

Features

- Advanced trench technology
- Fast switching speed
- Green device available
- RoHS compliant with Halogen-free

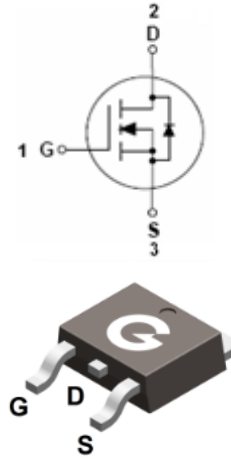
HF

Applications

- Synchronous Rectification
- Motor Control
- Portable equipment application

Mechanical Data

- Case: TO-252
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-252

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL990N10D	TO-252	80 pcs / Tube & 2500 pcs / Tape & Reel	990N10D

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	100	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	15	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		9.5	
Continuous Drain Current ($T_A = 25^\circ\text{C}$) ^{*1}		3.6	
Continuous Drain Current ($T_A = 100^\circ\text{C}$) ^{*1}		2.3	
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	60	A
Single Pulse Avalanche Energy ($L = 0.5\text{mH}$) ^{*3}	E_{AS}	15	mJ
Single Pulse Avalanche Energy ($L = 0.1\text{mH}$)		8	
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	39	W
Operating Junction Temperature Range	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	2.5	3.2	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	25	40	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit	
Static Characteristics							
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	100	-	-	V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA	
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA	
On Characteristics							
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 5A	-	80	99	mΩ	
		V _{GS} = 4.5V, I _D = 3A	-	84	120		
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	2.5	V	
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	3.5	-	Ω	
Dynamic Characteristics							
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	1010	-	pF	
C _{OSS}	Output Capacitance	V _{DS} = 25V	-	36	-		
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	31	-		
Switching Characteristics							
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 50V V _{GS} = 15V I _D = 5A R _G = 3.3Ω	-	6	-	ns	
t _r	Turn-on Rise Time		-	34	-		
t _{d(OFF)}	Turn-Off Delay Time		-	43	-		
t _f	Turn-Off Fall Time		-	16	-		
di/dt(on)	di/dt(on) Ruggedness			-	190	-	A/μs
dv/dt(on)	dv/dt(on) Ruggedness			-	1.1	-	V/ns
di/dt(off)	di/dt(off) Ruggedness			-	132	-	A/μs
dv/dt(off)	dv/dt(off) Ruggedness			-	2.2	-	V/ns
Q _G	Total Gate-Charge	V _{DD} = 50V	-	24.5	-	nC	
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	2.4	-		
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 5A	-	5.5	-		
Source-Drain Diode Characteristics							
V _{SD}	Diode Forward Voltage *2	I _{SD} = 5A, V _{GS} = 0V	-	0.84	1.2	V	
t _{rr}	Reverse Recovery Time	I _S = 5A, V _{GS} = 0V	-	34	-	ns	
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	39	-	nC	

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH$

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

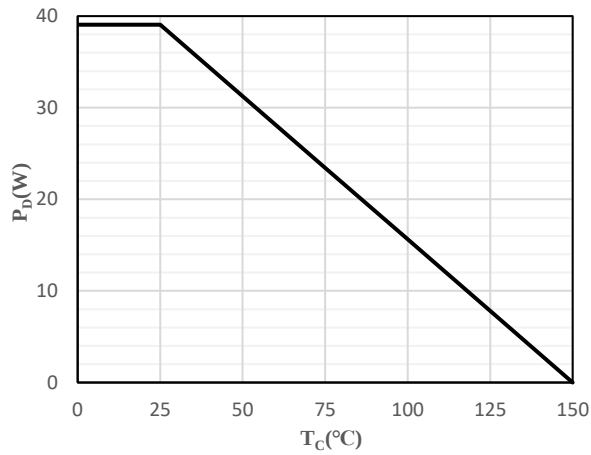


Fig 1 Power Dissipation

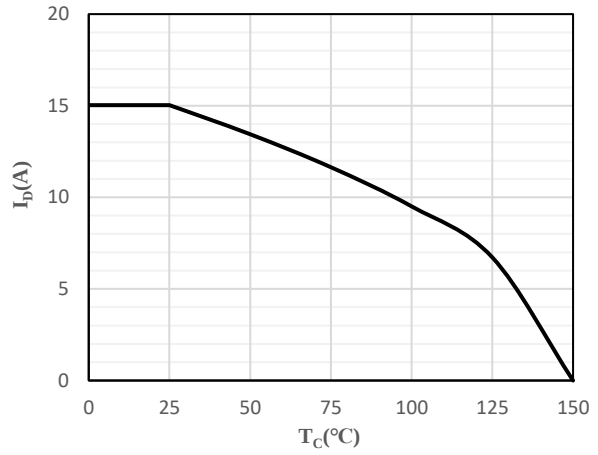


Fig 2 Drain Current

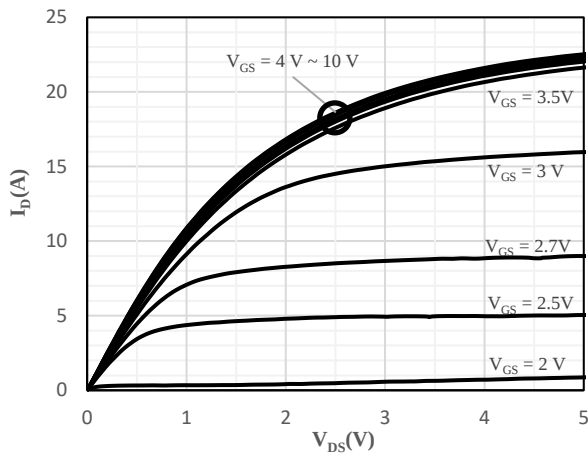


Fig 3 Typical Output Characteristics

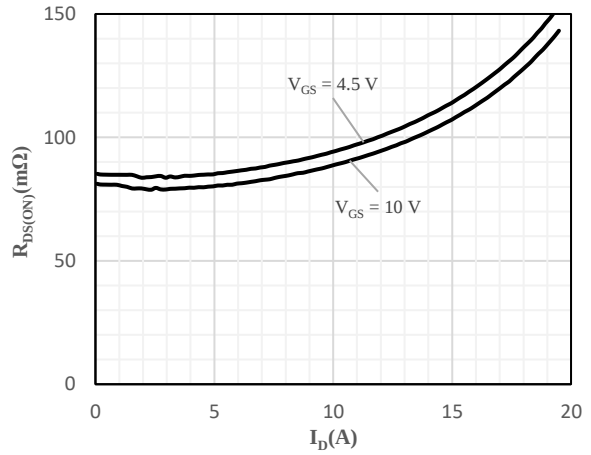


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

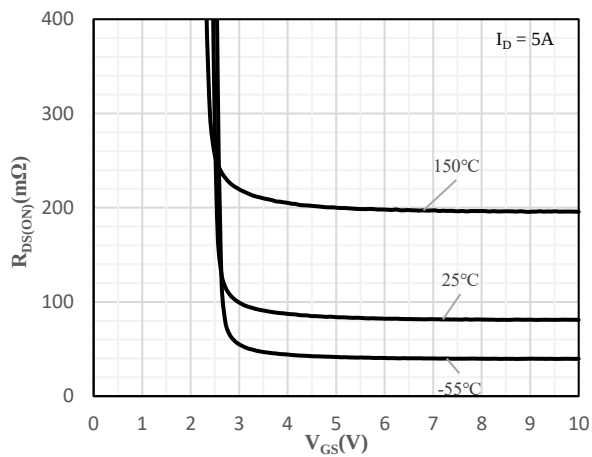


Fig 5 On-Resistance vs. Gate-Source Voltage

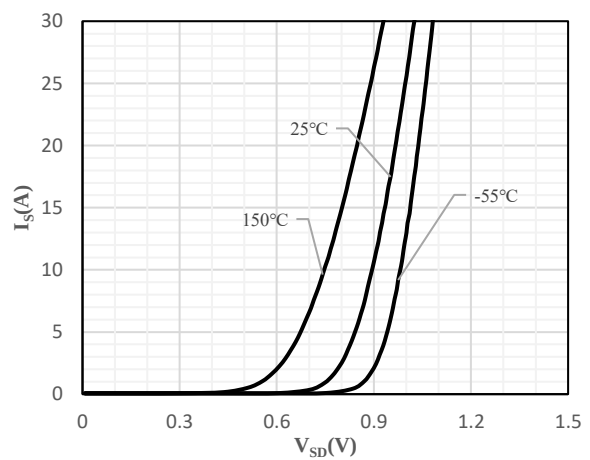


Fig 6 Body-Diode Characteristics

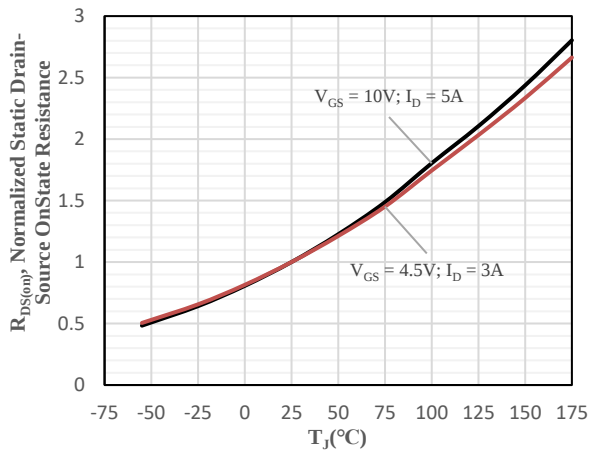


Fig 7 Normalized On-Resistance vs. Junction Temperature

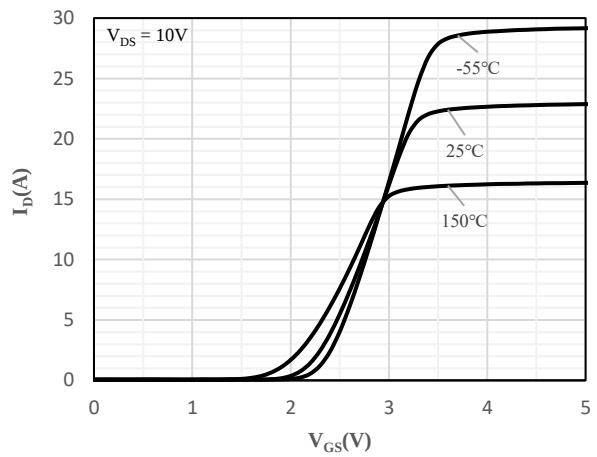


Fig 8 Transfer Characteristics

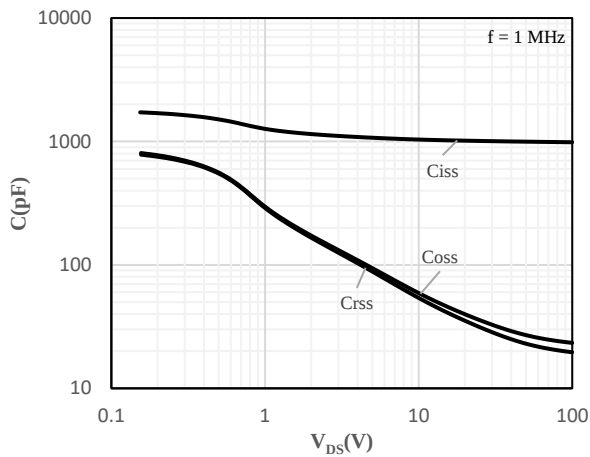


Fig 9 Capacitance Characteristics

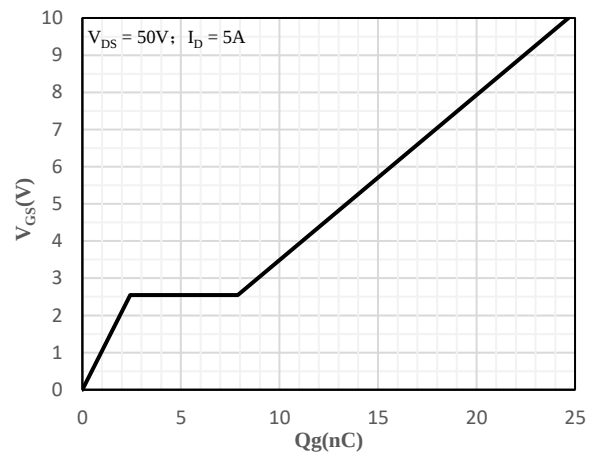


Fig 10 Gate-Charge Characteristics

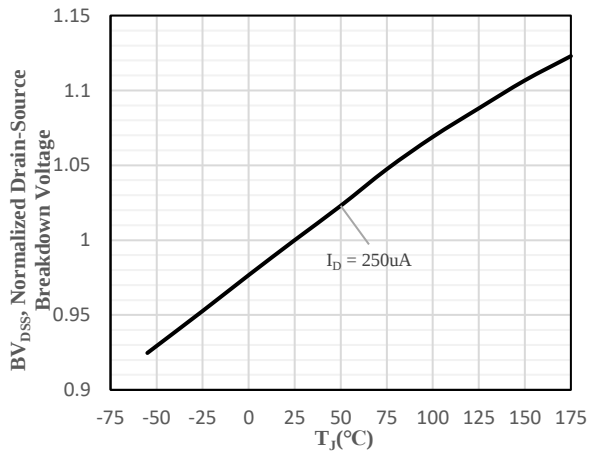


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

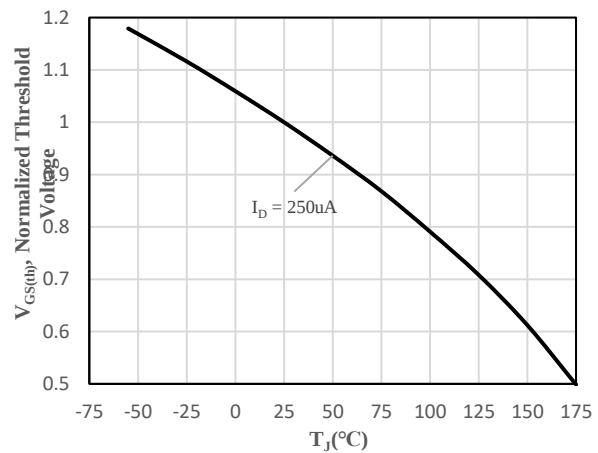


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

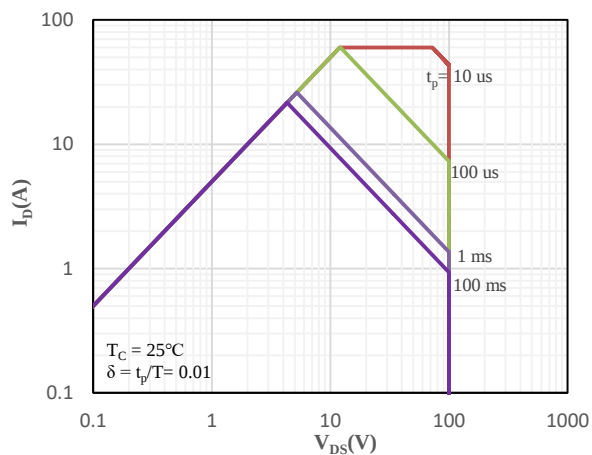


Fig 13 Safe Operating Area

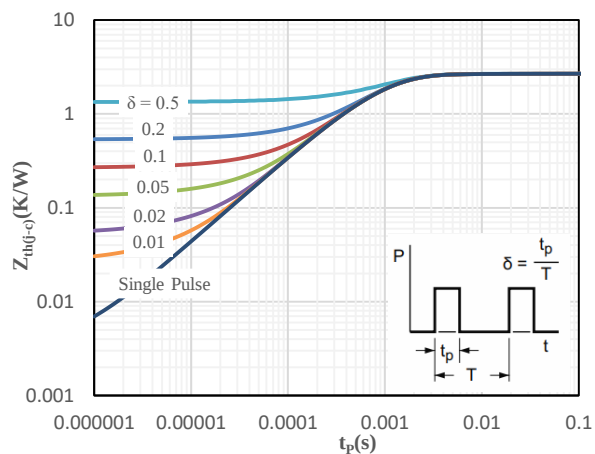
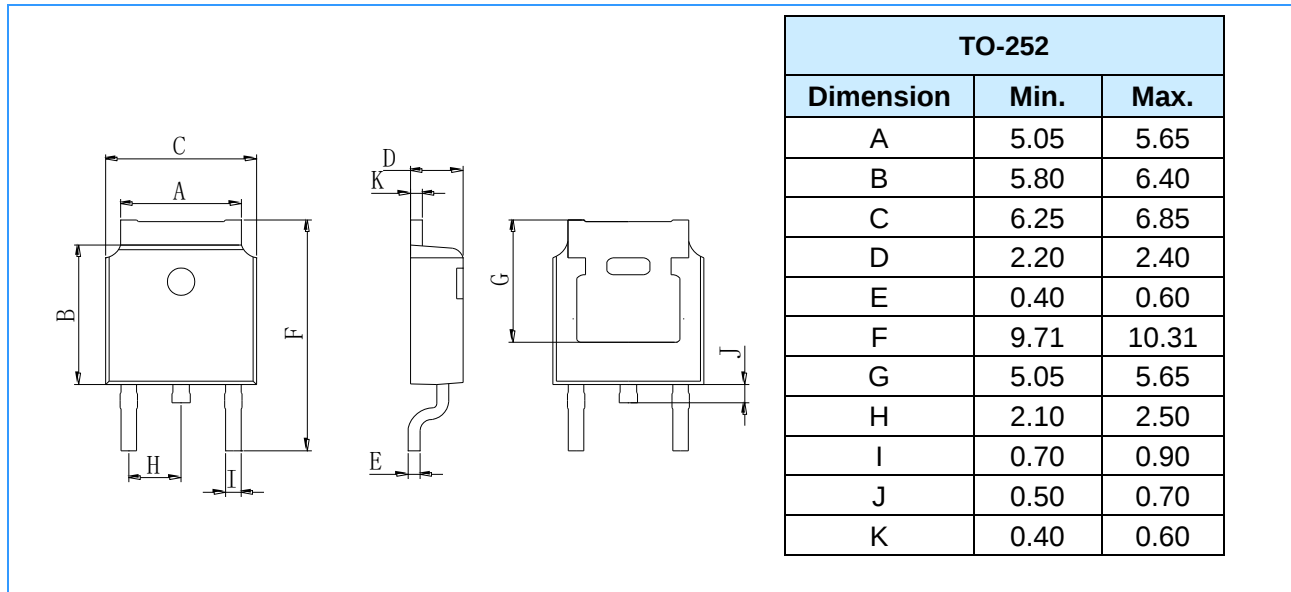


Fig 14 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



Mounting Pad Layout (Unit: mm)

