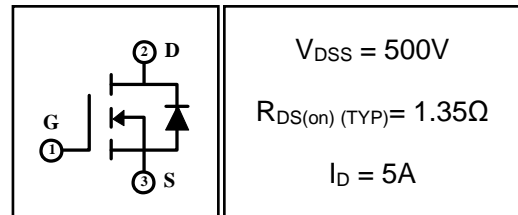


5A 500V N-channel Enhancement Mode Power MOSFET

1 Description

These, the silicon N-channel enhanced VDMOSFETs, is obtained by the self-aligned planar technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. Which accords with the RoHS standard.

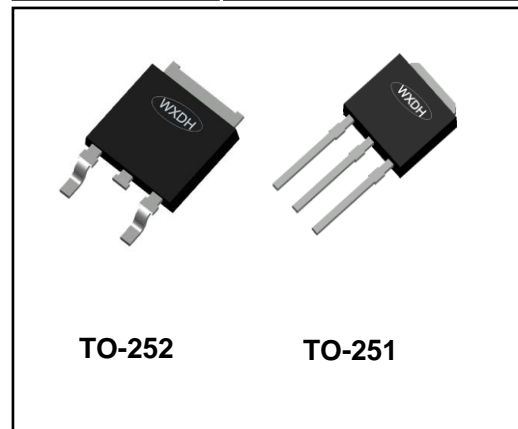


2 Features

- Fast switching
- Low on resistance
- Low gate charge
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

3 Applications

- Electronic ballast
- Electronic transformer
- Switch mode power supply



4 Electrical Characteristics

4.1 Absolute Maximum Rating ($T_C=25^\circ C$, unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-to-Source Voltage	V_{DSS}	500	V
Gate-to-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	5 A
	$T_C=100^\circ C$		3 A
Pulsed Drain Current ⁽¹⁾	I_{DM}	20	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	280	mJ
Peak Diode Recovery dv/dt ⁽⁵⁾	dv/dt	5	V/ns
Power Dissipation	$T_a=25^\circ C$	P_{tot}	2 W
	$T_C=25^\circ C$	P_{tot}	74 W
Junction Temperature Range	T_j	-55~150	$^\circ C$
Storage Temperature Range	T_{stg}	-55~150	$^\circ C$
Maximum Temperature for soldering	T_L	300	$^\circ C$

4.2 Thermal Characteristics

Parameter	Symbol	Typ	Unit
Thermal Resistance, Junction to Case-sink	R_{thJC}	1.70	$^\circ C/W$
Thermal Resistance, Junction to Ambient	R_{thJA}	62.5	$^\circ C/W$

4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	500	--	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V, T _C =25°C	--	--	25	μA
		V _{DS} =400V, V _{GS} =0V, T _C =125°C	--	--	250	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±30V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	--	4.0	V
Drain-to-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =2.5A	--	1.35	1.5	Ω
Forward Transfer Conductance	g _{fs}	V _{DS} =15V, I _D =2.5A	2.4	--	--	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	--	560	--	pF
Output Capacitance	C _{oss}		--	45	--	
Reverse Transfer Capacitance	C _{rss}		--	17	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =5A, V _{DD} =250V, R _G =25Ω	--	20	--	ns
Turn-on Rise Time	t _r		--	25	--	
Turn-off Delay Time	t _{d(off)}		--	47	--	
Turn-off Fall Time	t _f		--	18	--	
Total Gate Charge	Q _g	I _D =5A, V _{DD} =400V, V _{GS} =10V	--	26	--	nC
Gate-to-Source Charge	Q _{gs}		--	4	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	15	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =5A	--	--	1.5	V
Diode Forward Current	I _S		--	--	5	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =5A, di _F /dt=100A/μS, V _{GS} =0V	--	220	--	ns
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	1000	--	nC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=10mH, I_D=7.5A, V_{DD}=50V, V_{GATE}=500V, Start T_J=25°C.
- 5: I_{SD}=5A, di_F/dt≤100A/μs, V_{DD}≤BV_{DSS}, Start T_J=25°C.

5 Typical characteristics diagrams

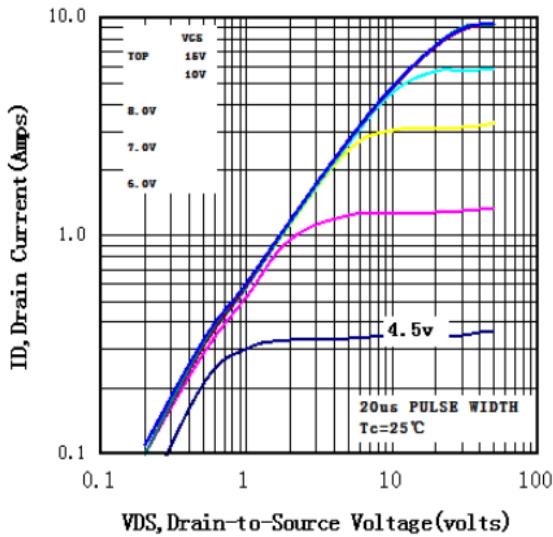


图 1 输出特性曲线, $T_c=25^\circ\text{C}$

Fig1 Typical Output Characteristics, $T_c=25^\circ\text{C}$

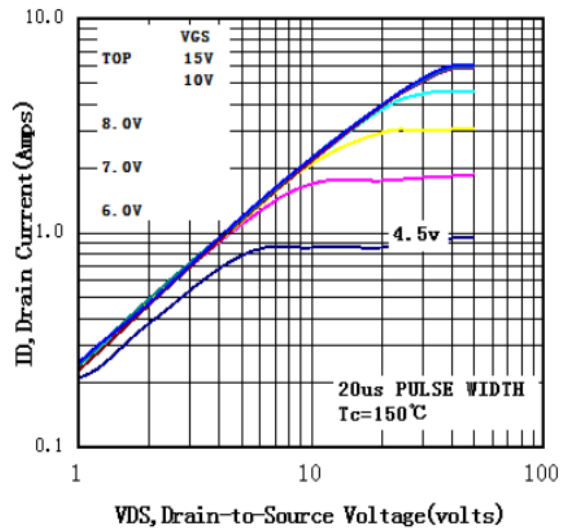


图 2 输出特性曲线, $T_c=150^\circ\text{C}$

Fig2 Typical Output Characteristics, $T_c=150^\circ\text{C}$

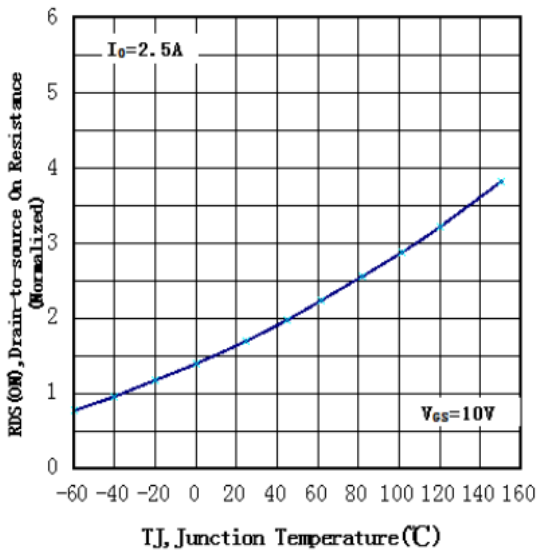


图 3 归一化导通电阻与温度曲线

Fig3 Normalized Resistance Vs. Temperature

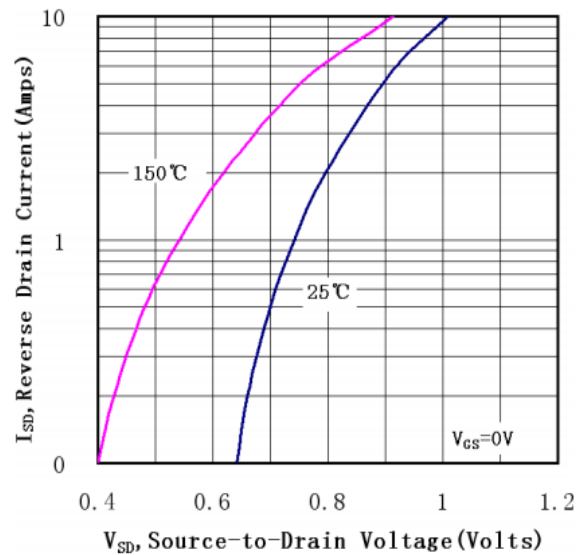


图 4 二极管正向电压曲线

Fig4 Typical Source-Drain Diode Forward Voltage

5 Typical characteristics diagrams(continues)

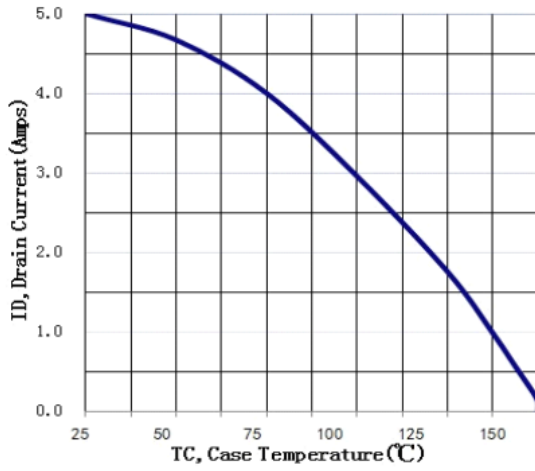


图5 最大漏极电流与壳温曲线

Fig5 Maximum Drain Current Vs. Case Temperature

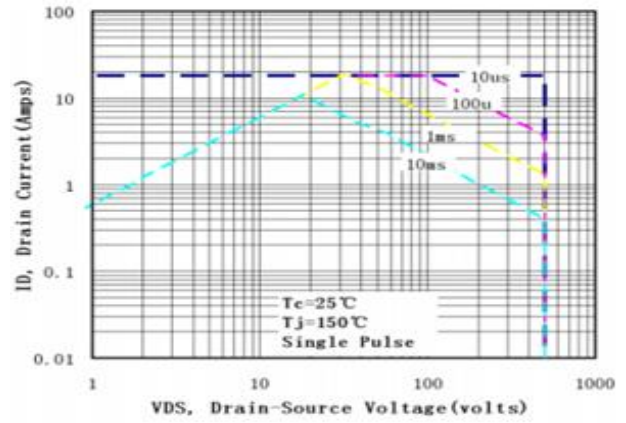
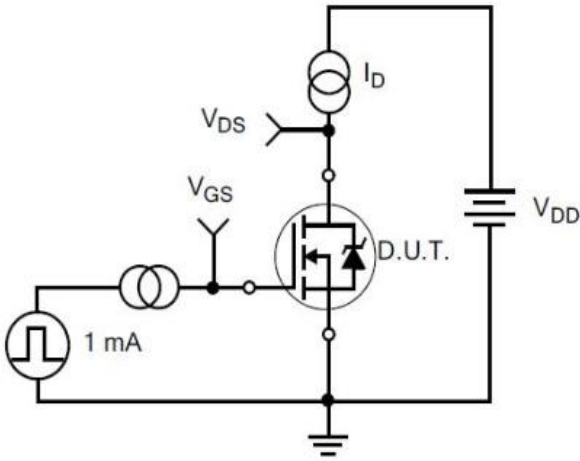


图6 5N50

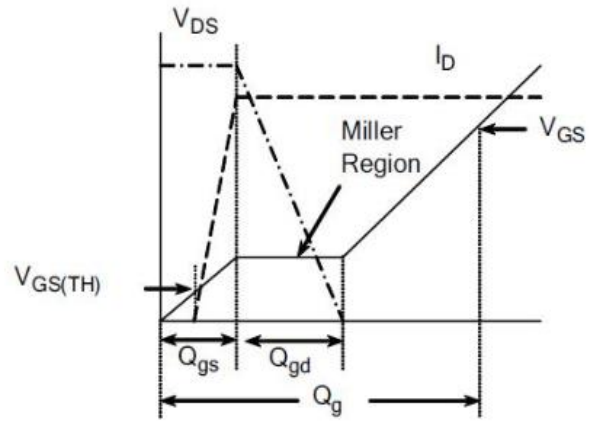
最大安全工作区曲线

Fig6 Maximum Safe Operating Area

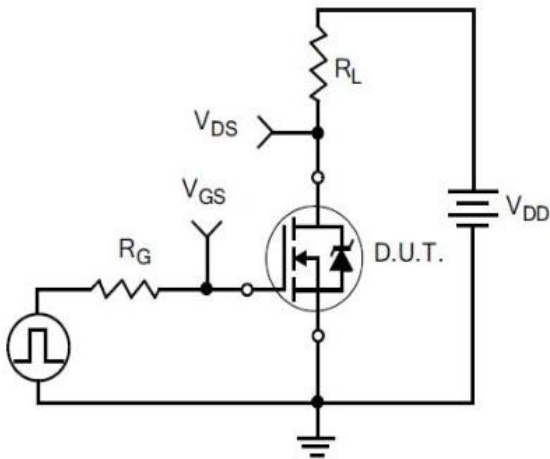
6 Typical Test Circuit and Waveform



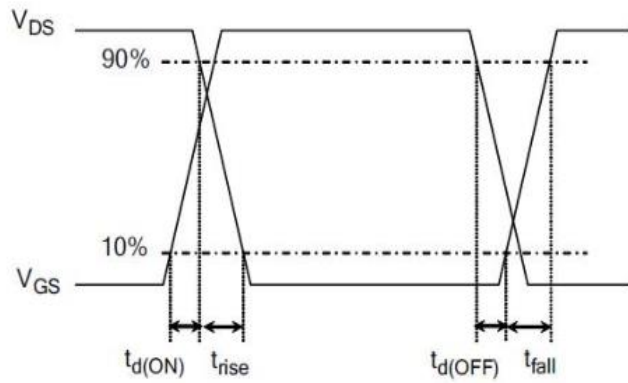
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

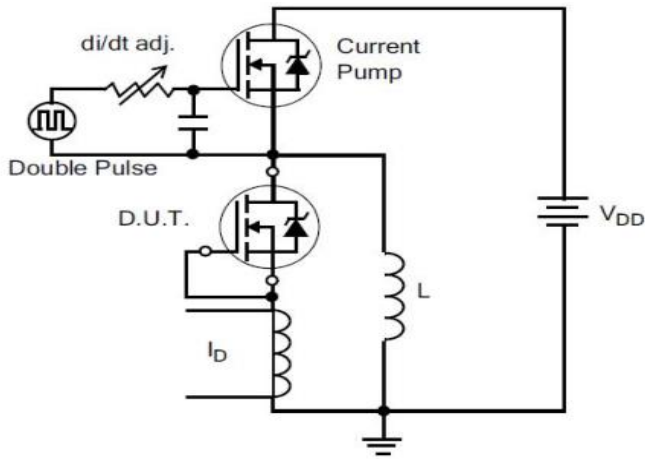


3) Resistive Switching Test Circuit

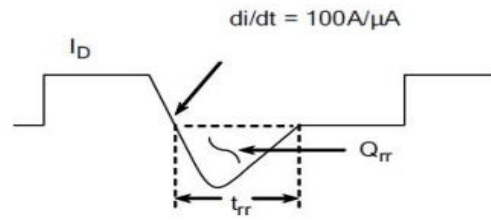


4) Resistive Switching Waveforms

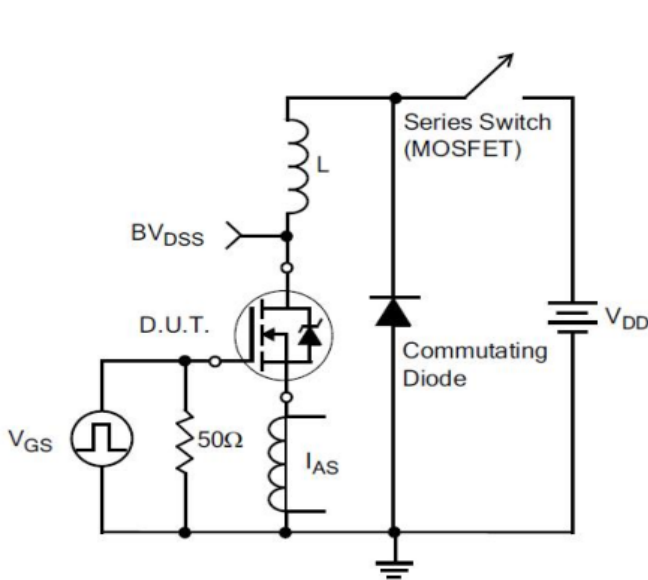
6 Typical Test Circuit and Waveform(continues)



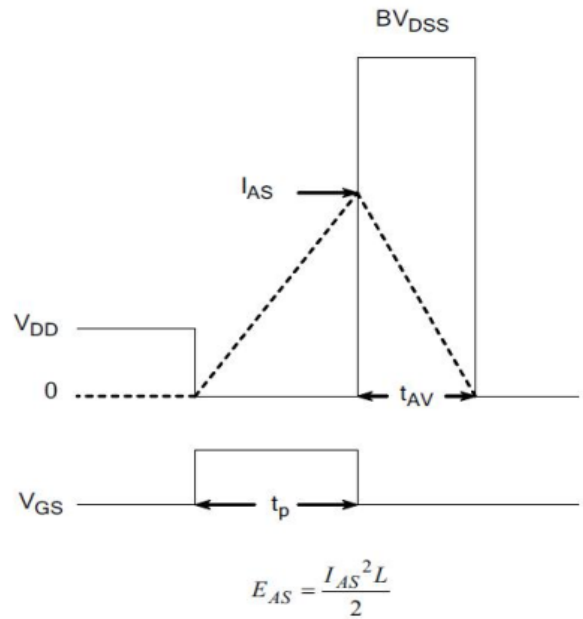
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



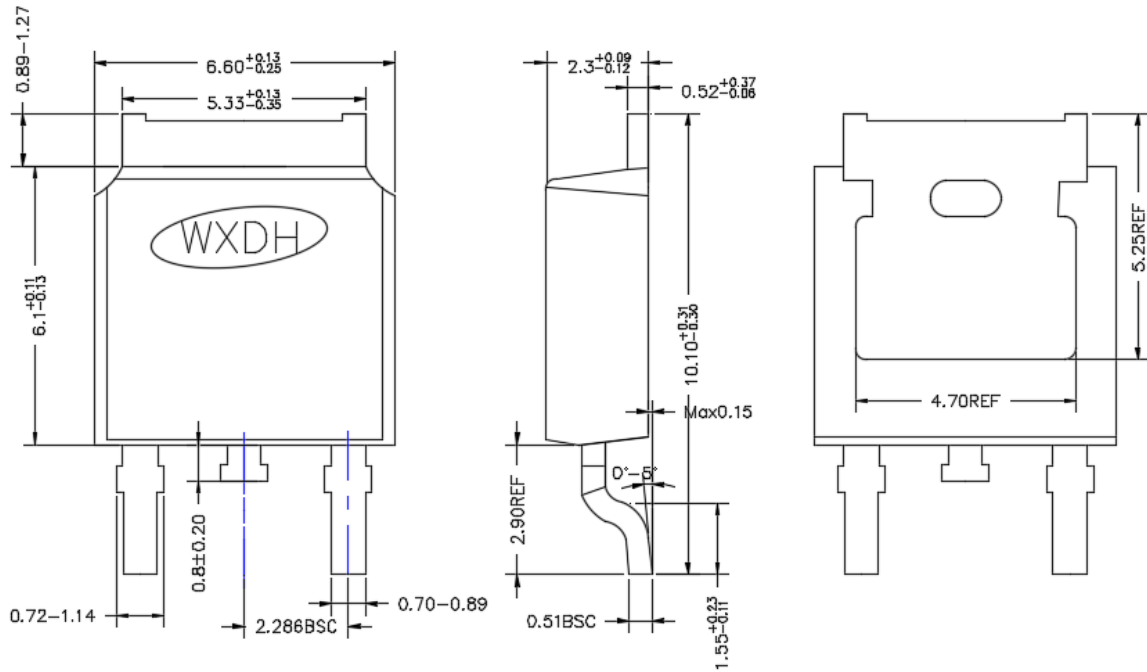
8) Unclamped Inductive Switching Waveforms

7 Product Specifications and Packaging Models

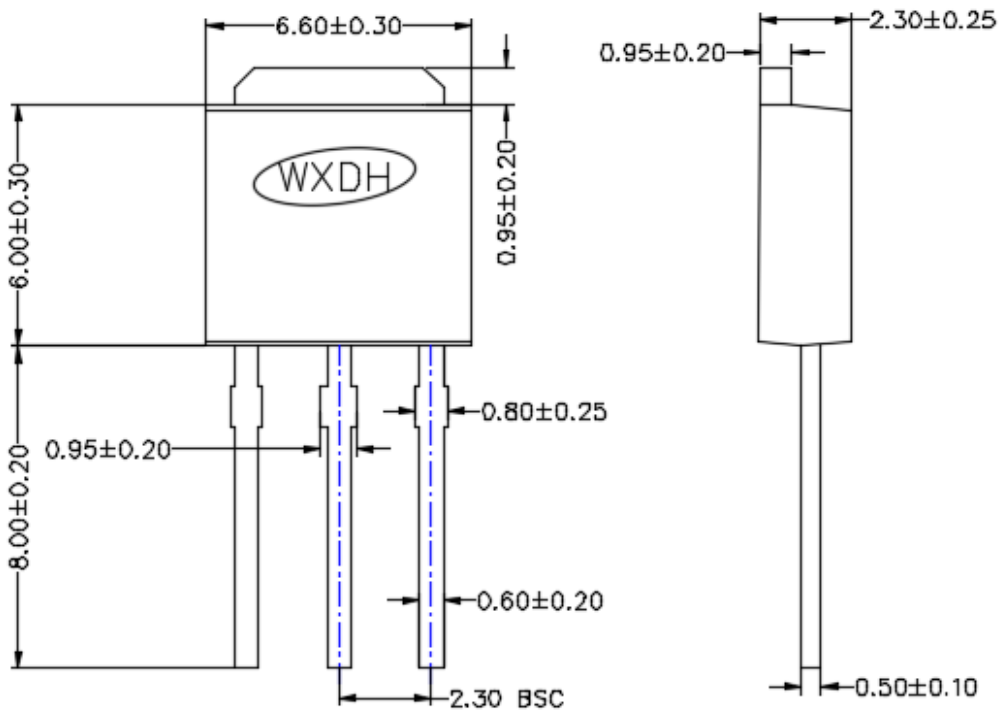
Product Model	Package Type	Mark Name	RoHS	Package	Quantity
B5N50	TO-251	B5N50	Pb-free	Tube	3000/box
D5N50	TO-252	D5N50	Pb-free	Tape & Reel	2500/box

8 Dimensions

TO-252 PACKAGE OUTLINE



TO-251 PACKAGE OUTLINE



9 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

10 Appendix

Revision history:

Date	REV.	Description	Page
2018.05.15	1.0	Original	8