N-Channel Enhancement Mode MOSFET

TBL03N10R

Features

- Electrostatic sensitive devices
- Excellent package for good heat dissipation
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 standards for high reliability

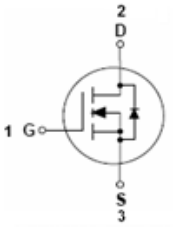
APPLICATIONS

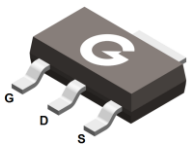
HF

- Power switching application
- Hard switching and high frequency circuits
- Uninterruptible power supply

Mechanical Data

- Case: SOT-223
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208





SOT-223

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL03N10R	SOT-223	4000 pcs / Tape & Reel	03N10

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	100	V
Gate-to-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (T_A = 25°C)	I_D	3	A
Continuous Drain Current (T_A = 70°C)	I_D	1.8	A
Pulsed Drain Current (t_p = 10μs, T_A = 25°C)	I_{DM}	12	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation (T_C = 25°C)	P_D	3.1	W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	40.3	°C/W
Thermal Resistance Junction-to-Air *2	$R_{\theta JA}$	50	°C/W
Operating Junction Temperature Range	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Electrical Characteristics (@ T_A = 25℃ 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						
$R_{DS(ON)}$	Static Drain-Source On-resistance *3	V_{GS} = 10V,I_D = 3A	-	0.15	0.22	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	2.1	2.5	V
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz	-	478	-	pF
C_{OSS}	Output Capacitance		-	33	-	
C_{RSS}	Reverse Transfer Capacitance		-	23	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DD} = 30V, V_{GS} = 10V R_G = 2.5Ω, R_L = 15Ω I_D = 2A	-	11	-	ns
t_r	Turn-on Rise Time		-	7.4	-	
$t_{d(OFF)}$	Turn-Off Delay Time		-	35	-	
t_f	Turn-Off Fall Time		-	9.1	-	
Q_G	Total Gate-Charge	V_{DD} = 30V V_{GS} = 10V I_D = 3A	-	14.1	-	nC
Q_{GS}	Gate to Source Charge		-	3.9	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	2.3	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *3	I_{SD} = 3A, V_{GS} = 0V, T_J = 25°C	-	-	1.2	V

Notes:

1. Device mounted on FR-4 PCB
2. Surface−mounted on 1 inch^2 FR-4 board with 2OZ copper
3. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

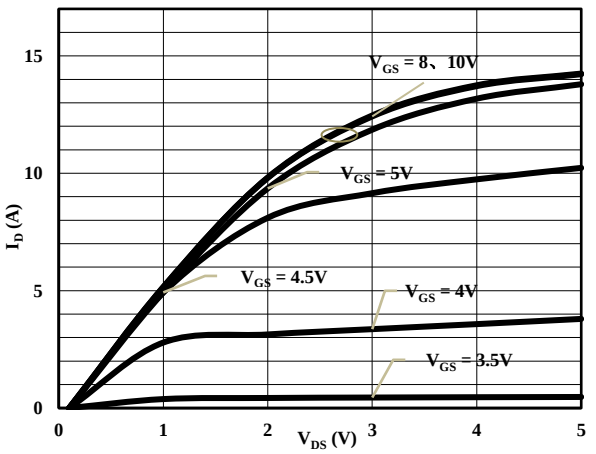


Fig 1 On-Region Characteristics

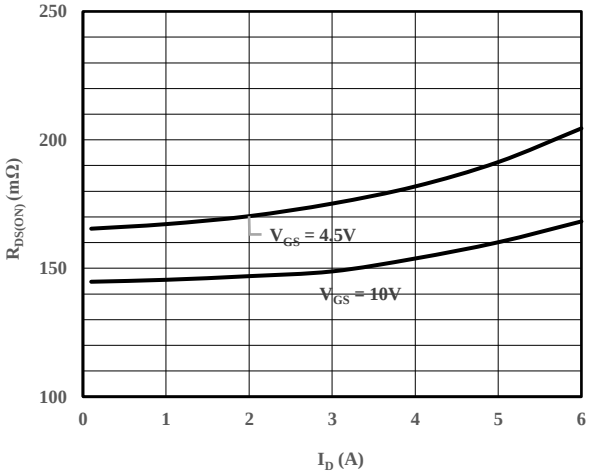


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

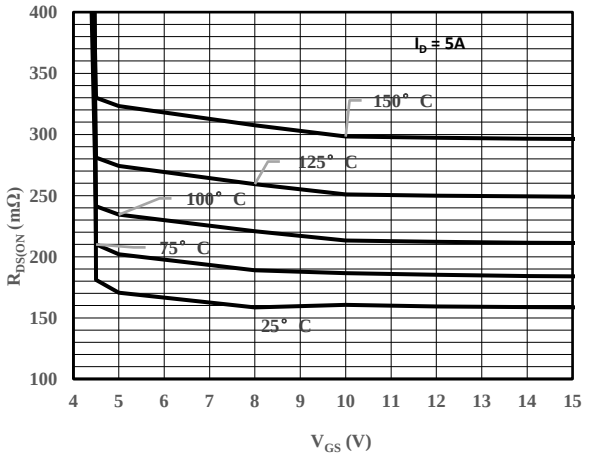


Fig 3 On-Resistance vs. Gate-Source Voltage

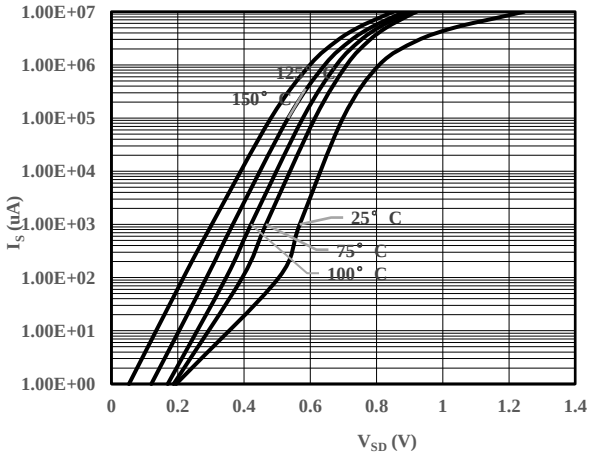


Fig 4 Body-Diode Characteristics

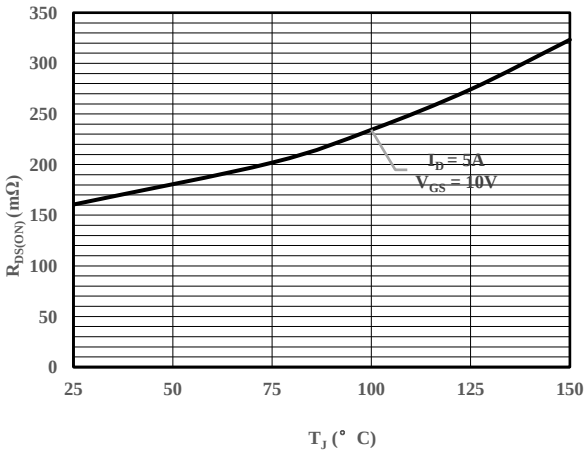


Fig 5 On-Resistance vs. Junction Temperature

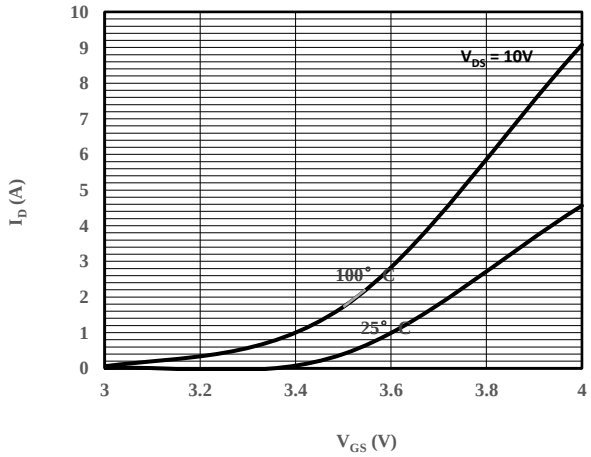


Fig 6 Transfer Characteristics

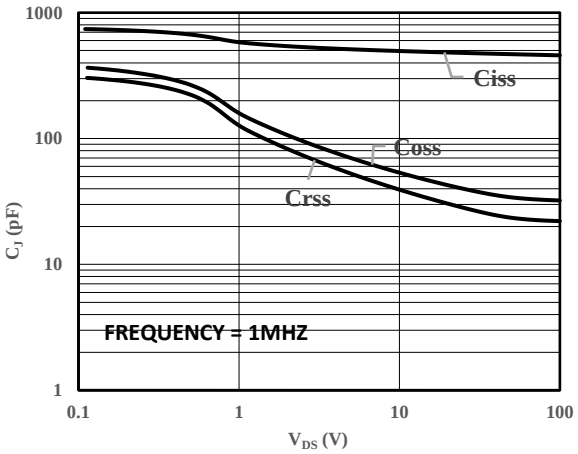


Fig 7 Capacitance Characteristics

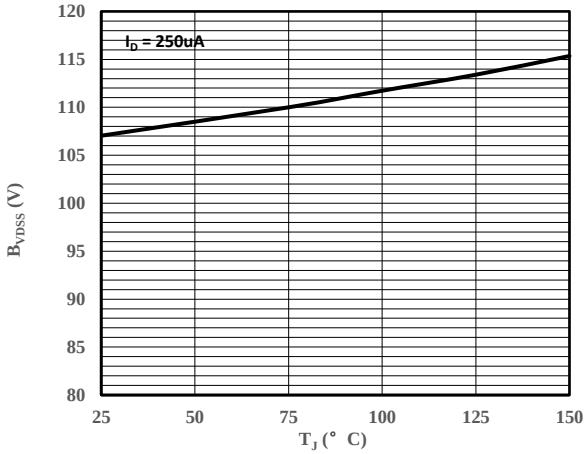


Fig 8 Drain-Source vs. Junction Temperature

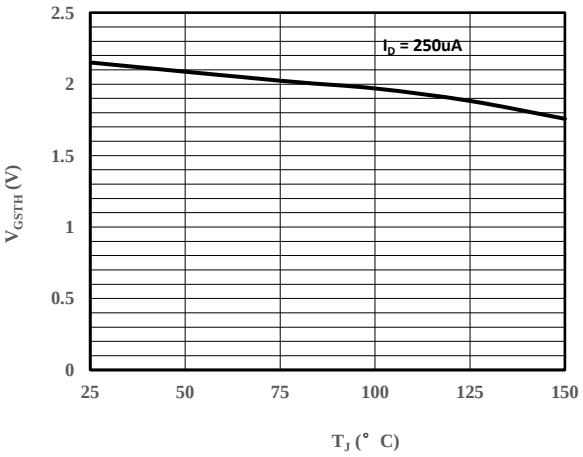


Fig 9 Gate Voltage vs. Junction Temperature

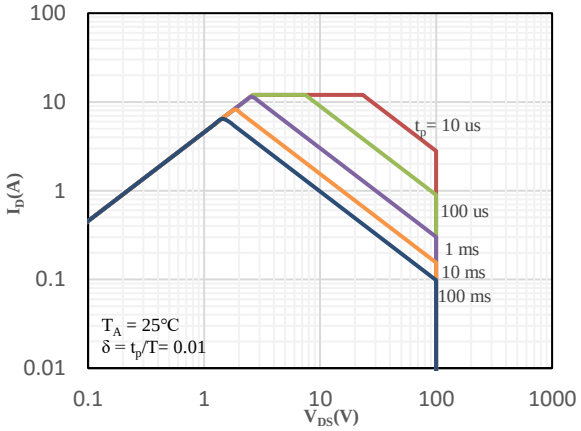


Fig 10 Safe Operation Area

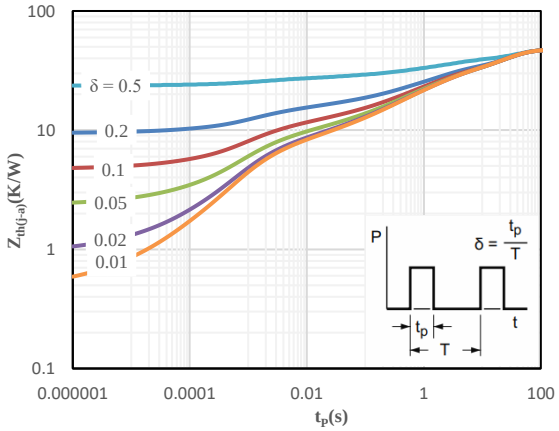
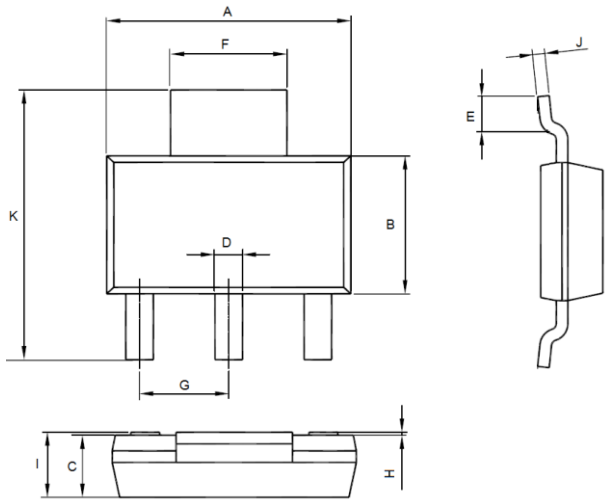


Fig 11 Maximum transient thermal impedance

Package Outline Dimensions (Unit: mm)



SOT-223		
Dimension	**Min.**	**Max.**
A	6.10	6.50
B	3.30	3.70
C	1.50	1.70
D	0.66	0.82
E	0.90	1.15
F	2.90	3.10
G	2.20	2.40
H	0.02	0.10
I	1.52	1.80
J	0.20	0.40
K	6.70	7.30

Mounting Pad Layout (Unit: mm)

SOT-223

