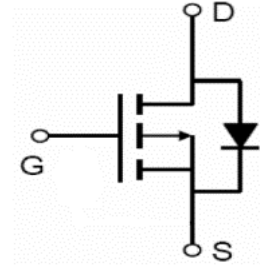


Features

- Advanced Trench technology
- Low $R_{DS(ON)}$
- HBM: AEC-Q101-001: H2 (JESD22-A114-B: 2)
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 standards for high reliability

HF

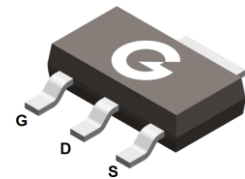


Typical Applications

- Backlighting
- Power management functions
- DC-DC Converters

Mechanical Data

- Case: SOT-223
- Molding Compound, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Plated Leads, Solderable Per MIL-STD-202, Method 208



SOT-223

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL500P06XR	SOT-223	4000 pcs / Tape & Reel	500P06XR

Maximum Ratings (@ $T_A = 25^\circ\text{C}$ 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 ($T_A = 25^\circ\text{C}$) ^{*1}	I_D	-6	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) ^{*1}		-3.8	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_A = 25^\circ\text{C}$)	I_{DM}	-60	A
Single Pulse Avalanche Energy ^{*3}	E_{AS}	50	mJ
Power Dissipation ($T_A = 25^\circ\text{C}$)	P_D	3.1	W
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	-	40	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_c = 25^\circ\text{C}$ 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	-60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -48V, 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 = -5A	-	30	50	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	39	70	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.5	-3	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	10	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	2163	-	pF
C _{OSS}	Output Capacitance	V _{DS} = -30V	-	108	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	93	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = -30V V _{GS} = -10V R _G = 3Ω	-	13	-	ns
t _r	Turn-on Rise Time *4		-	17	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	50	-	
t _f	Turn-Off Fall Time *4		-	20	-	
Q _G	Total Gate-Charge	V _{DD} = -30V	-	38	-	nC
Q _{GS}	Gate to Source Charge	I _D = -15A	-	7.6	-	
Q _{GD}	Gate to Drain (“Miller”) Charge	V _{GS} = -10V	-	6.1	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = -5A, V _{GS} = 0V	-	-0.8	-1.2	V
t _{rr}	Reverse Recovery Time	I _F = -5A, V _{GS} = 0V	-	28	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	17	-	nC

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 $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The E_{AS} data shows Max. rating. The test condition is $V_{DD} = -30V, V_{GS} = -10V, L = 0.5mH$
4. Guaranteed by design, not subject to production

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

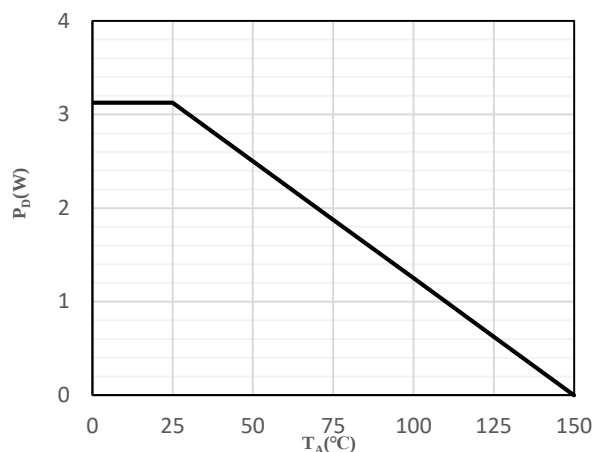


Fig 1 Power Dissipation

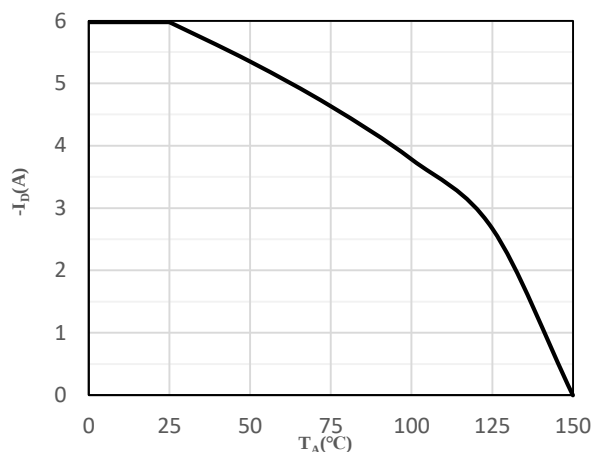


Fig 2 Drain Current

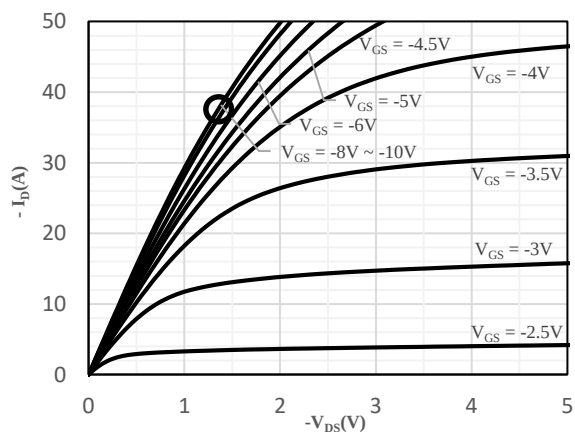


Fig 3 Typical Output Characteristics

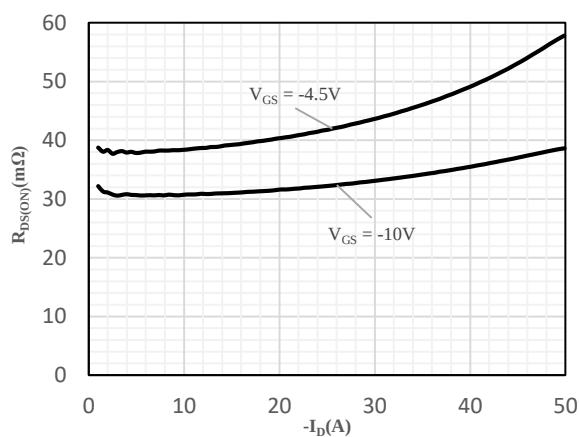


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

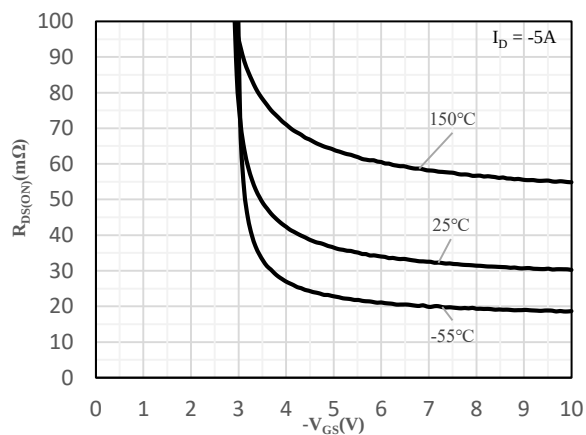


Fig 5 On-Resistance vs. Gate-Source Voltage

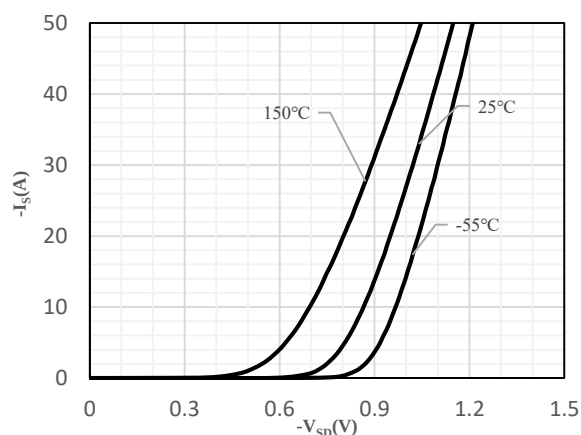


Fig 6 Body-Diode Characteristics

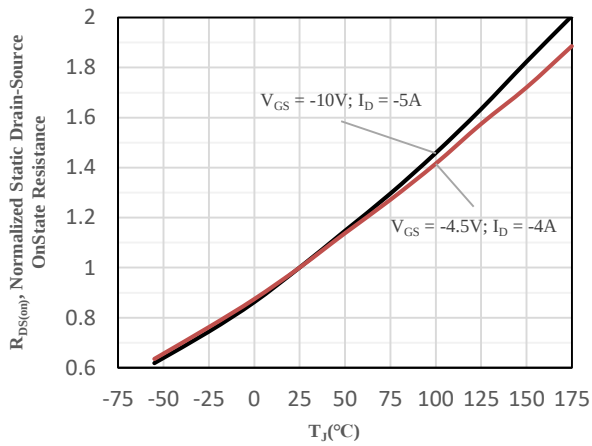


Fig 7 Normalized On-Resistance vs. Junction Temperature

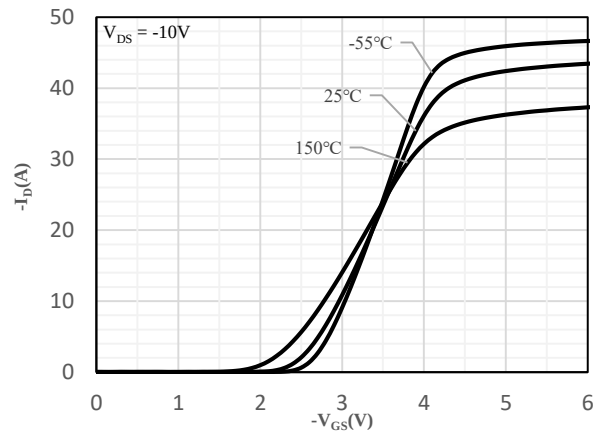


Fig 8 Transfer Characteristics

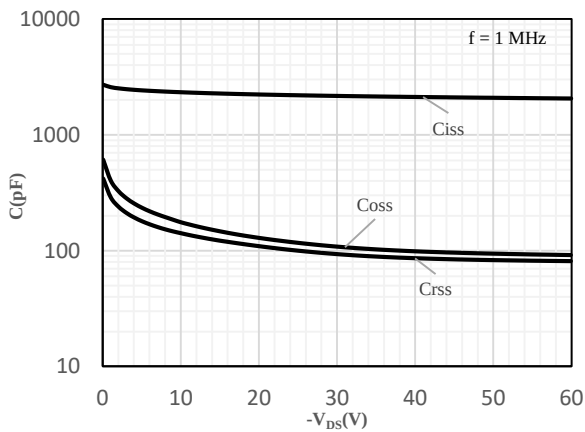


Fig 9 Capacitance Characteristics

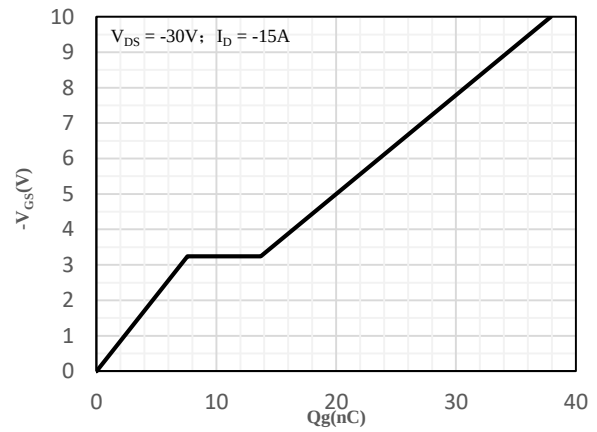


Fig 10 Gate-Charge Characteristics

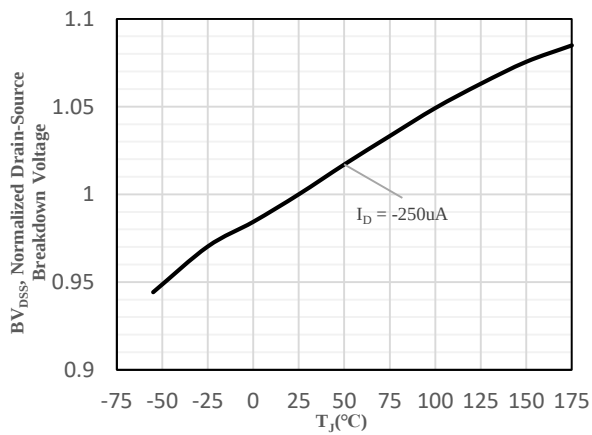


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

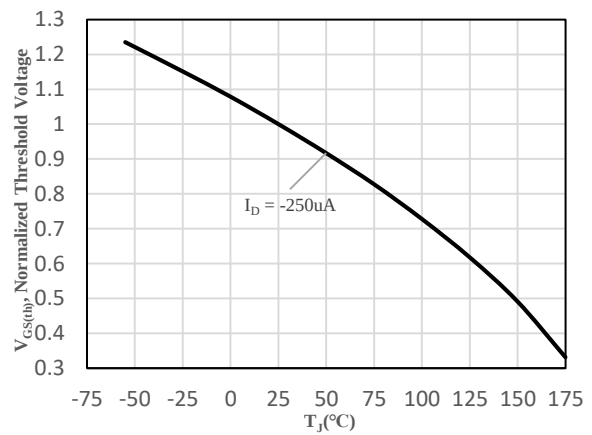
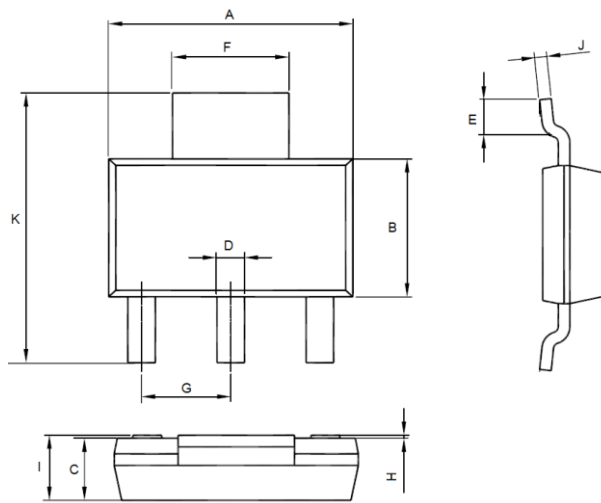


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



SOT-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

