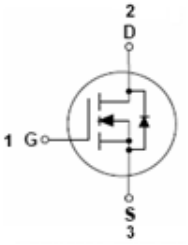
N-Channel Enhancement Mode MOSFET

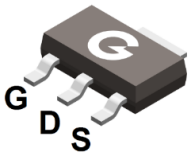
TBL300N06R

Features

HF

- Super low gate charge
- Green device available
- Excellent C_{dV} / d_t effect decline
- Advanced high cell density trench technology
- JESD22-A114-B ESD rating of class 1B per human body model
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 standards for high reliability





SOT-223

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

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL300N06R	SOT-223	4000 pcs / Tape & Reel	300N06R

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (T_A = 25°C) *1	I_D	6	A
Continuous Drain Current (T_A = 100°C) *1		4	A
Pulsed Drain Current (t_p = 10μs, T_A = 25°C)	I_{DM}	24	A
Single Pulse Avalanche Energy *3	E_{AS}	8	mJ
Power Dissipation (T_A = 25°C，$R_{\theta JA}$ = 41°C/W) *1	P_D	3.1	W
Operating Junction Temperature Range	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	41	62.5	°C/W
Thermal Resistance Junction-to-Case *1	$R_{\theta JC}$	-	-	40.3	°C/W
Thermal Resistance Junction-to-Lead *1	$R_{\theta JL}$		-	20	°C/W

Electrical Characteristics (@ T_A = 25°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	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V, T_C = 25°C	-	-	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 = 4A	-	27	30	mΩ
		V_{GS} = 4.5V,I_D = 2A	-	31	38	mΩ
$V_{GS(th)}$	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	-	4.5	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 15V f = 1.0MHz	-	872	-	pF
C_{OSS}	Output Capacitance		-	86	-	
C_{RSS}	Reverse Transfer Capacitance		-	64	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time*4	V_{DD} = 30V V_{GS} = 10V R_G = 3.3Ω I_D = 4A	-	8	-	ns
t_r	Turn-on Rise Time*4		-	14	-	
$t_{d(OFF)}$	Turn-Off Delay Time*4		-	25	-	
t_f	Turn-Off Fall Time*4		-	4.6	-	
Q_G	Total Gate-Charge	V_{DD} = 48V V_{GS} = 10V I_D = 4A	-	25	-	nC
Q_{GS}	Gate to Source Charge		-	2.8	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	6	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = 1A, V_{GS} = 0V, T_J = 25°C	-	0.7	1.2	V
trr	Reverse Recovery Time	I_F = 6A, V_{GS} = 0V di/dt = 100A/μs	-	23	-	ns
Qrr	Reverse Recovery Charge		-	17	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating. The test condition is V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH
4. Guaranteed by design, not subject to production

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

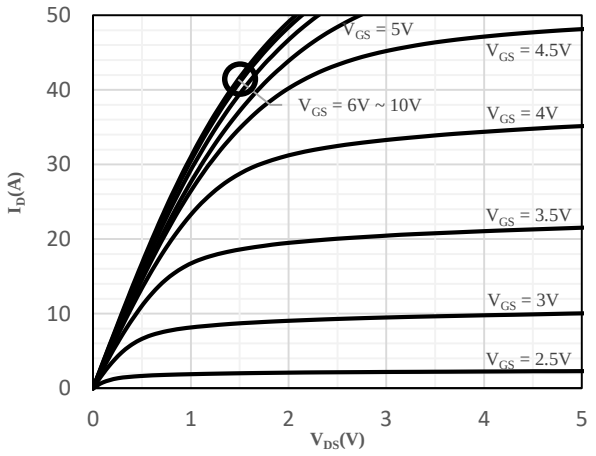


Fig 1 Typical Output Characteristics

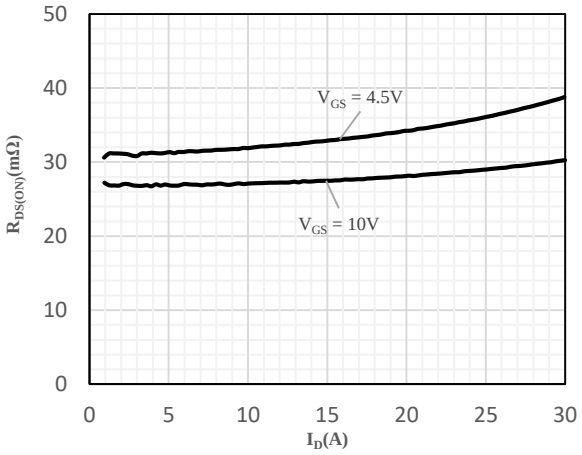


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

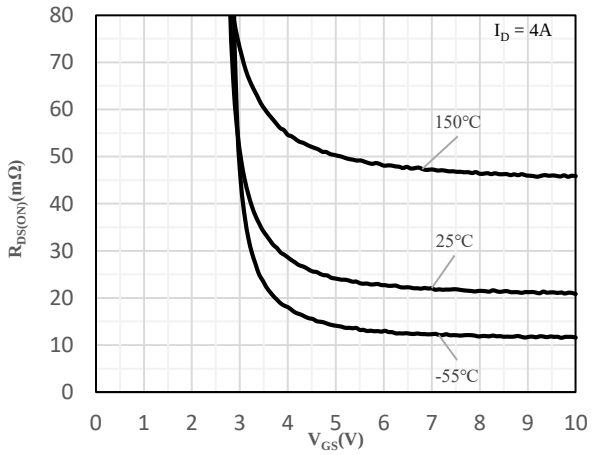


Fig 3 On-Resistance vs. Gate-Source Voltage

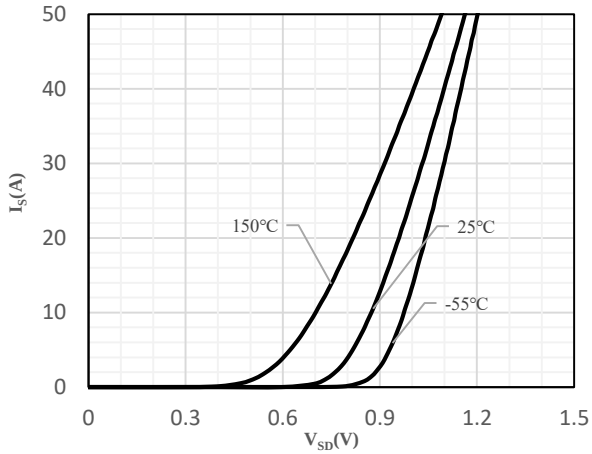


Fig 4 Body-Diode Characteristics

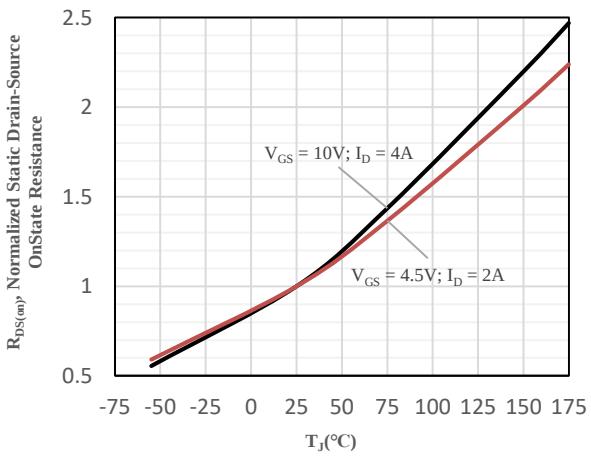


Fig 5 Normalized On-Resistance vs. Junction Temperature

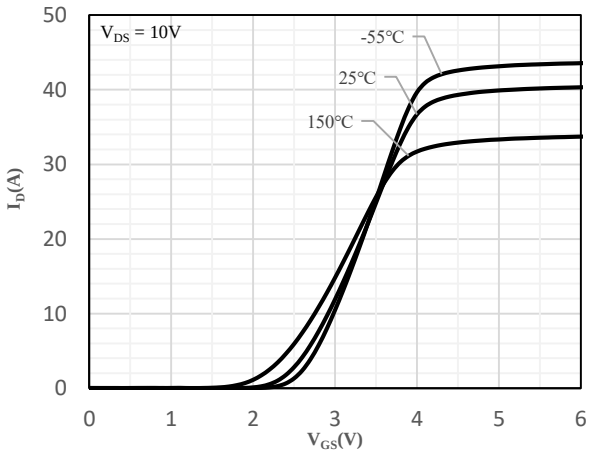


Fig 6 Transfer Characteristics

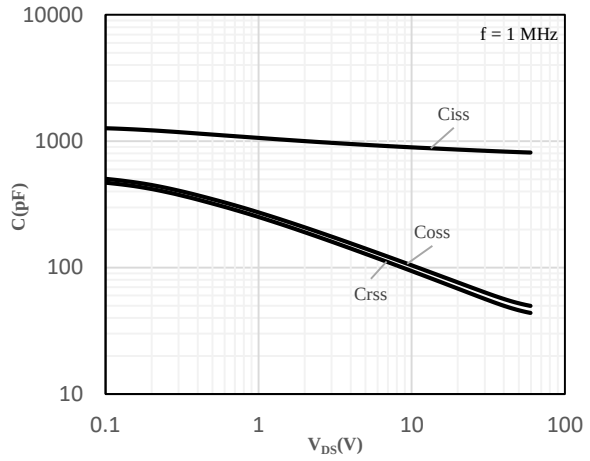


Fig 7 Capacitance Characteristics

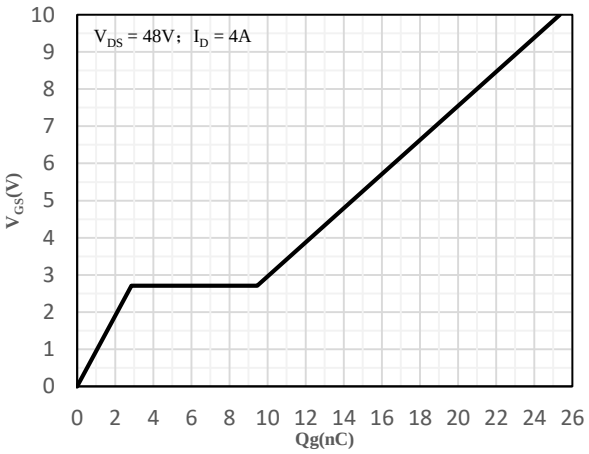


Fig 8 Gate-Charge Characteristics

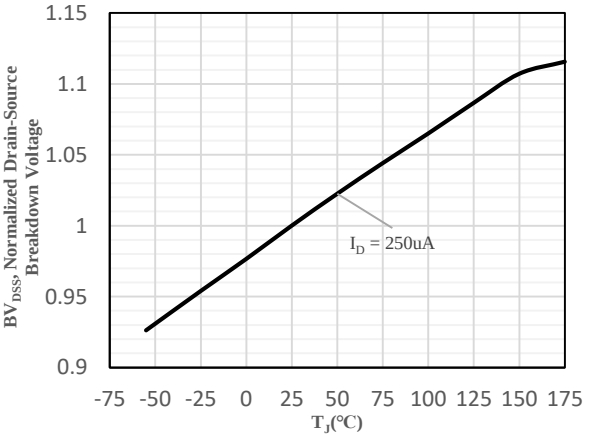


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

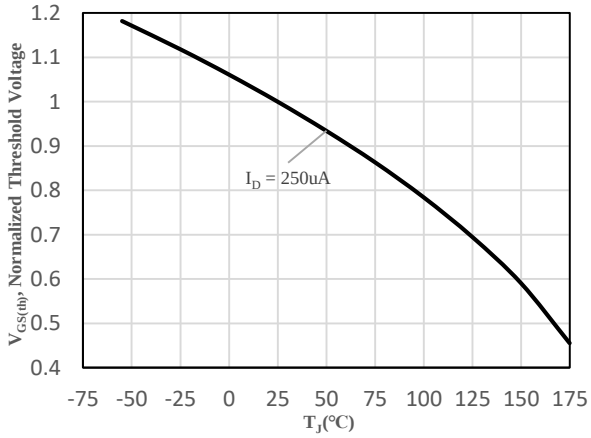


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

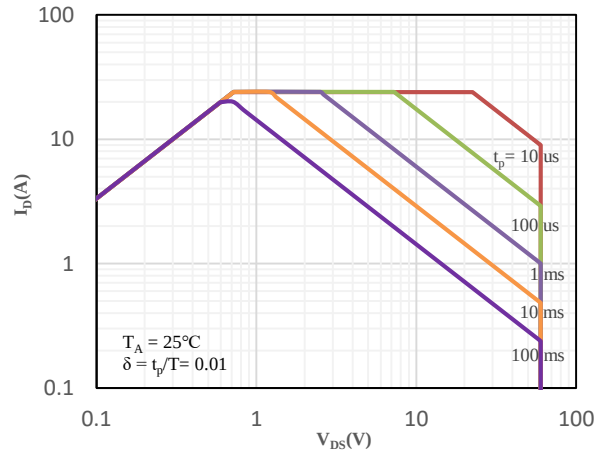


Fig 11 Safe Operation Area

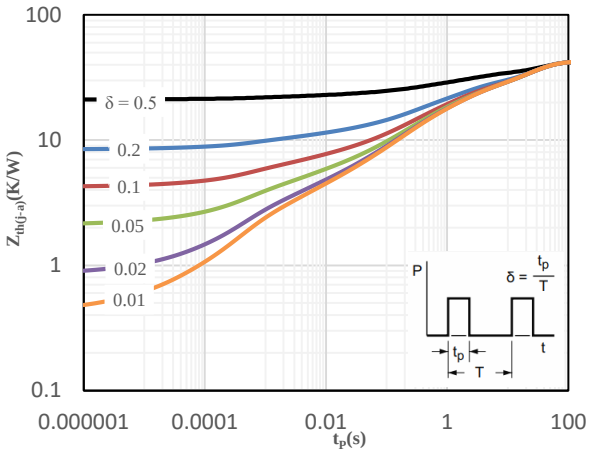
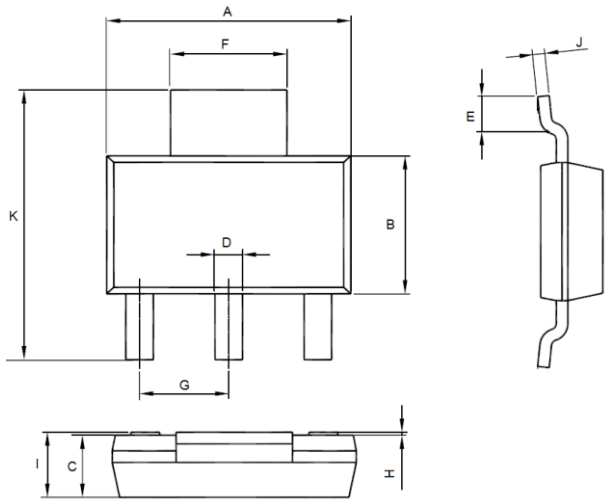


Fig 12 Maximum transient thermal impedance

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

