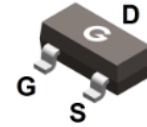
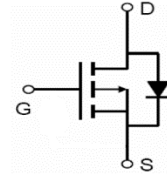


Features

- Advanced Trench technology
- Excellent $R_{DS(ON)}$ and low gate charge
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF



SOT-23

Mechanical Data

- Case: SOT-23
- 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
TBL900P04	SOT-23	3000 pcs / Tape & Reel	900P04

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	-40	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_A = 25^\circ\text{C}$) ^{*1}	I_D	-2.8	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) ^{*1}		-1.7	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$)	I_{DM}	-22	A

Thermal Characteristics

Parameter	Symbol	Value	Unit
Power Dissipation ($T_A = 25^\circ\text{C}$) ^{*1}	P_D	1.14	W
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	110	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case ^{*1}	$R_{\theta JC}$	58	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Lead ^{*1}	$R_{\theta JL}$	49	$^\circ\text{C/W}$
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_J = 25^{\circ}\text{C}$ 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	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -40V, 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 ^{*2}	V _{GS} = -10V, I _D = -3A	-	64	90	mΩ
		V _{GS} = -4.5V, I _D = -2A	-	88	100	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.6	-2.5	V
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = -20V f = 1.0MHz	-	525	-	pF
C _{OSS}	Output Capacitance		-	53	-	
C _{RSS}	Reverse Transfer Capacitance		-	42	-	
Q _G	Total Gate-Charge	V _{DD} = -20V I _D = -3A V _{GS} = -10V	-	13	-	nC
Q _{GS}	Gate to Source Charge		-	1.9	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	1.6	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = -20V V _{GS} = -10V R _G = 2.5Ω I _D = -5A	-	6.5	-	ns
t _r	Turn-on Rise Time		-	14	-	
t _{d(OFF)}	Turn-Off Delay Time		-	34	-	
t _f	Turn-Off Fall Time		-	18	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage ^{*2}	I _{SD} = -5A, V _{GS} = 0V	-	-	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} = -5A, V _{GS} = 0V	-	23	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	12	-	nC

Notes:

- The data tested by device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
- Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

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

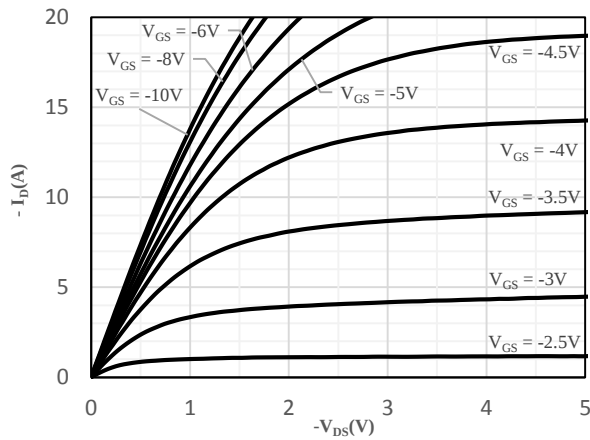


Fig 1 Typical Output Characteristics

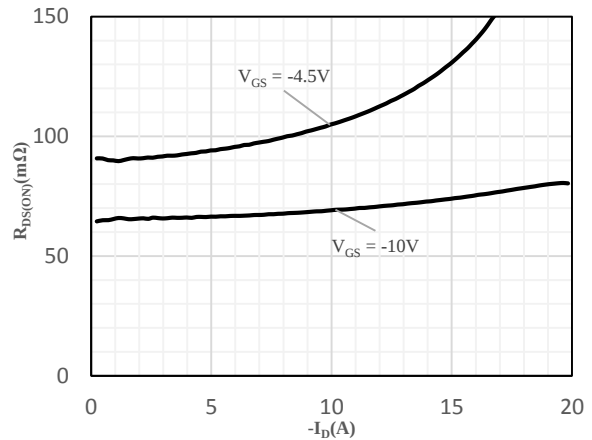


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

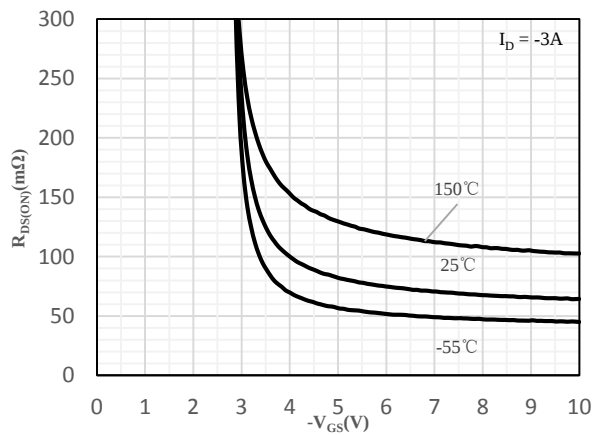


Fig 3 On-Resistance vs. Gate-Source Voltage

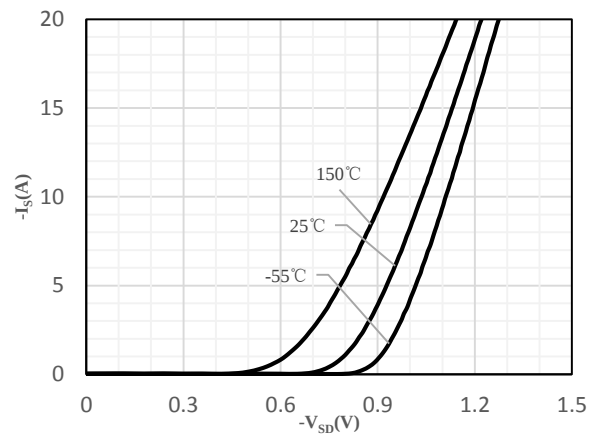


Fig 4 Body-Diode Characteristics

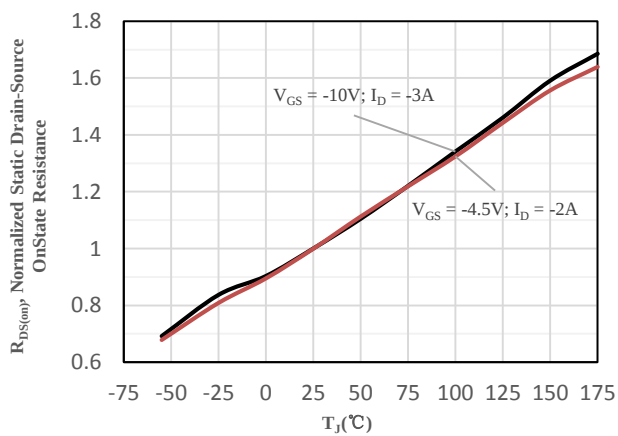


Fig 5 Normalized On-Resistance vs. Junction Temperature

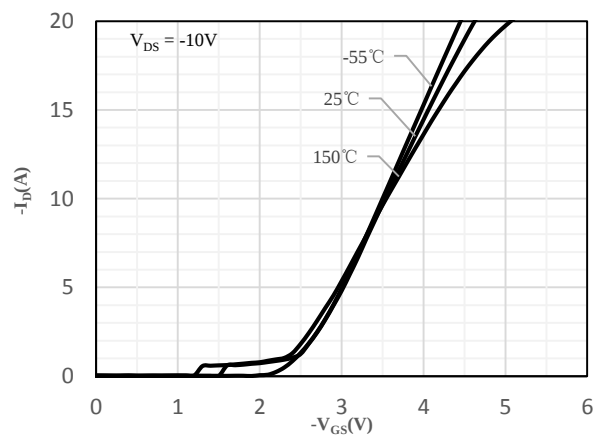


Fig 6 Transfer Characteristics

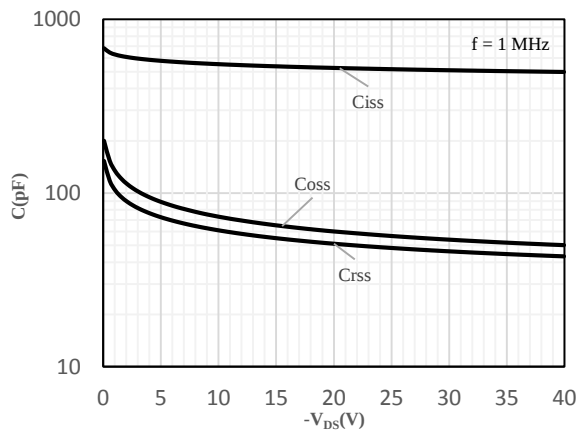


Fig 7 Capacitance Characteristics

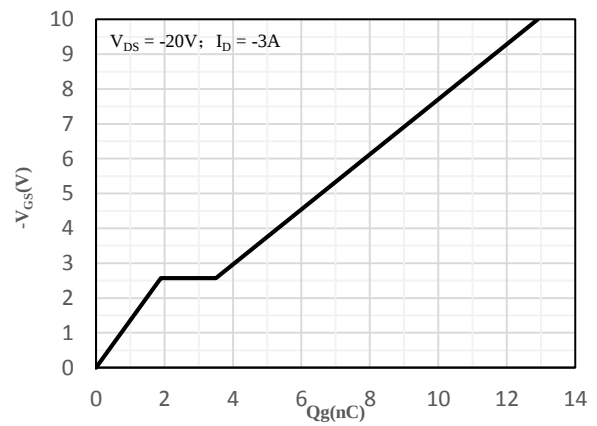


Fig 8 Gate-Charge Characteristics

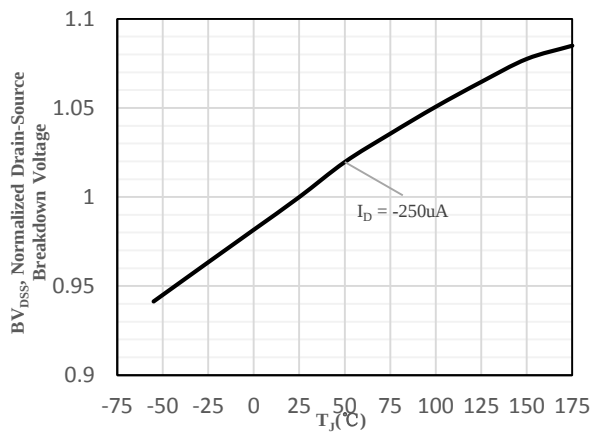


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

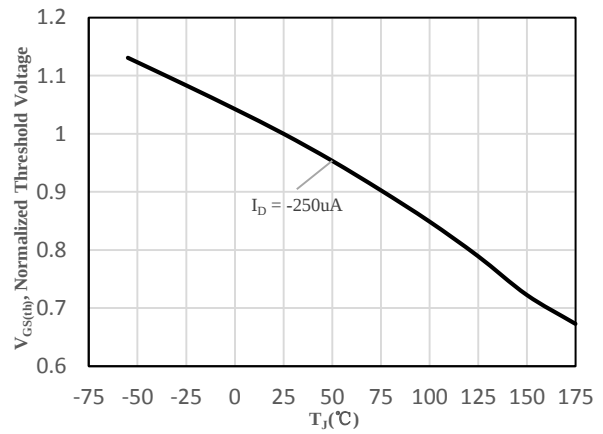


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

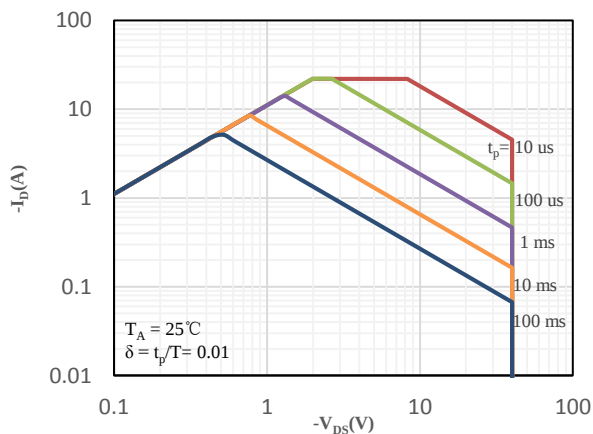


Fig 11 Safe Operation Area

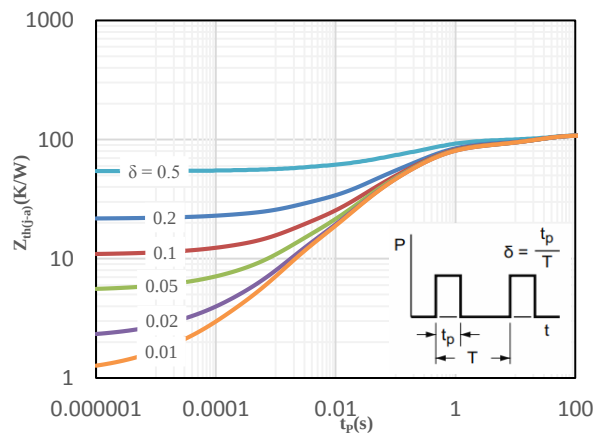
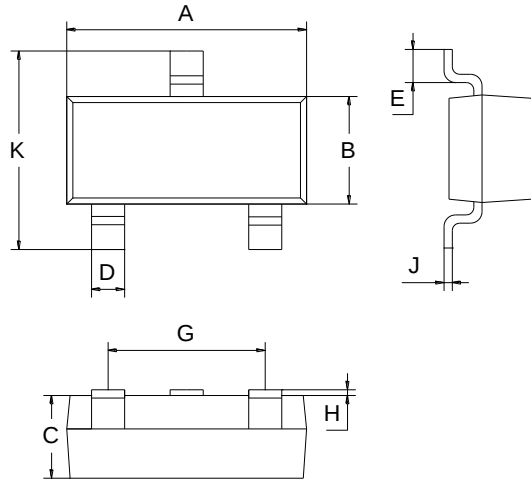


Fig 12 Maximum transient thermal impedance

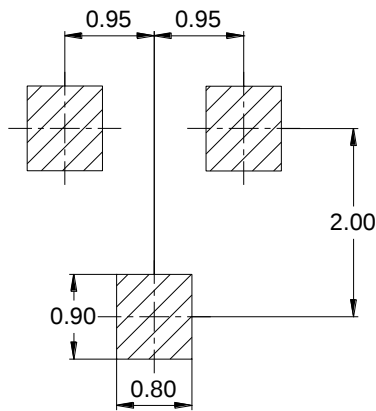
Package Outline Dimensions (Unit: mm)



SOT-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

Mounting Pad Layout (Unit: mm)

SOT-23



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