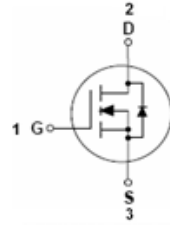


Features

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

HF

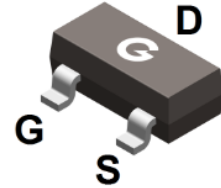


Applications

- PWM
- Load switch

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



SOT-23

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TQBL350N04	SOT-23	3000 pcs / Tape & Reel	350N04

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 ($T_C = 25^\circ\text{C}$)	I_D	6.5	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$) *1		5.4	A
Continuous Drain Current ($T_A = 70^\circ\text{C}$) *1		4.5	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_A = 25^\circ\text{C}$)	I_{DM}	40	A
Single Pulse Avalanche Energy *3	E_{AS}	8	mJ
Power Dissipation ($T_A = 25^\circ\text{C}$) *1	P_D	2	W
Operating Junction Temperature Range	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	35	50	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	70	75	$^{\circ}\text{C/W}$

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	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)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 4A	-	25	35	mΩ
		V _{GS} = 4.5V, I _D = 3A	-	33	60	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	2.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	9.3	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	446	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 20V	-	45	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	39	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = 20V	-	10	-	ns
t _r	Turn-on Rise Time *4	V _{GS} = 10V	-	8	-	
t _{d(OFF)}	Turn-Off Delay Time *4	R _G = 5.0Ω	-	29	-	
t _f	Turn-Off Fall Time *4	I _D = 3A	-	12	-	
Q _G	Total Gate-Charge	V _{DD} = 20V	-	10.5	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	1.3	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 3A	-	2.5	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 7A, V _{GS} = 0V	-	0.9	1.2	V
T _{rr}	Body Diode Reverse Recovery Time	I _F = 5A, V _{GS} = 0V	-	17	-	ns
Q _{rr}	Body Diode Reverse Recovery charge	di/dt = 100A/μs	-	7	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 25\text{V}$, $V_{GS} = 10\text{V}$, $L = 0.1\text{mH}$
- Guaranteed by design, not subject to production

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

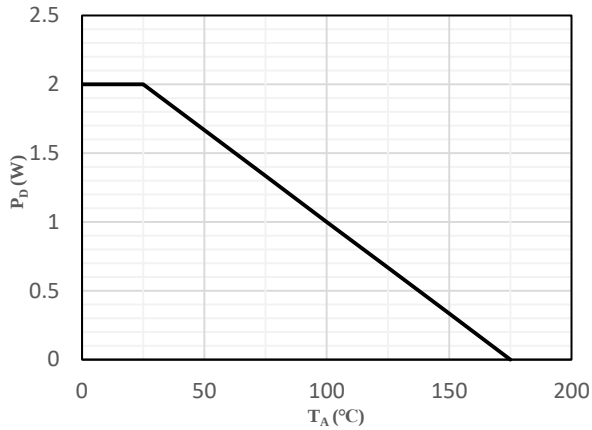


Fig 1 Power Dissipation

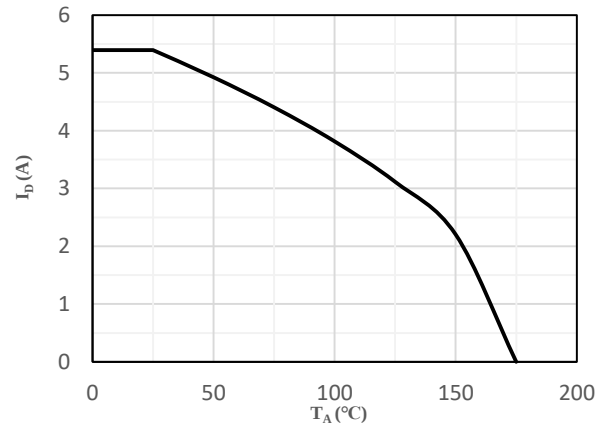


Fig 2 Drain Current

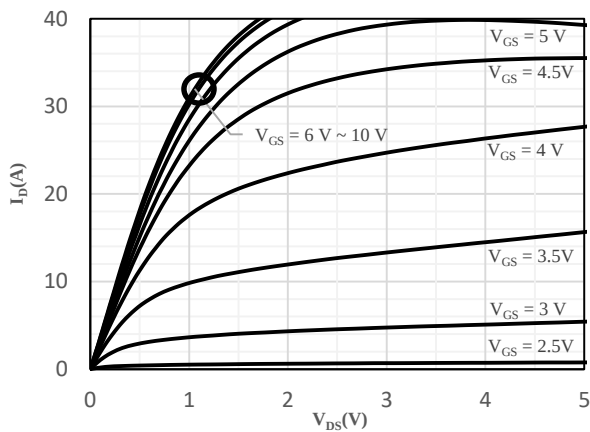


Fig 3 Typical Output Characteristics

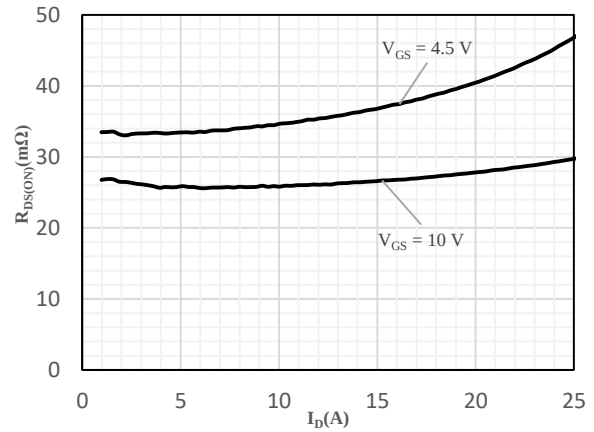


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

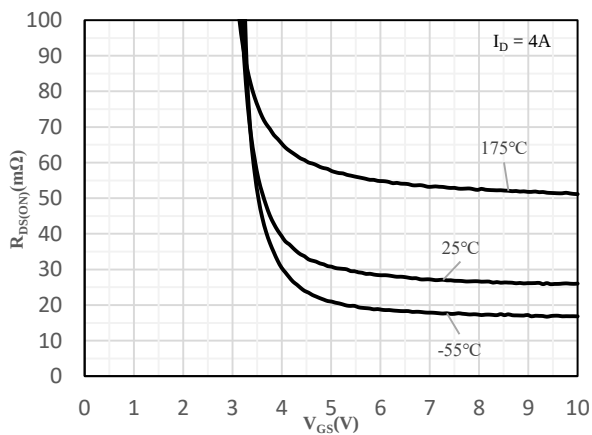


Fig 5 On-Resistance vs. Gate-Source Voltage

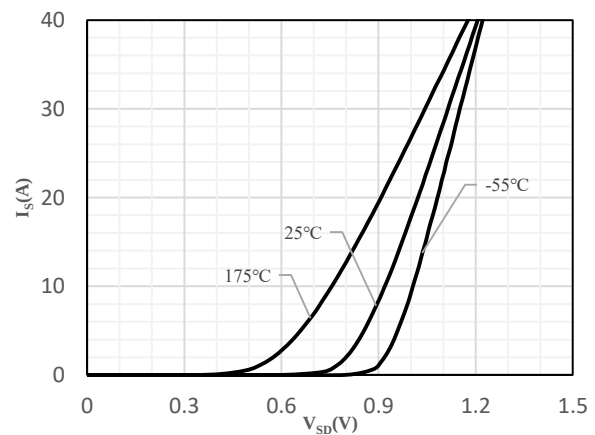


Fig 6 Body-Diode Characteristics

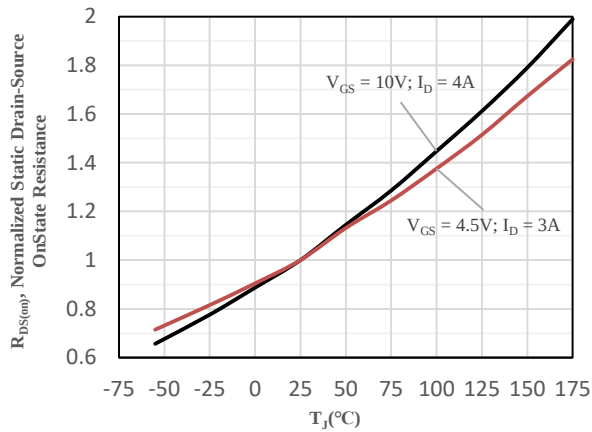


Fig 7 Normalized On-Resistance vs. Junction Temperature

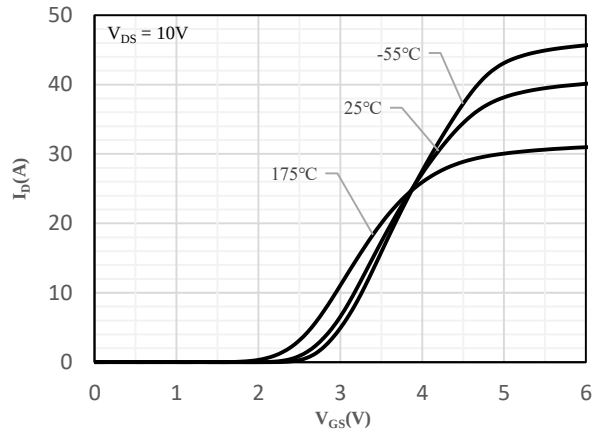


Fig 8 Transfer Characteristics

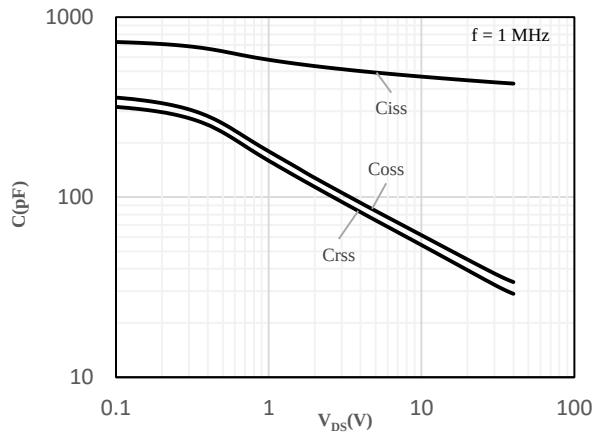


Fig 9 Capacitance Characteristics

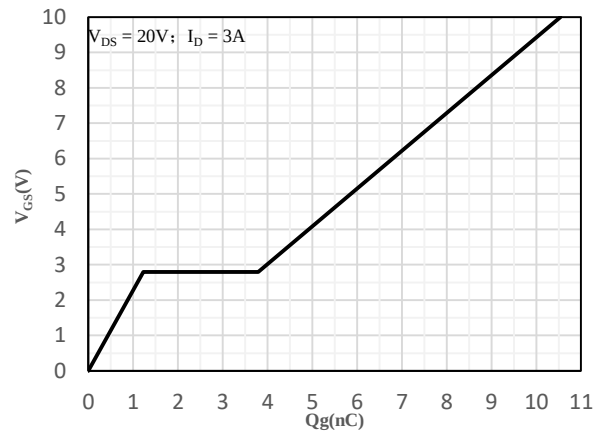


Fig 10 Gate-Charge Characteristics

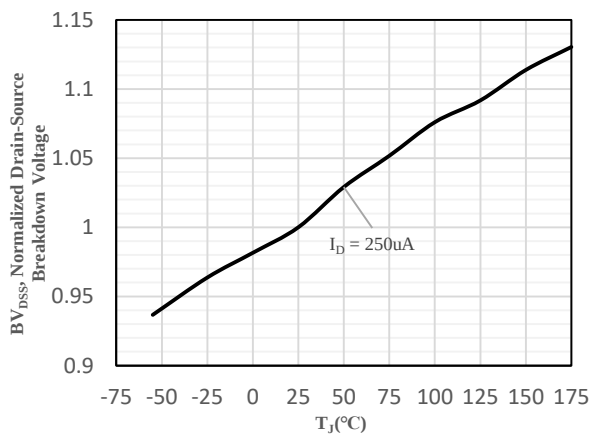


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

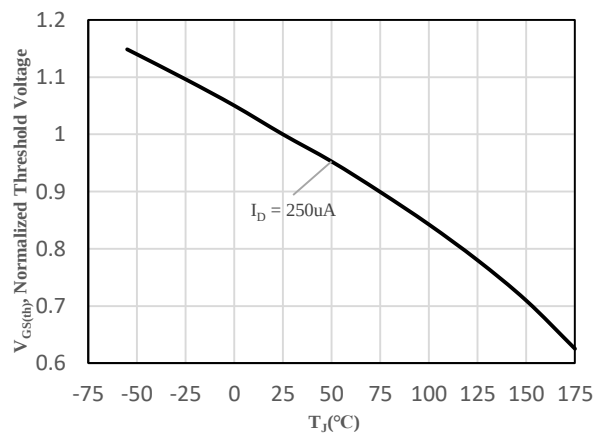


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

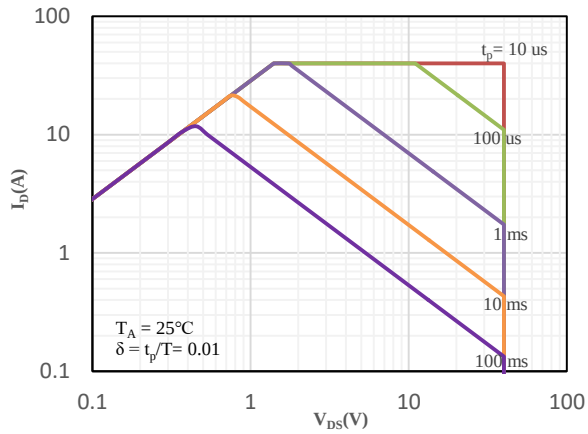


Fig 13 Safe Operation Area

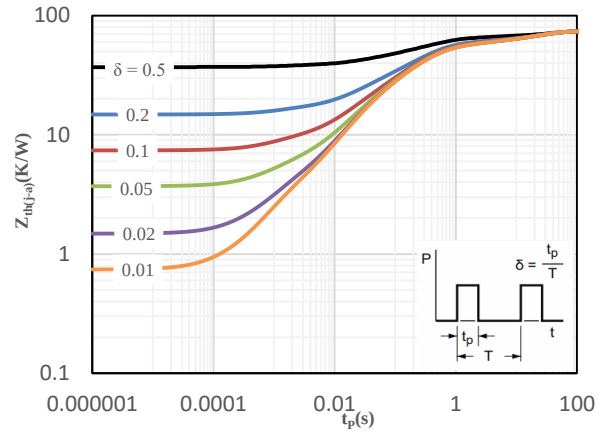
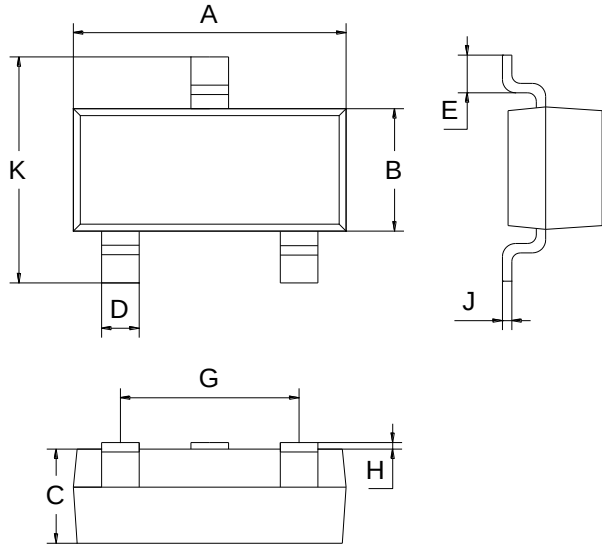


Fig 14 Maximum transient thermal impedance

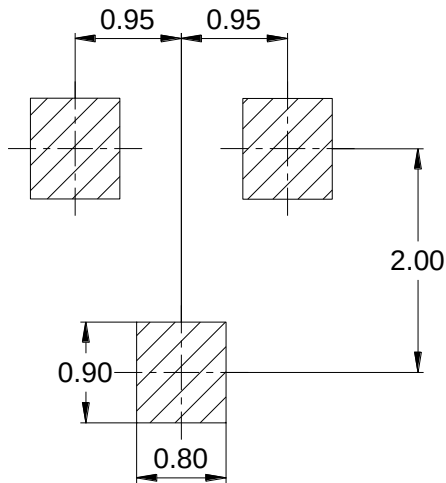
Package Outline Dimensions (Unit: mm)



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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