

Features

- High-speed switching
- Drive circuits can be simple
- Parallel use is easy
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

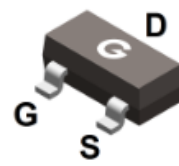
HF

Typical Applications

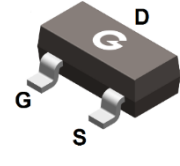
- Power management in note book
- Switching application
- Battery powered system
- Load switch

Mechanical Data

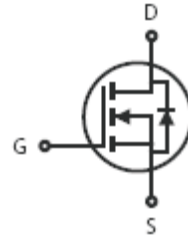
- Case: SOT-23, SOT-23-3L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TBL2300
SOT-23



TBL2300-3L
SOT-23-3L



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL2300	SOT-23	3000 pcs / Tape & Reel	2300
TBL2300-3L	SOT-23-3L	3000 pcs / Tape & Reel	2300

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	20	V
Gate-to-Source Voltage	V _{GSS}	±10	V
Continuous Drain Current (T _A = 25°C) *1	I _D	4	A
Continuous Drain Current (T _A = 70°C) *1		3.2	A
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)	I _{DM}	25	A
Single Pulse Avalanche Energy *3	E _{AS}	5	mJ
Power Dissipation (T _A = 25°C) *1	P _D	1.25	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-Case	$R_{\theta JC}$	-	55	70	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	100	$^{\circ}\text{C/W}$

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	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±10V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 4.5V, I _D = 5A	-	22	40	mΩ
		V _{GS} = 2.5V, I _D = 4A	-	30	60	
		V _{GS} = 1.8V, I _D = 1A	-	51	75	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	0.6	0.8	1.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	9	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz	-	413	-	pF
C _{OSS}	Output Capacitance		-	63	-	
C _{RSS}	Reverse Transfer Capacitance		-	57	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 10V V _{GS} = 4.5V I _D = 1A R _G = 6Ω	-	31.8	-	ns
t _r	Turn-on Rise Time *4		-	14.5	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	50.3	-	
t _f	Turn-Off Fall Time *4		-	31.9	-	
Q _G	Total Gate-Charge	V _{DD} = 10V	-	6.4	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 4.5V	-	1.1	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 3.5A	-	1.8	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 1.25A, V _{GS} = 0V	-	0.7	1.2	V

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
3. The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 10\text{V}, V_{GS} = 6\text{V}, L = 0.1\text{mH}$
4. Guaranteed by design, not subject to production

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

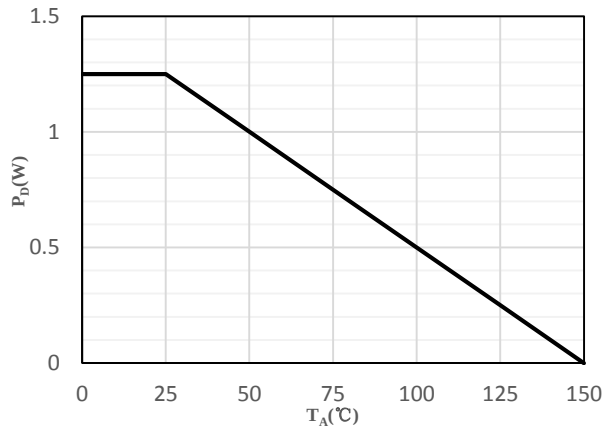


Fig 1 Power Dissipation

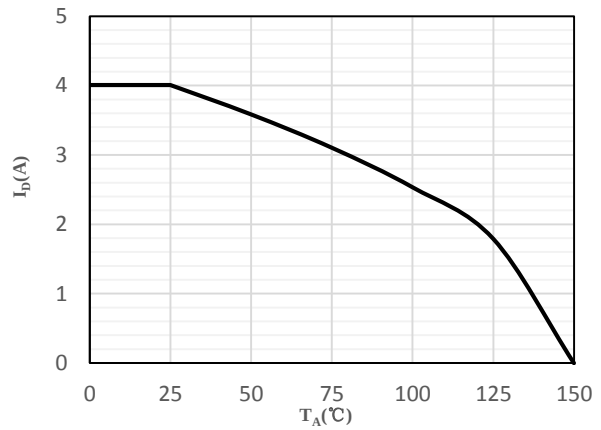


Fig 2 Drain Current

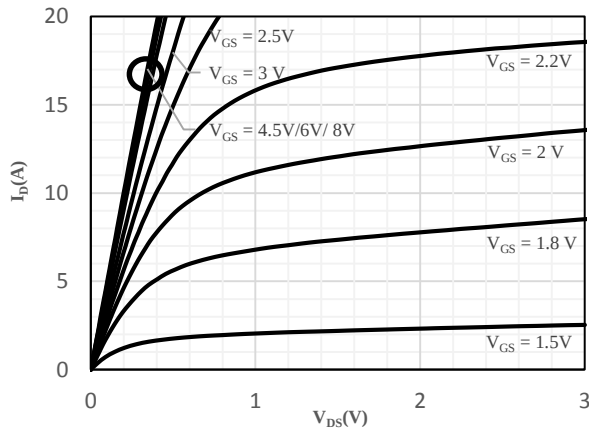


Fig 3 Typical Output Characteristics

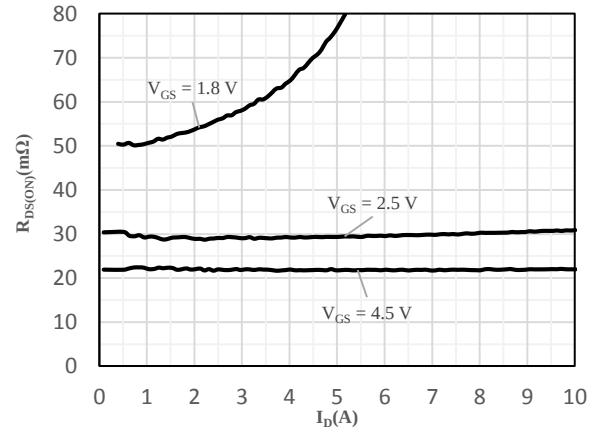


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

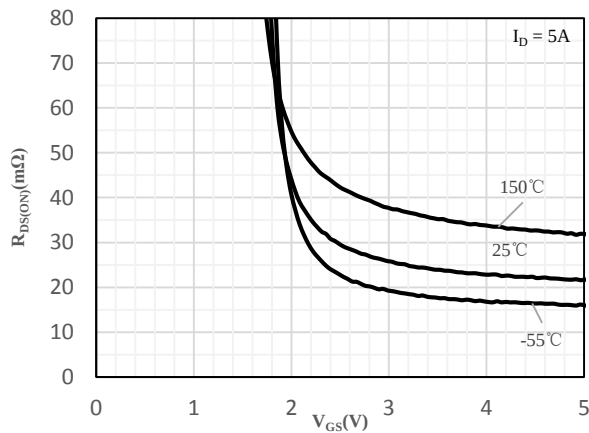


Fig 5 On-Resistance vs. Gate-Source Voltage

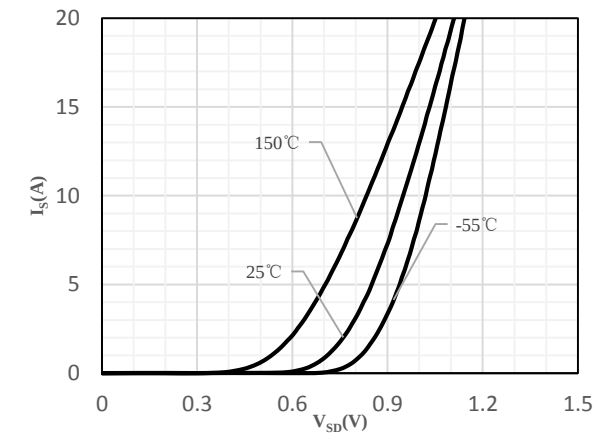


Fig 6 Body-Diode Characteristics

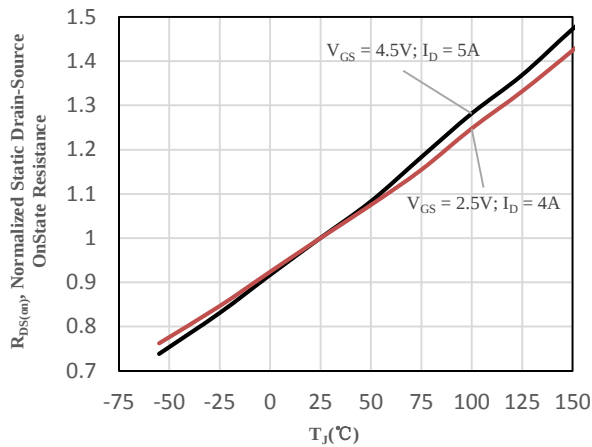


Fig 7 Normalized On-Resistance vs. Junction Temperature

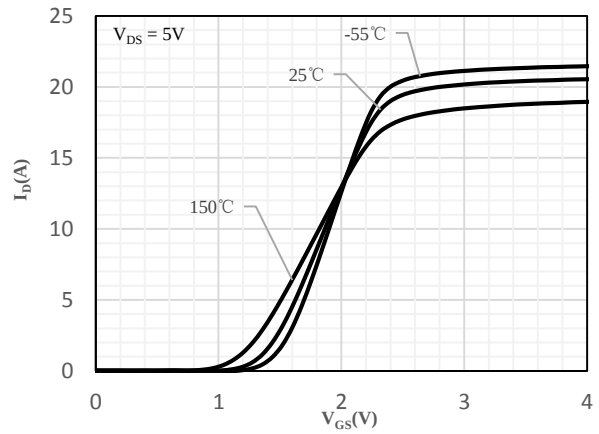


Fig 8 Transfer Characteristics

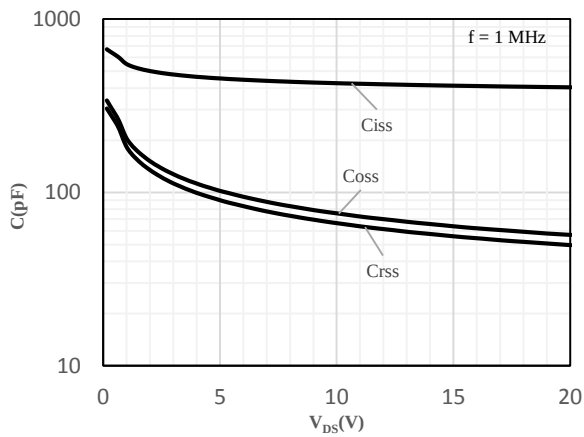


Fig 9 Capacitance Characteristics

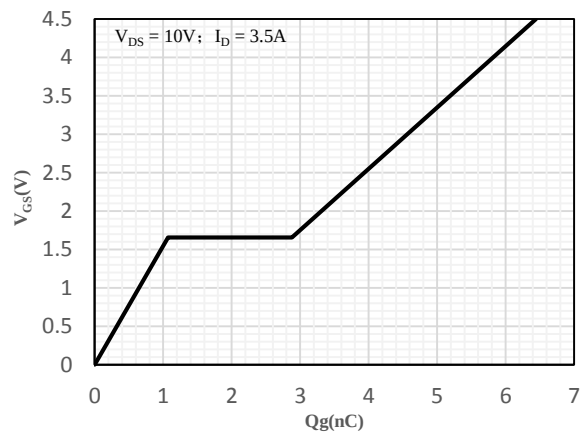


Fig 10 Gate-Charge Characteristics

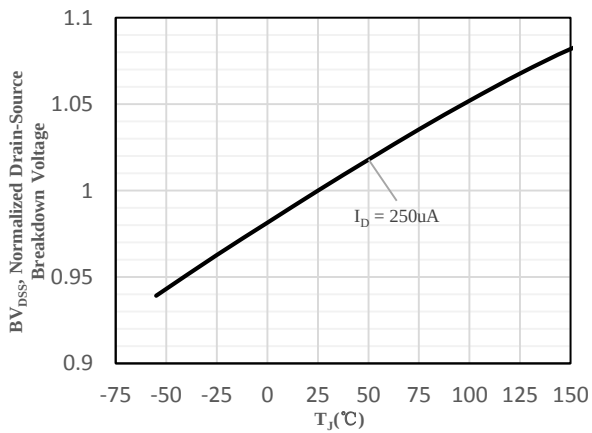


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

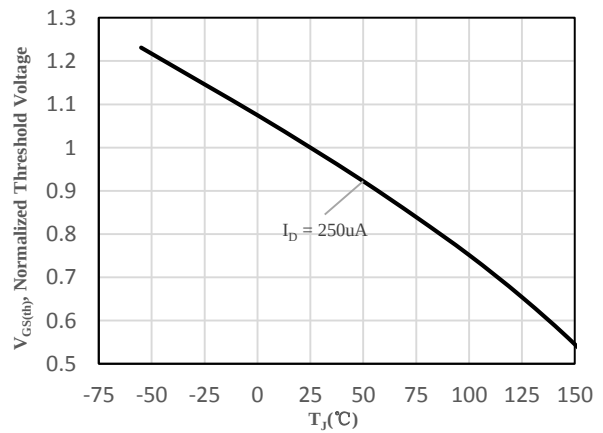
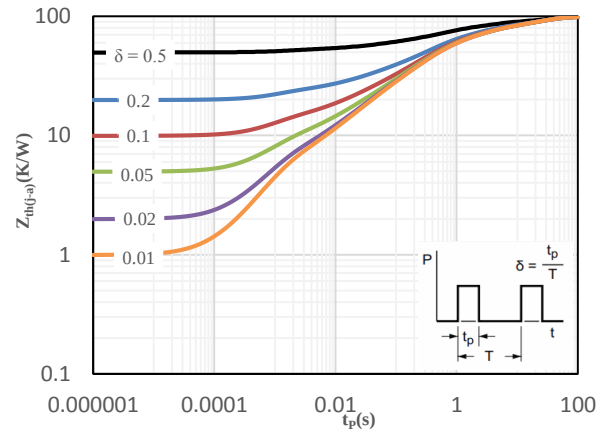
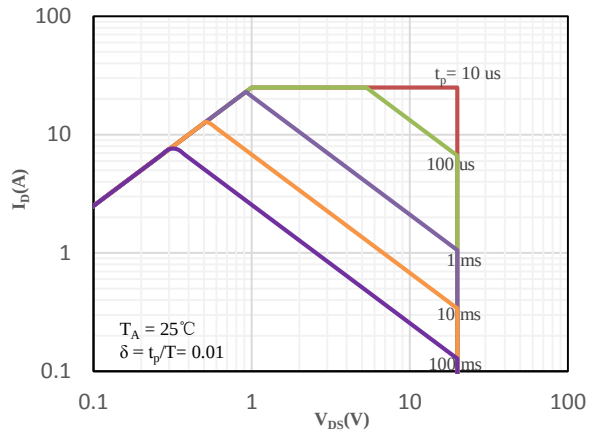
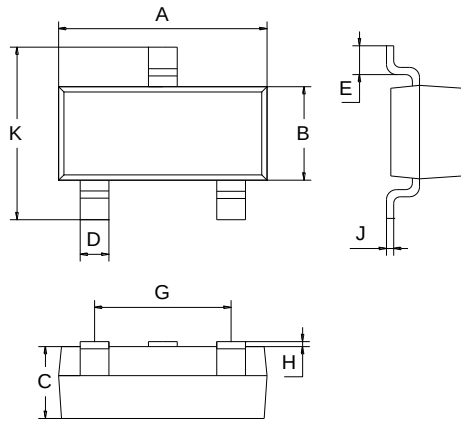


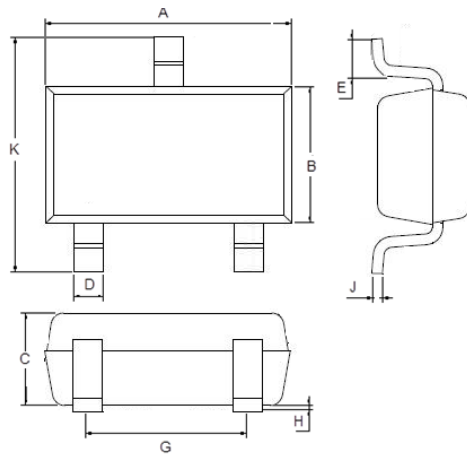
Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature



Package Outline Dimensions (Unit: mm)



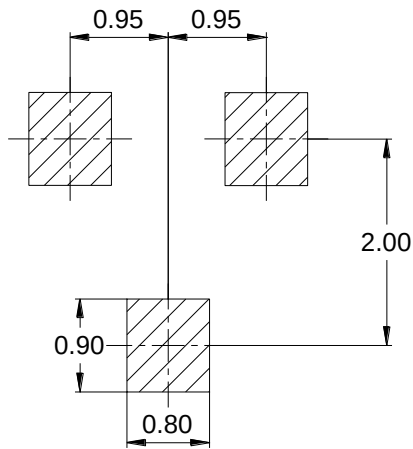
SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60



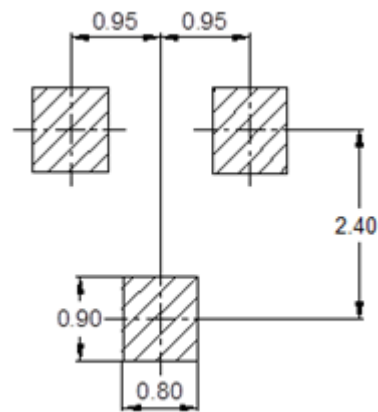
SOT-23-3L		
Dimension	Min.	Max.
A	2.80	3.00
B	1.50	1.70
C	1.00	1.20
D	0.35	0.45
E	0.35	0.55
G	1.80	2.00
H	0.02	0.10
J	0.10	0.20
K	2.60	3.00

Mounting Pad Layout (Unit: mm)

SOT-23



SOT-23-3L



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