

Features

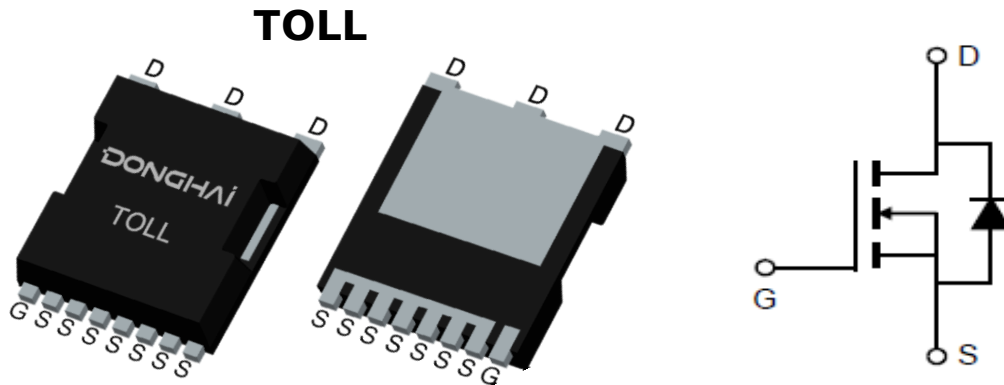
- Advanced SGT2 silicon technology utilized
- Extremely low on-resistance $R_{DS(on)}$
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test
- Pb-Free plating / Halogen-Free / RoHS compliant

Key Parameters

V_{DS}	100V
$R_{DS(on)typ.}$	2mΩ
I_D	281A
V_{th}	3V
$C_{iss@10V}$	12750pF
Q_{gd}	24.3nC

Applications

- Motor Control and Drive
- Charge/Discharge for Battery Management System
- Synchronous Rectifier for SMPS



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DSU023N10N3	TOLL	DSU023N10N3	Reel	1800/box

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Gate-Source voltage	V_{GS}	±20	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	281 178	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	1124	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$) ^[1]	E_{AS}	1600	mJ
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	313	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	°C

Notes: 1. EAS was tested at $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_d=56\text{A}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.40	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at $T_j = 25^\circ\text{C}$, unless otherwise specified)

Static Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Drain-source breakdown voltage	BV_{DSS}	100	-	-	V	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.0	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	-	1 100	μA	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$ $T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	100	nA	$V_{GS}=20\text{V}$, $V_{DS}=0\text{V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	2	2.3	mΩ	$V_{GS}=10\text{V}$, $I_D=100\text{A}$, $T_j=25^\circ\text{C}$
Transconductance	g_{fs}	-	142	-	S	$V_{DS}=5\text{V}$, $I_D=70\text{A}$

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	12750	-	pF	$V_{GS}=0V, V_{DS}=50V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	2322	-		
Reverse Transfer Capacitance	C_{rss}	-	24	-		
Gate Total Charge	Q_G	-	160	-	nC	$V_{GS}=10V, V_{DS}=50V,$ $I_D=60A$
Gate-Source charge	Q_{gs}	-	60	-		
Gate-Drain charge	Q_{gd}	-	24.3	-		
Gate plateau voltage	$V_{plateau}$	-	5	-	V	
Turn-on delay time	$t_{d(on)}$	-	40	-	ns	$V_{GS}=10V, V_{DD}=50V,$ $R_{G_ext}=3\Omega$
Rise time	t_r	-	62	-		
Turn-off delay time	$t_{d(off)}$	-	79	-		
Fall time	t_f	-	47	-		
Gate resistance	R_G	-	3.0	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1MHz$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S		-	281	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=100A$
Diode Reverse Recovery Time	t_{rr}	-	112	-	ns	$I_F=50A, dI/dt=100A/\mu s$
Diode Reverse Recovery Charge	Q_{rr}	-	207	-	nC	

Typical Characteristics Diagram

Fig1. Output Characteristics

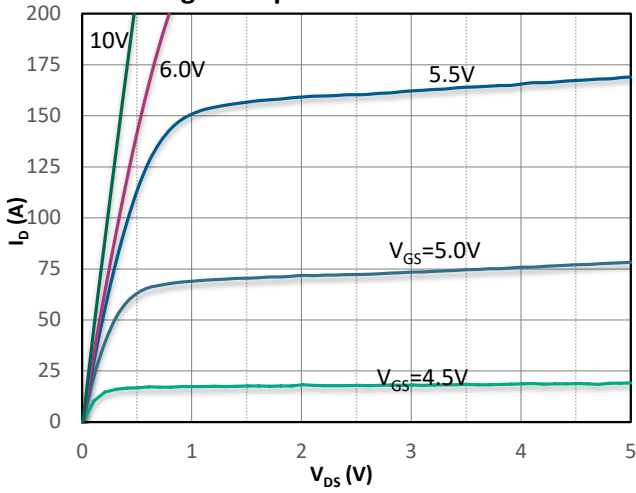


Fig2. Transfer Characteristics

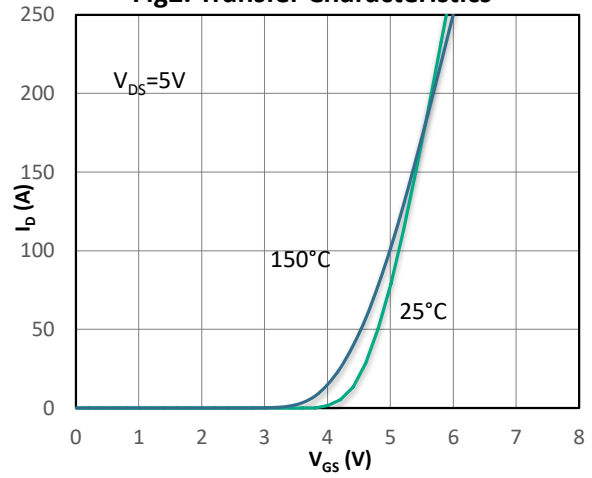


Fig3. Rds(on) vs Drain Current

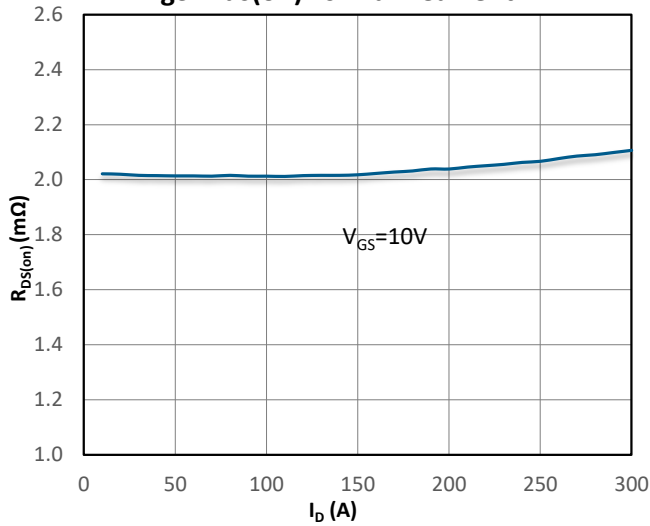


Fig 4. Rds(on) vs Gate Voltage

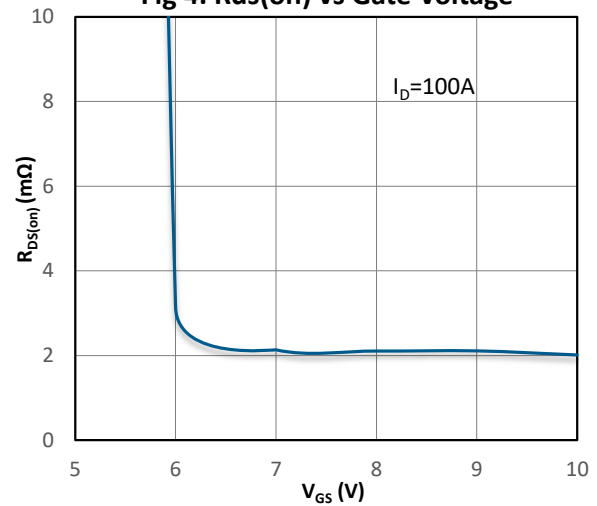


Fig5. Rds(on) vs. Temperature

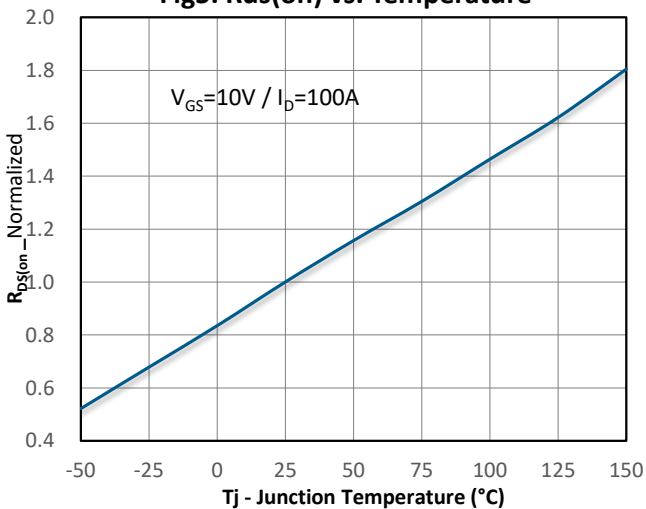
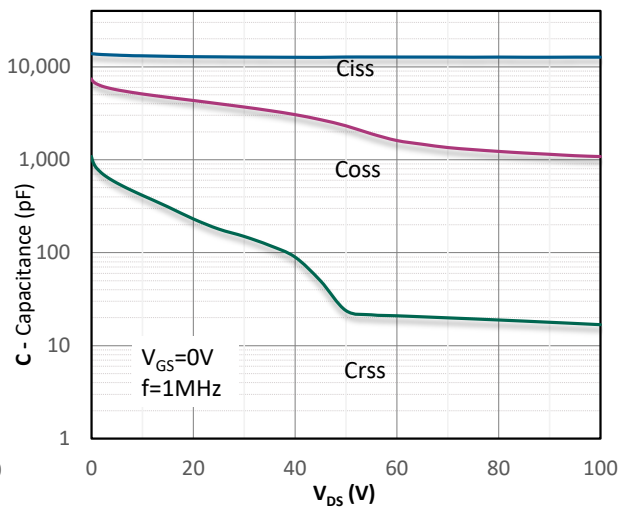
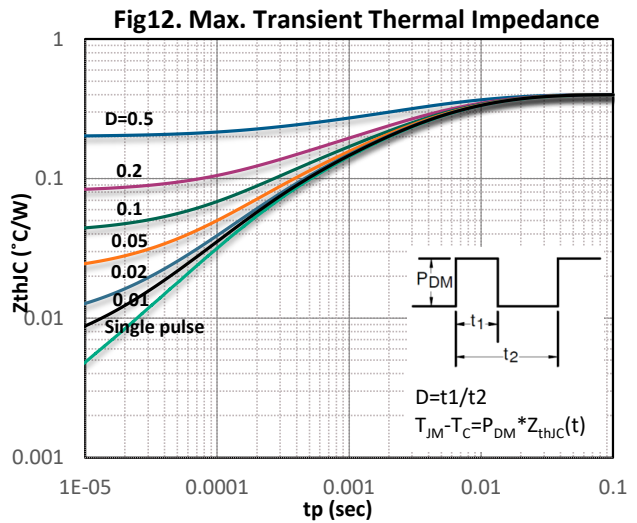
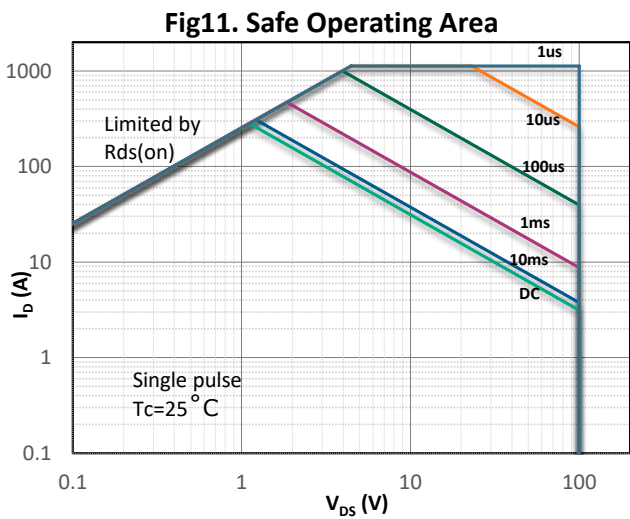
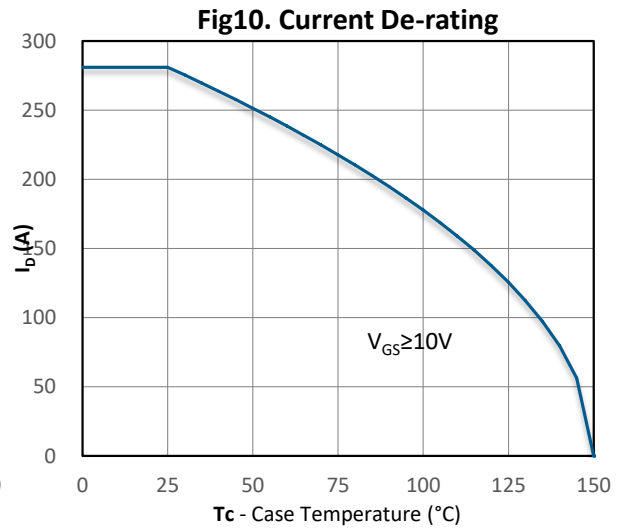
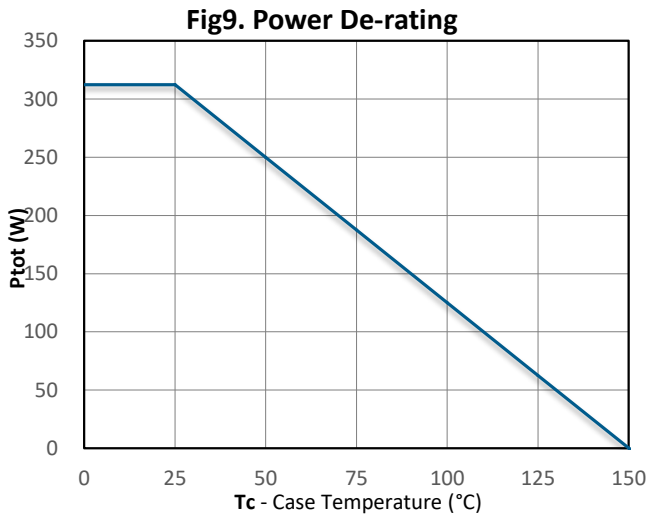
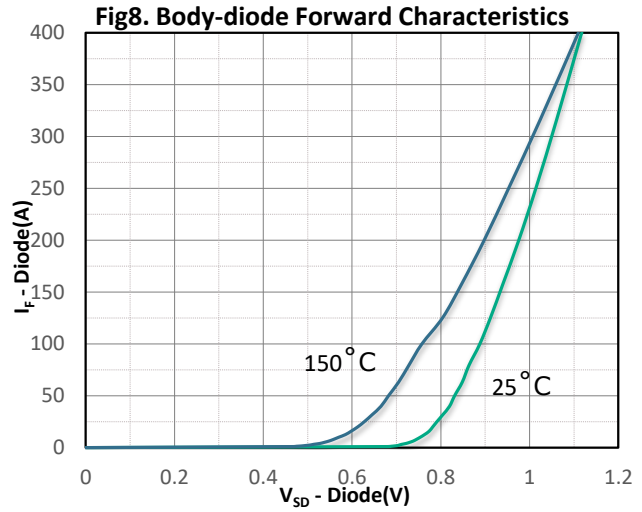
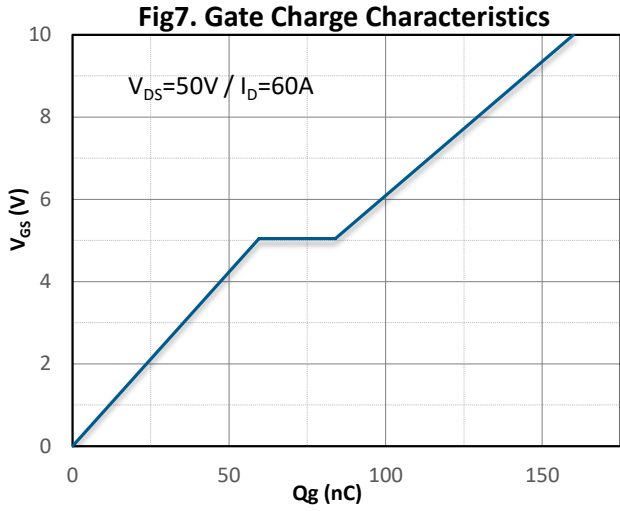


Fig6. Capacitance Characteristics

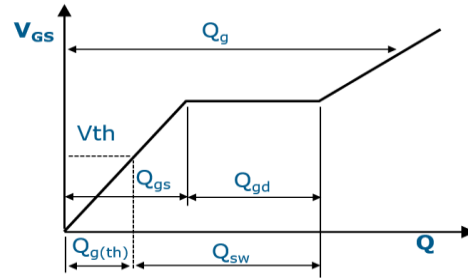
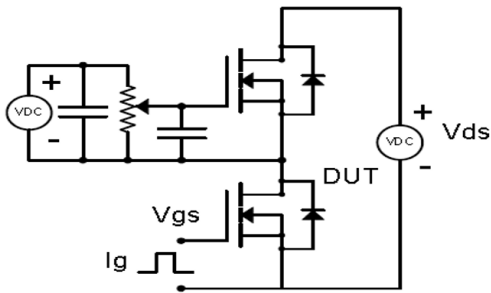


Typical Characteristics Diagram

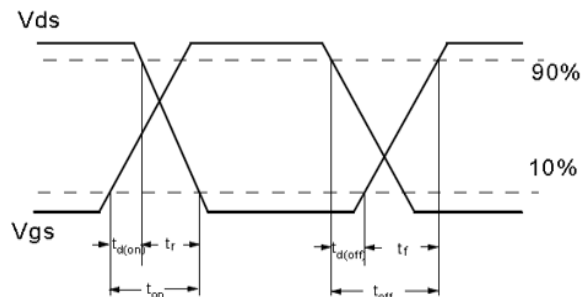
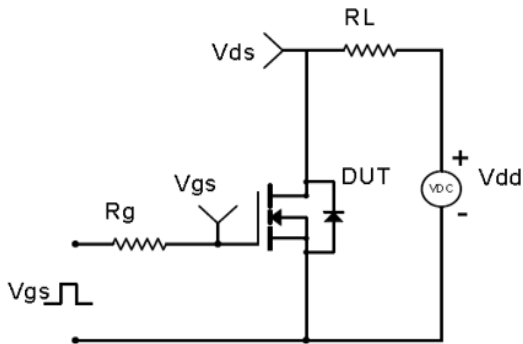


Test Circuit & Waveform

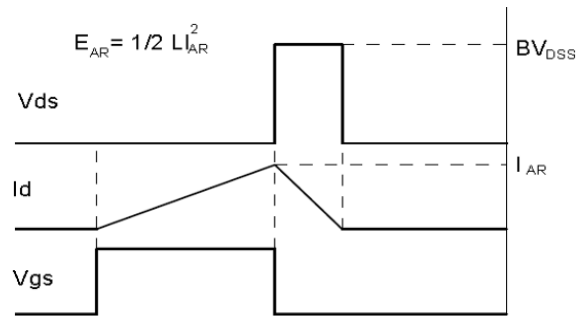
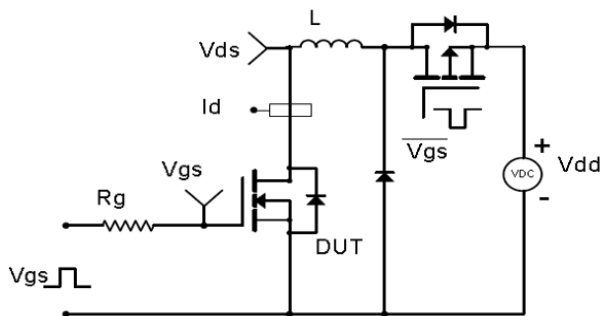
Gate Charge Test Circuit & Waveform



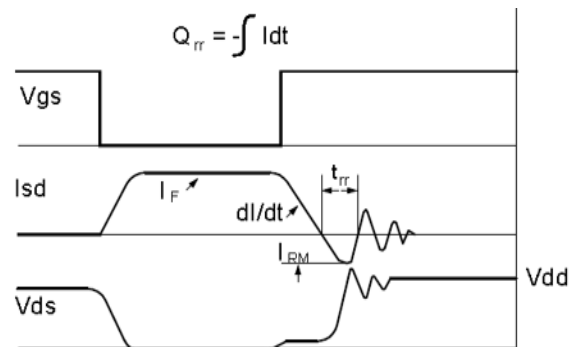
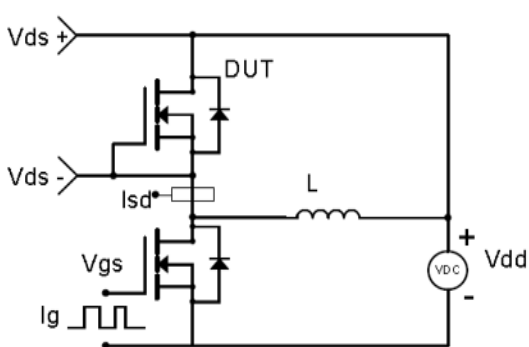
MOSFET Switching Test Circuit & Waveform



EAS Test Circuit & Waveform

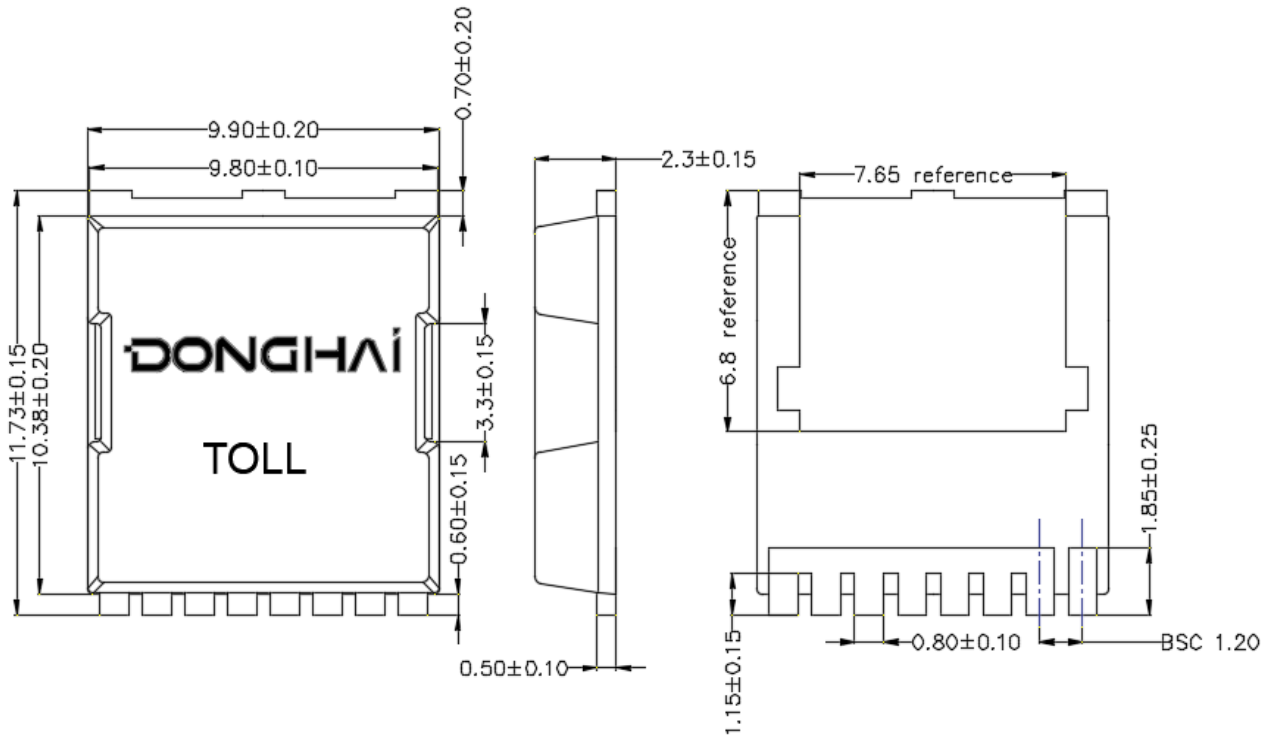


Diode Recovery Test Circuit & Waveform



Package Outline : TOLL

*Dimensions in mm



Revision History

Revision	Date	Major changes
1.0	2023/5/19	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation, aerospace, life-support devices or systems.

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