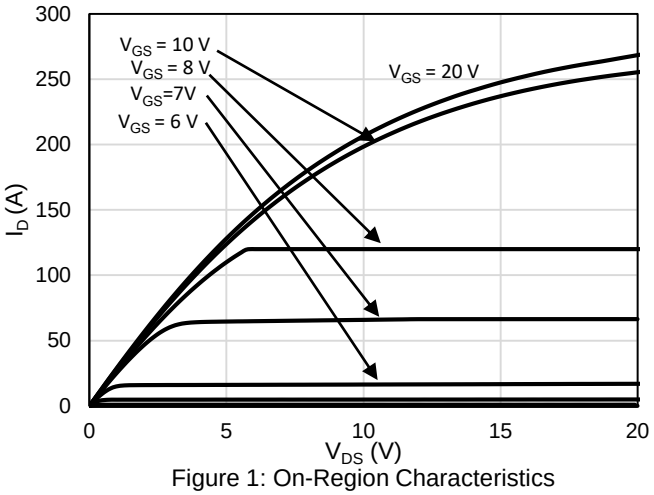


Figure 1: On-Region Characteristics

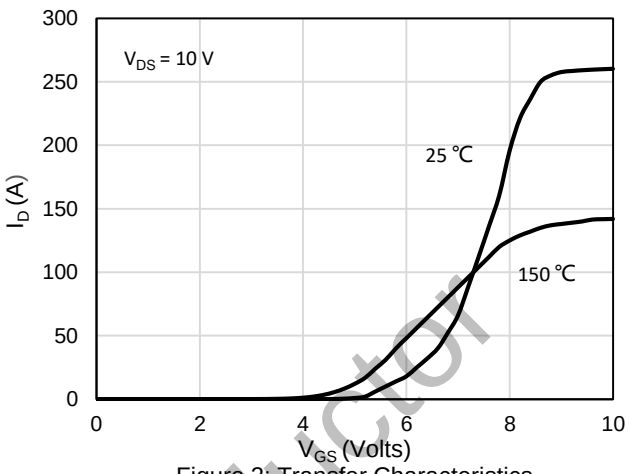


Figure 2: Transfer Characteristics

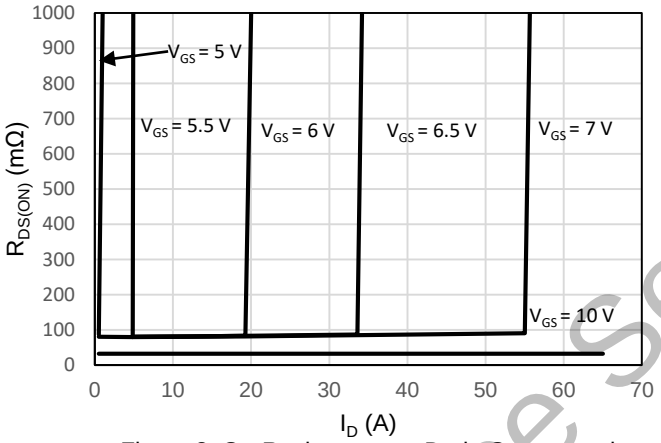


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

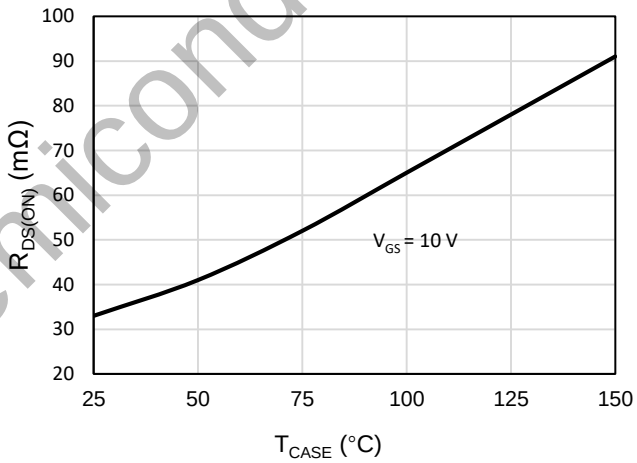


Figure 4: On-Resistance vs. T_{CASE}

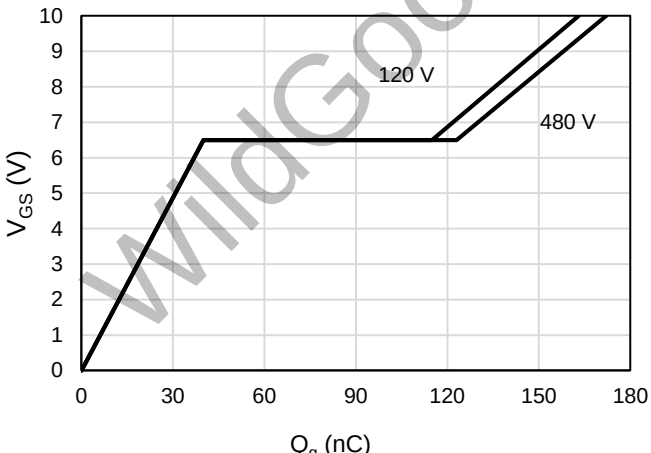


Figure 5: Gate-Charge Characteristics

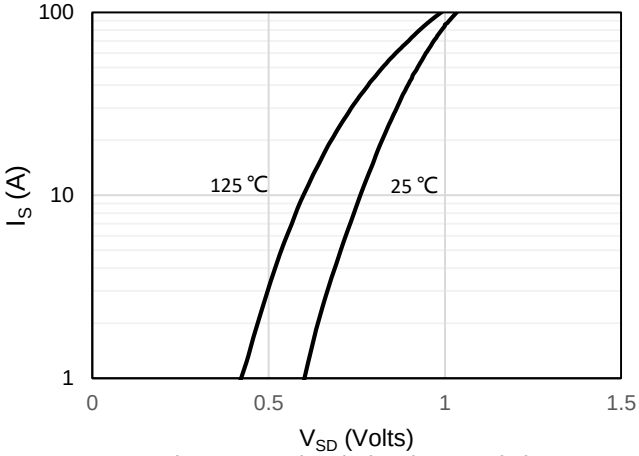


Figure 6: Body-Diode Characteristics

Typical Performance Characteristics

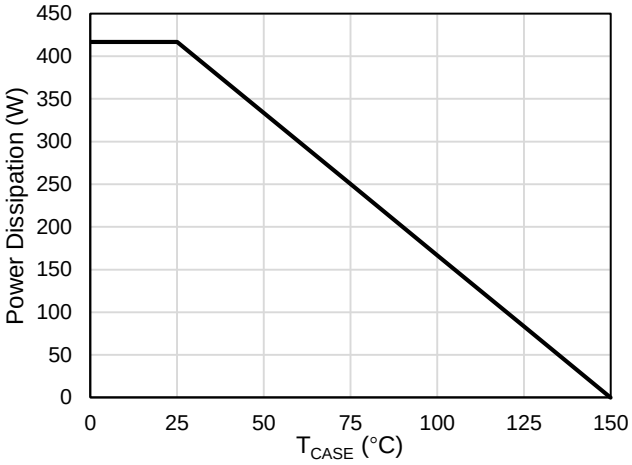


Figure 7: Power De-rating

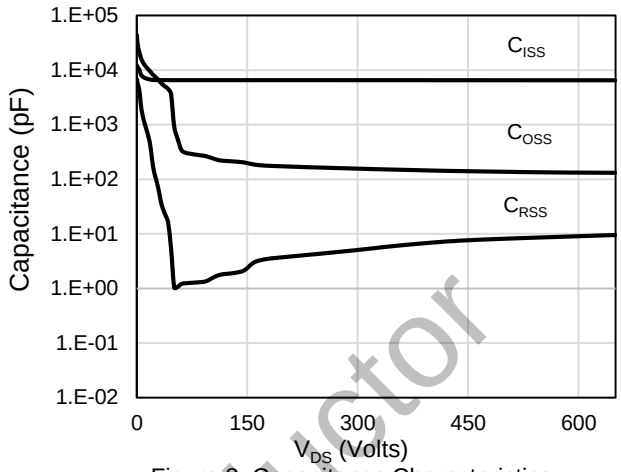


Figure 8: Capacitance Characteristics

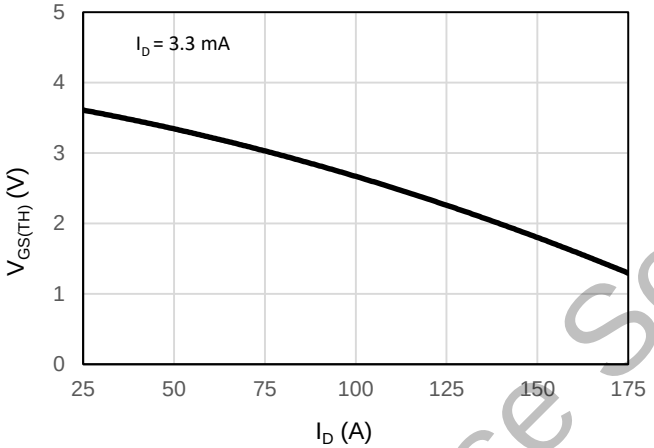


Figure 9: $V_{GS(TH)}$ vs. T_{CASE}

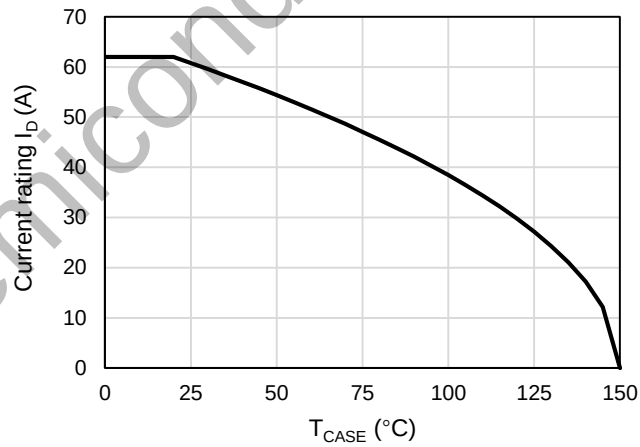


Figure 10: Current De-rating

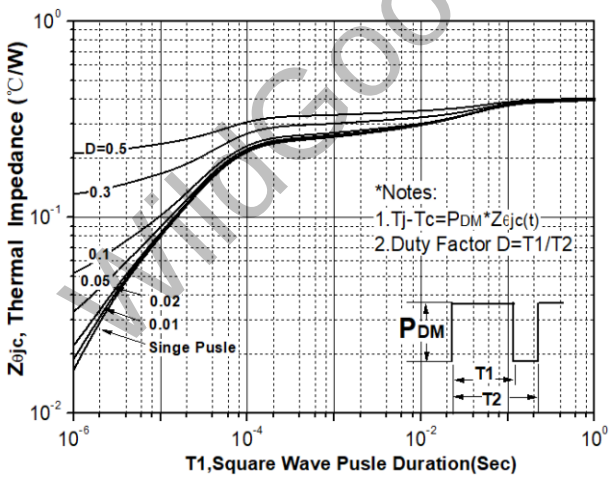


Figure 11: Transient Thermal Response Curve

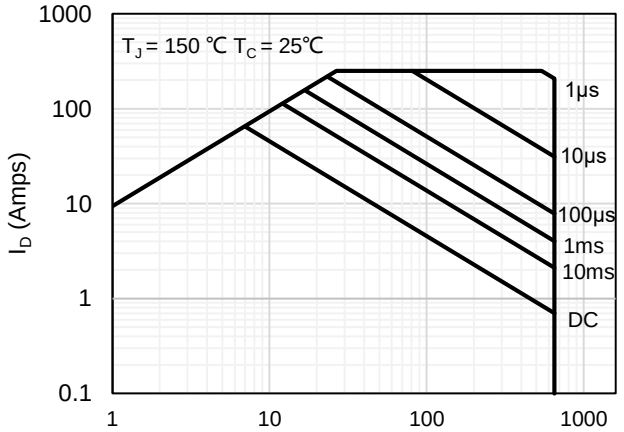
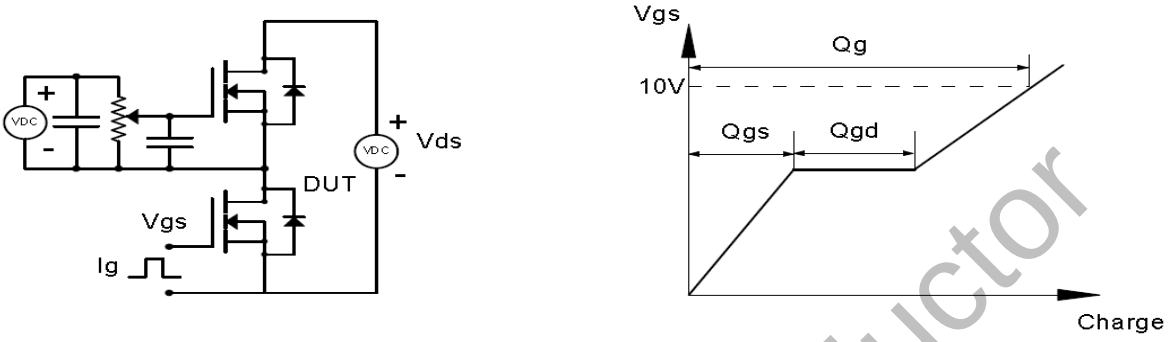


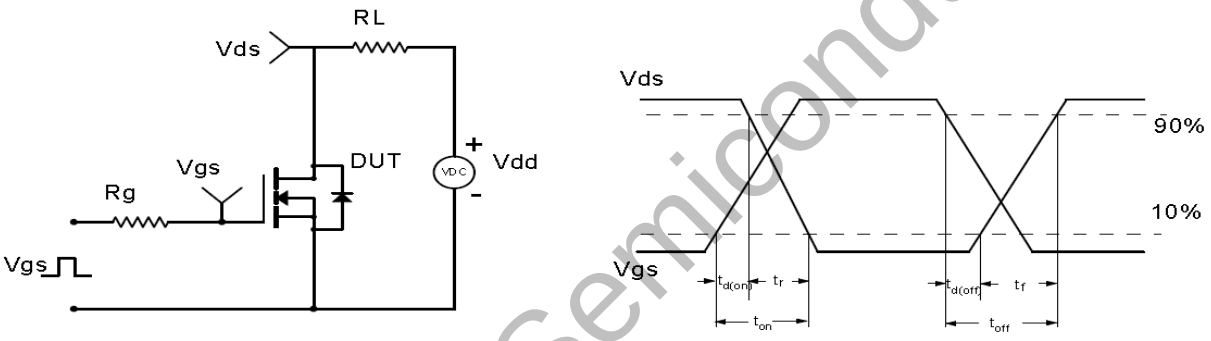
Figure 12: Maximum Forward Biased Safe Operating Area

Test Circuit & Waveform

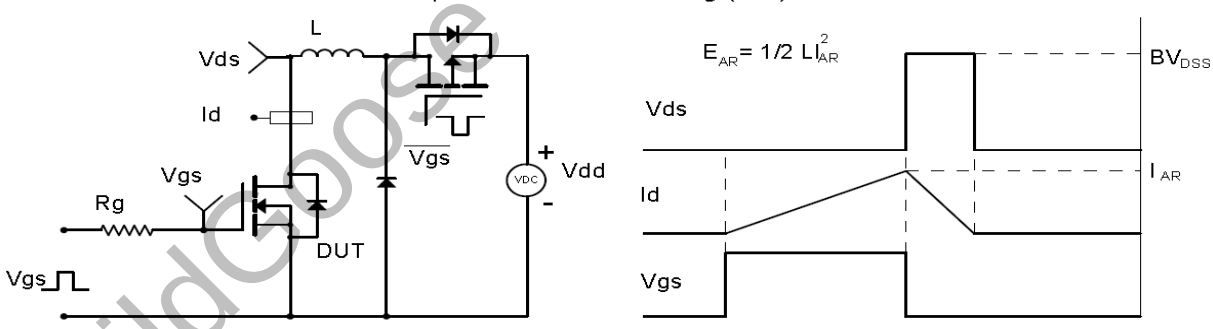
Gate Charge Test Circuit & Waveform



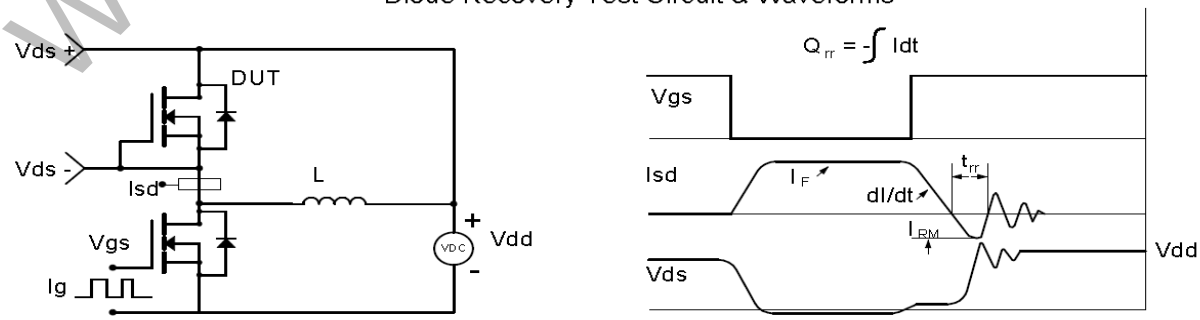
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



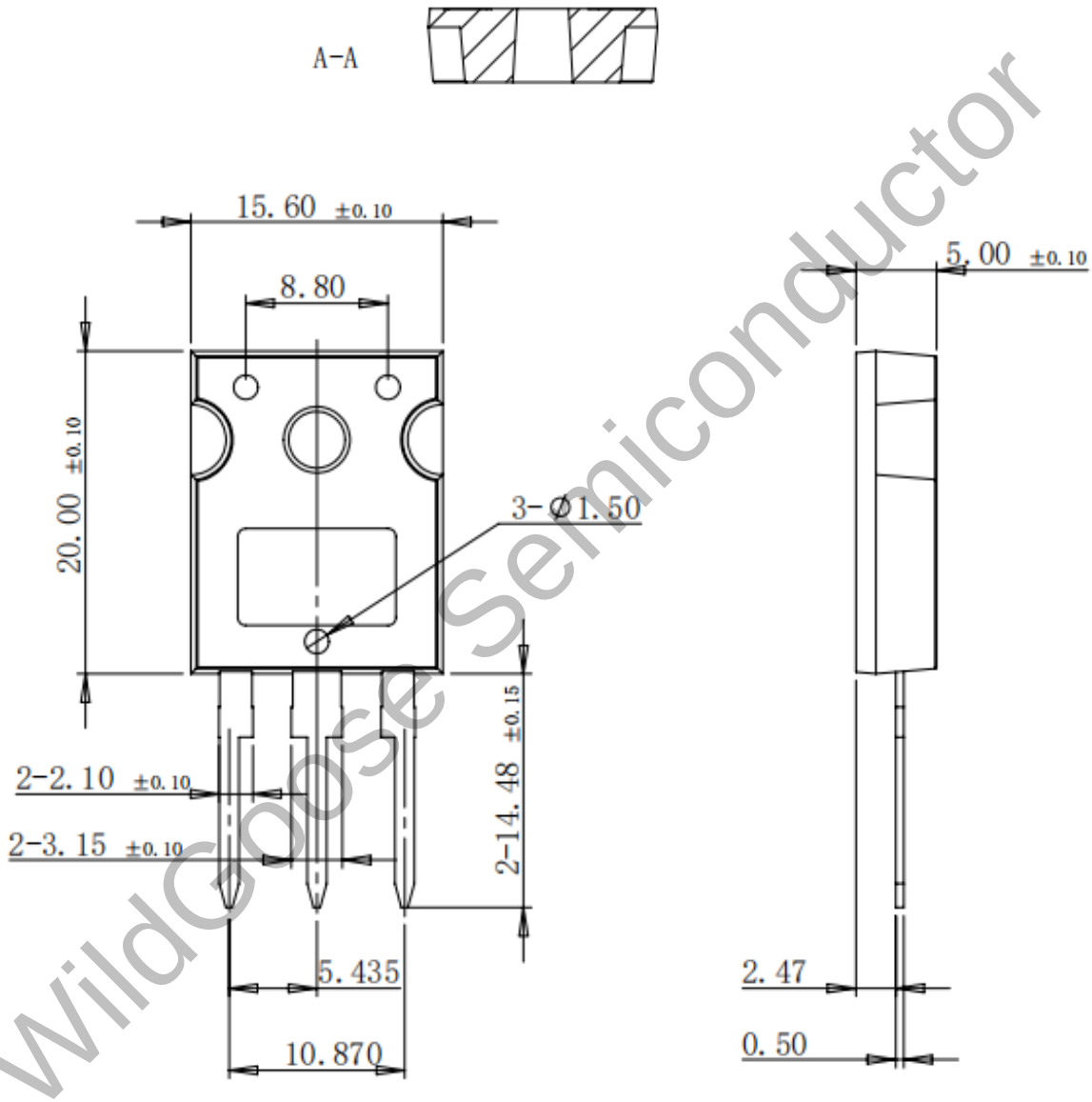
Diode Recovery Test Circuit & Waveforms



Package Dimension

TO-247S

Unit: mm



Package Dimension

TO-247

Unit: mm