

Features

- Low on resistance
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔVDS test
- Pb-Free plating / Halogen-Free / RoHS compliant

Key Parameters

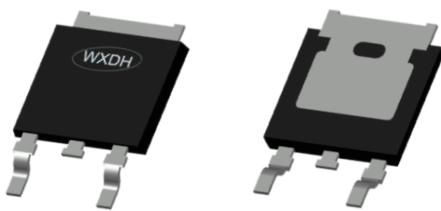
V _{DS}	100V
R _{DS(on)typ.}	15mΩ
I _D	50A
C _{iss@10V}	1076pF
Qgd	2nC

Applications

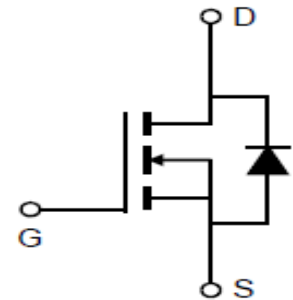
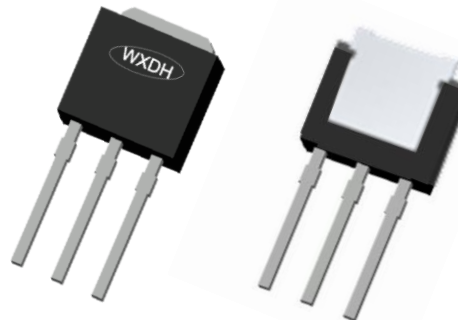
- Motor Control and Drive
- Charge/Discharge for Battery Management System
- Synchronous Rectifier for SMPS



TO-252



TO-251



Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DSD190N10L3	TO-252	DSD190N10L3	Reel	2500/box
DSB190N10L3	TO-251	DSB190N10L3	Tube	3000/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	50 35	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D\ pulse}$	200	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$) ^[1]	E_{AS}	90	mJ
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	68	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	°C

Notes: 1.EAS was tested at $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_d=13\text{A}$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	2.2	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	98	

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	$V_{GS(th)}$	1.0	-	2.3	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	$R_{DS(on)}$	-	15 23	19 30	mΩ	$V_{GS}=10\text{V}$, $I_D=20\text{A}$, $T_j=25^\circ\text{C}$ $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$,

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	1076	-	pF	$V_{GS}=0V, V_{DS}=50V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	281	-		
Reverse Transfer Capacitance	C_{rss}	-	22	-		
Gate Total Charge	Q_G	-	19	-	nC	$V_{GS}=10V, V_{DS}=50V,$ $I_D=20A$
Gate-Source charge	Q_{gs}	-	5	-		
Gate-Drain charge	Q_{gd}	-	2	-		
Gate plateau voltage	$V_{plateau}$	-	3.2	-	V	
Turn-on delay time	$t_{d(on)}$	-	7	-	ns	$V_{GS}=10V, V_{DD}=50V,$ $R_{G_ext}=3\Omega$
Rise time	t_r	-	18	-		
Turn-off delay time	$t_{d(off)}$	-	19	-		
Fall time	t_f	-	5	-		
Gate resistance	R_G	-	2.3	-	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		-	50	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	$V_{GS}=0V, I_{SD}=20A$
Diode Reverse Recovery Time	t_{rr}	-	42	-	ns	$I_F=20A, dI/dt=100A/\mu s$
Diode Reverse Recovery Charge	Q_{rr}	-	53	-	nC	

Typical Characteristics Diagram

Fig1. Output Characteristics

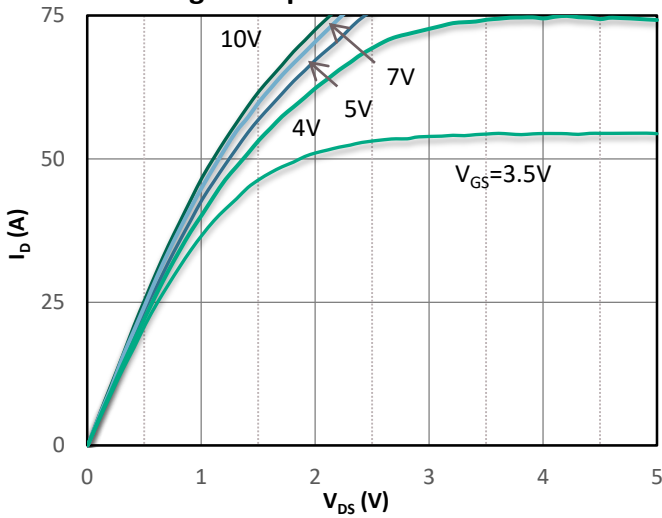


Fig2. Transfer Characteristics

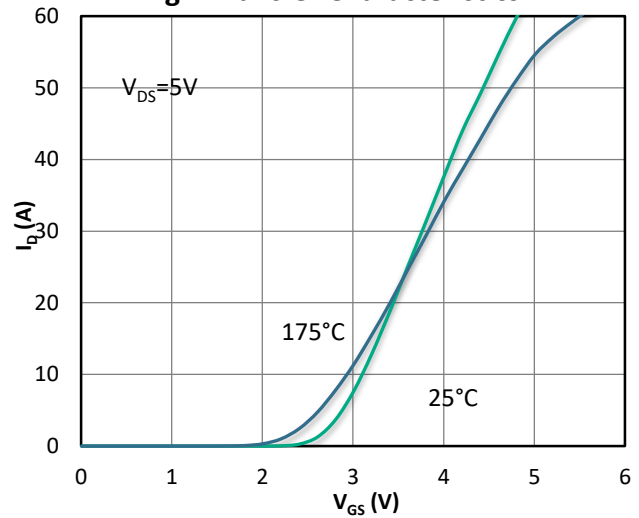


Fig3. Body-diode Forward Characteristics

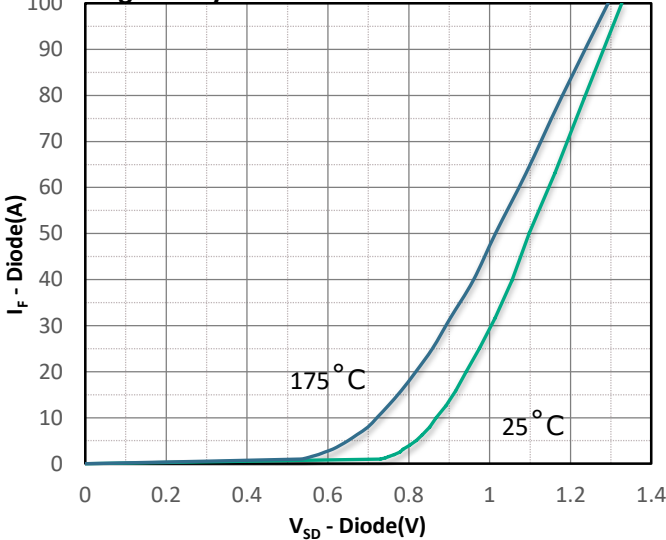


Fig 4. Rds(on) vs Gate Voltage

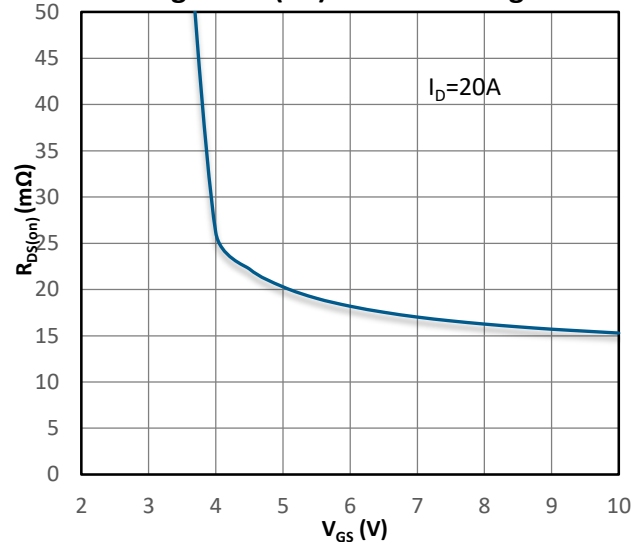


Fig5. Rds(on) vs. Temperature

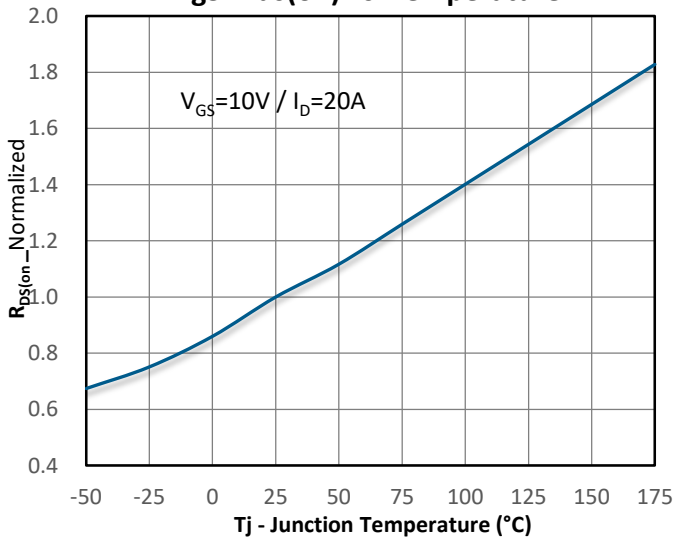
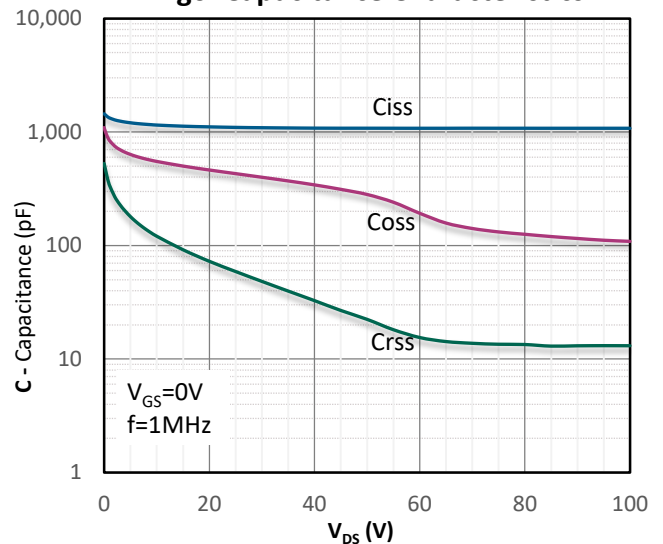


Fig6. Capacitance Characteristics



Typical Characteristics Diagram

Fig7. Gate Charge Characteristics

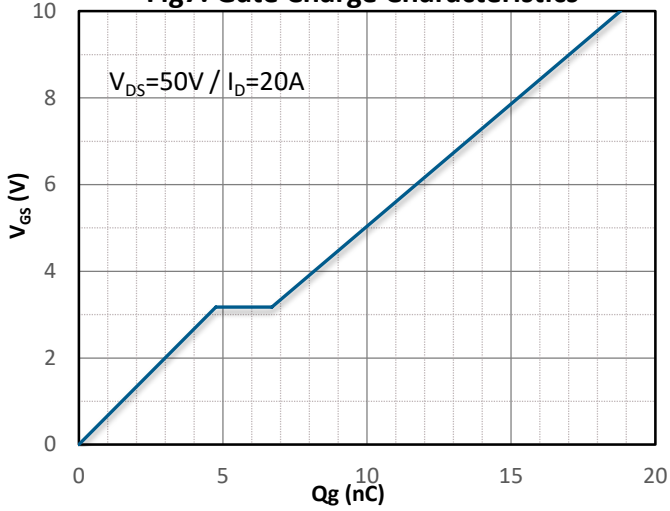


Fig8. Safe Operating Area

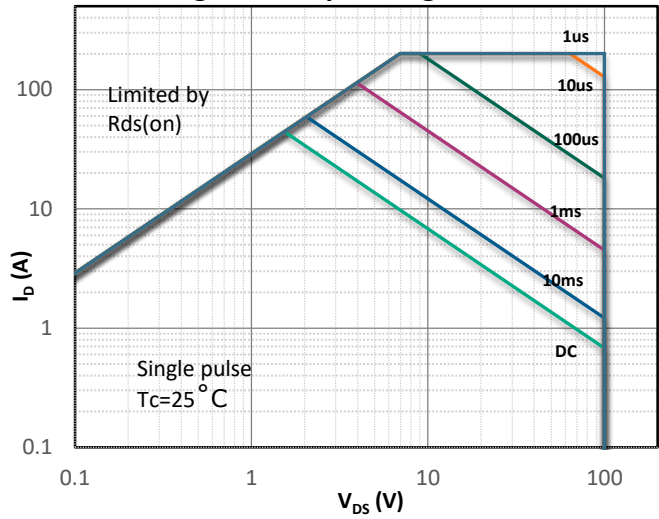


Fig9. Power De-rating

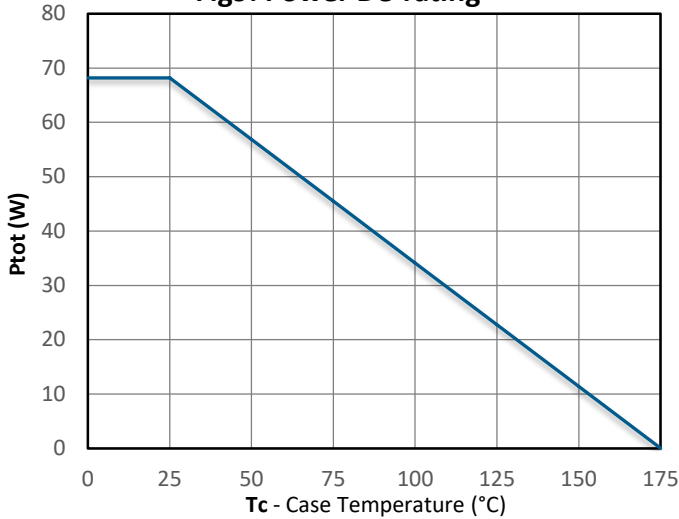


Fig10. Current De-rating

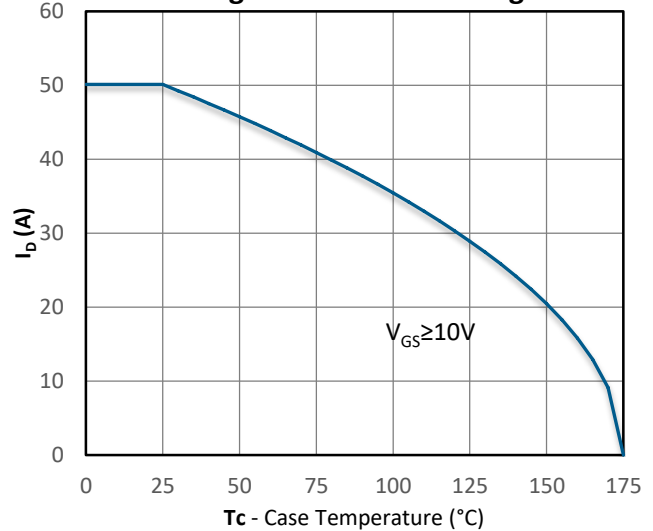
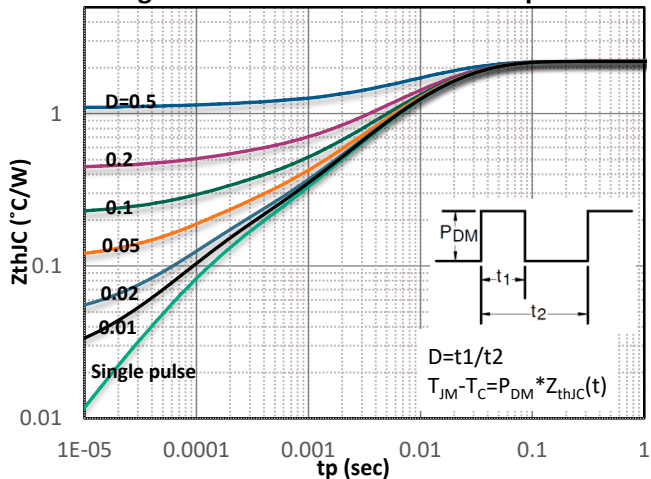
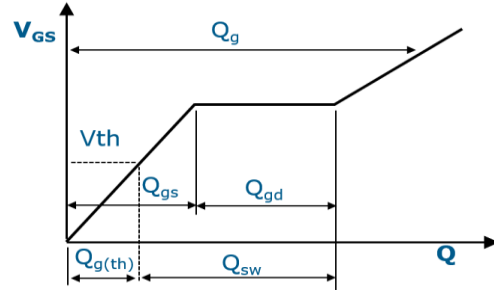
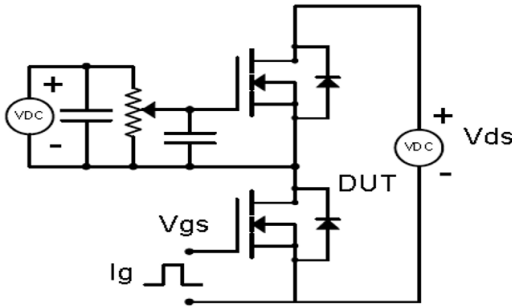


Fig11. Max. Transient Thermal Impedance

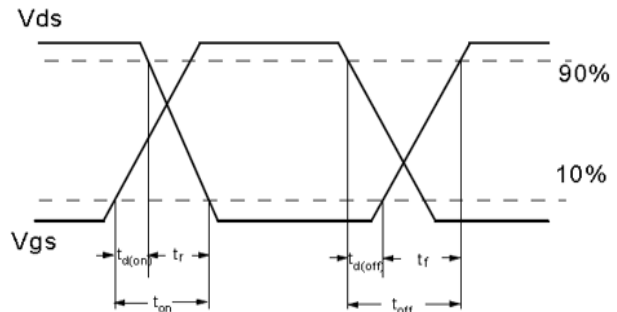
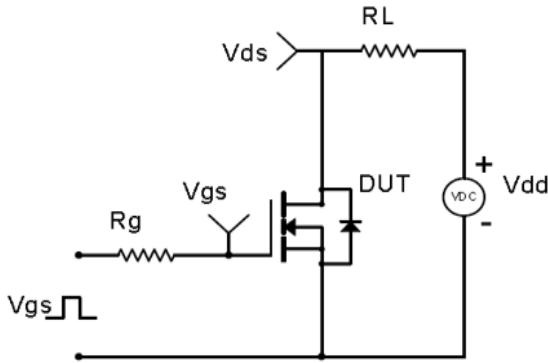


Test Circuit & Waveform

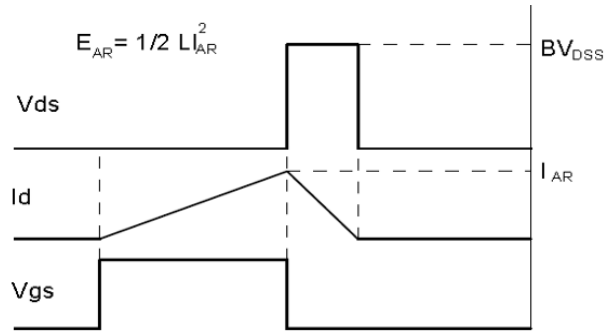
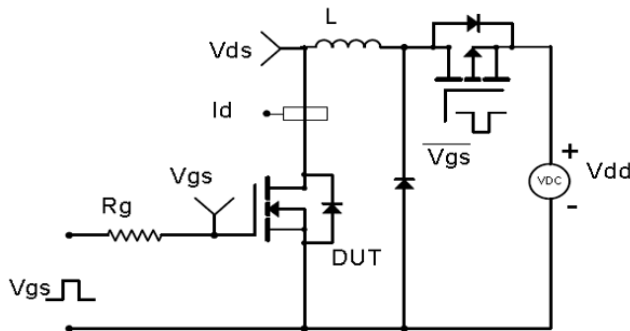
Gate Charge Test Circuit & Waveform



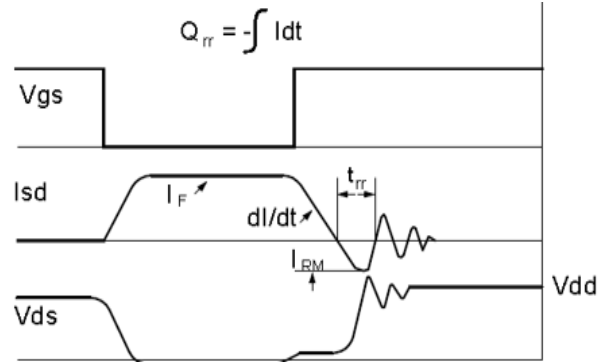
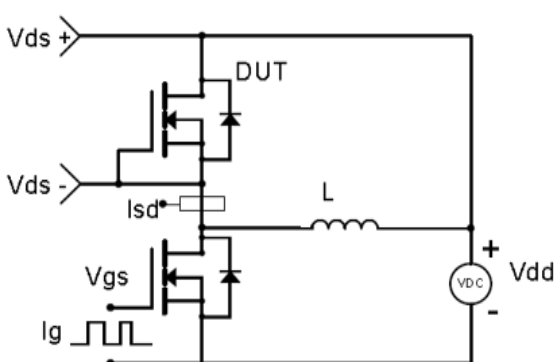
MOSFET Switching Test Circuit & Waveform



E_{AS} Test Circuit & Waveform

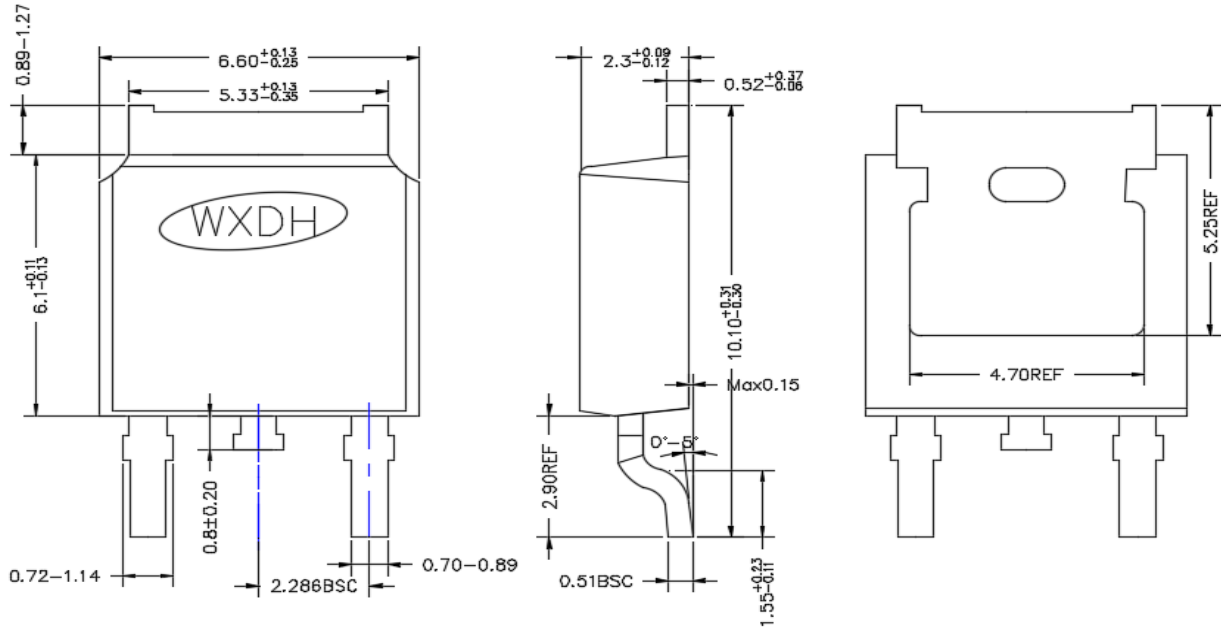


Diode Recovery Test Circuit & Waveform



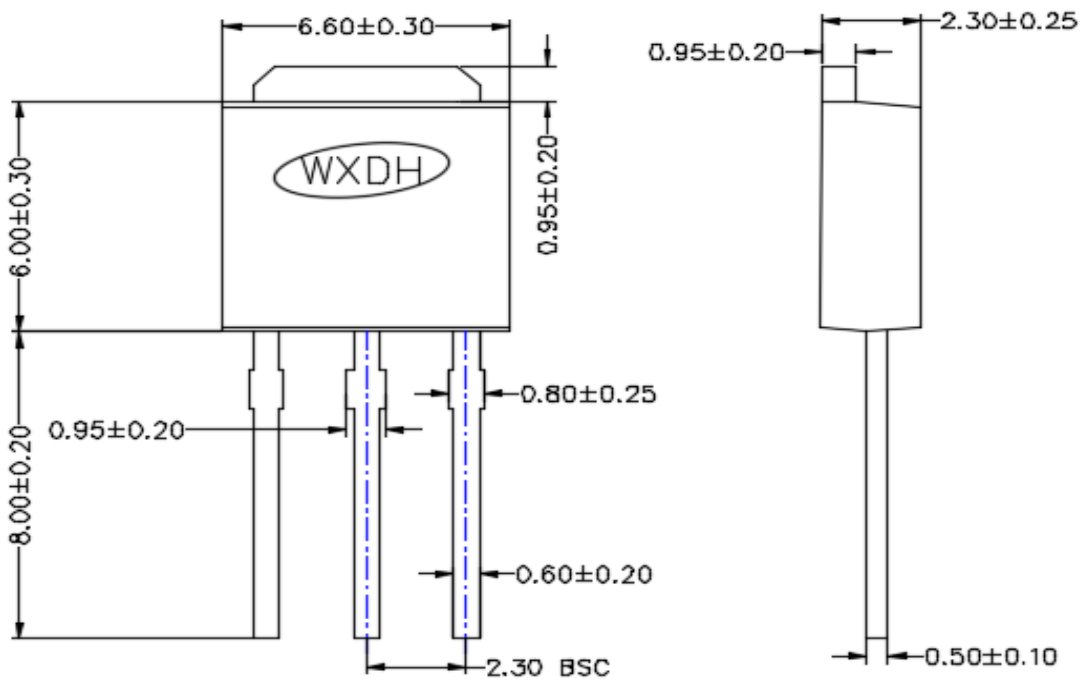
Package Outline : TO-252

*Dimensions in mm



Package Outline : TO-251

*Dimensions in mm



Revision History

Revision	Date	Major changes
1.0	2023/6/26	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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