

HBM3404

30V N-Channel Enhancement Mode MOSFET

Features

- Low $R_{DS(on)}$ @ $V_{GS}=10V$
- 5V Logic Level Control
- N Channel SOT23 Package
- Pb -Free, RoHS Compliant

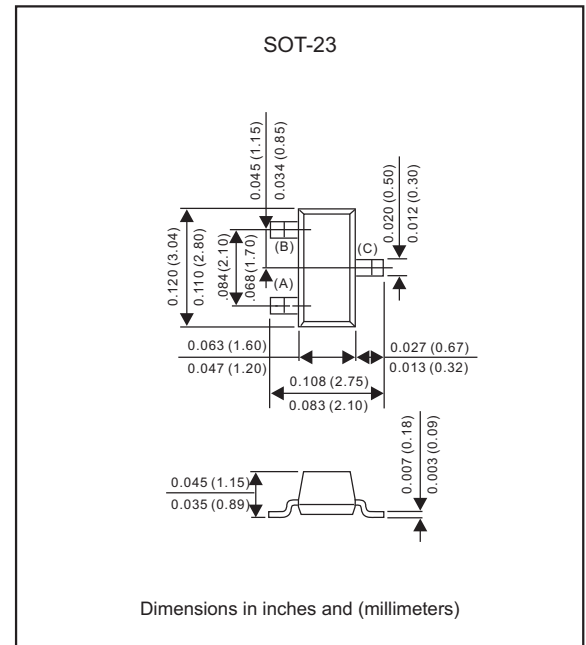
Applications

- Charging switch for portable devices
- Small brushless DC motor drive
- Load Switch for PWM
- DC-to-DC converters

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (TA=25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage		±20	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		30	V
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-50 to 150	°C
Mounted on Large Heat Sink				
I _{DM}	Pulse Drain Current Tested①	T _A =25°C	23.2	A
I _D	Continuous Drain Current	T _A =25°C	5.8	A
		T _A =70°C	4.6	
P _D	Maximum Power Dissipation	T _A =25°C	1.5	W
		T _A =70°C	0.9	
R _{θJA}	Thermal Resistance Junction-Ambient		80	°C/W

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Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250pA	30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _A =25°C)	V _{DS} =30V, V _{GS} =0V	--	--	1	PA
	Zero Gate Voltage Drain Current(T _A =125°C)	V _{DS} =24V, V _{GS} =0V	--	--	100	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250pA	1.0	1.5	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =10V, I _D =4A	--	22	28	mQ
R _{DS(ON)}	Drain-Source On-State Resistance②	V _{GS} =4.5V, I _D =2A	--	32	45	mQ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V,f=1MHz	--	331	--	pF
C _{oss}	Output Capacitance		--	49	--	pF
C _{rss}	Reverse Transfer Capacitance		--	44	--	pF
Q _g	Total Gate Charge	V _{DS} =15V I _D =5A, V _{GS} =10V	--	6.3	--	nC
Q _{gs}	Gate Source Charge		--	1.2	--	nC
Q _{gd}	Gate Drain Charge		--	0.7	--	nC
Switching Characteristics @ T _J = 25°C (unless otherwise stated)						
t _{d(on)}	Turn on Delay Time	V _{DD} =15V, I _D =3A, R _G =3.3Q, V _{GS} =10V	--	4.5	--	ns
t _r	Turn on Rise Time		--	3.1	--	ns
t _{d(off)}	Turn Off Delay Time		-	22	--	ns
t _f	Turn Off Fall Time		--	4	--	ns
Source Drain Diode Characteristics @ T _J = 25°C (unless otherwise stated)						
I _{SD}	Source drain current(Body Diode)	T _A =25°C	--	--	1.8	A
V _{SD}	Forward on voltage②	T _J =25°C, I _{SD} =2A, V _{GS} =0V	--	0.81	1.2	V

Notes:

① Pulse width limited by maximum allowable junction temperature

② Pulse test ; Pulse width ≤ 300us , duty cycle ≤ 2%.

Rating and characteristic curves (HBM3404)

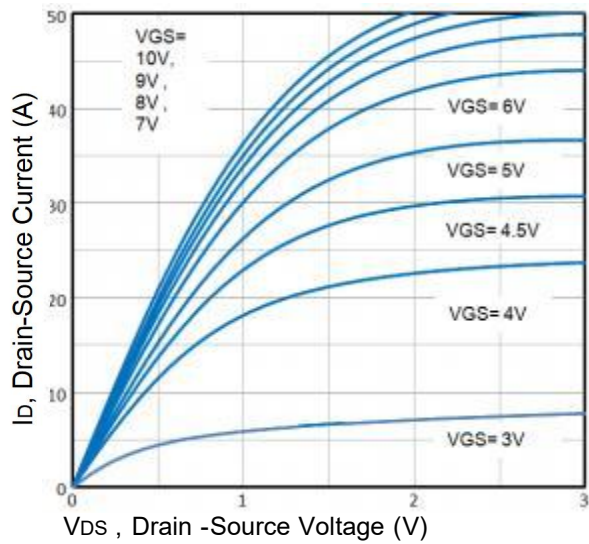


Fig1. Typical Output Characteristics

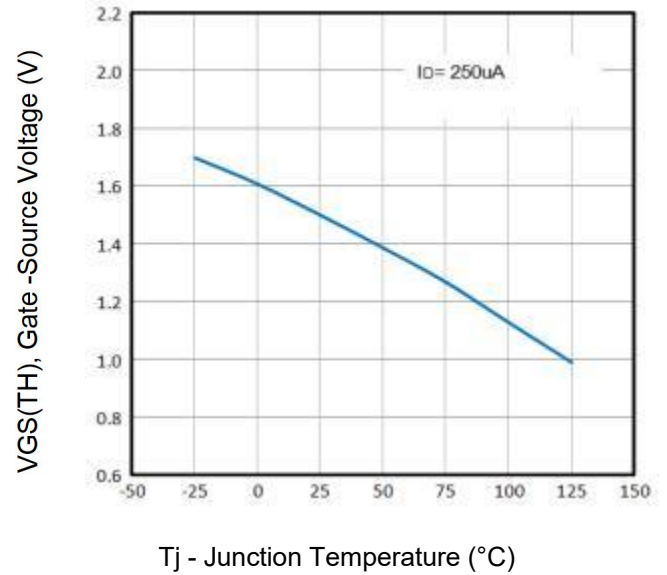


Fig2. Normalized Threshold Voltage Vs. Temperature

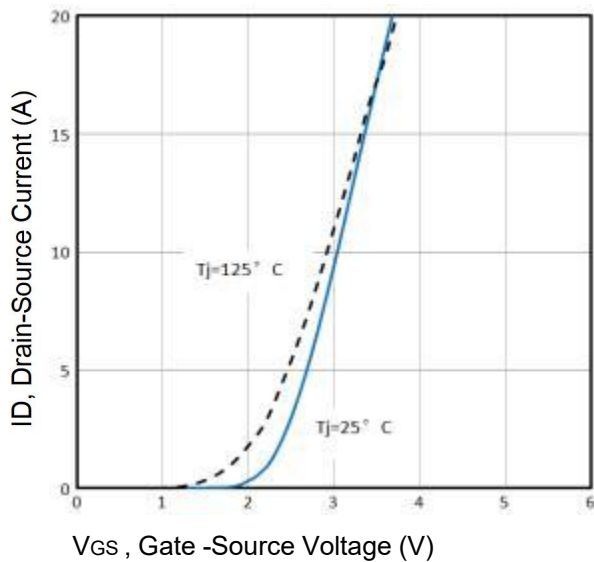


Fig3. Typical Transfer Characteristics

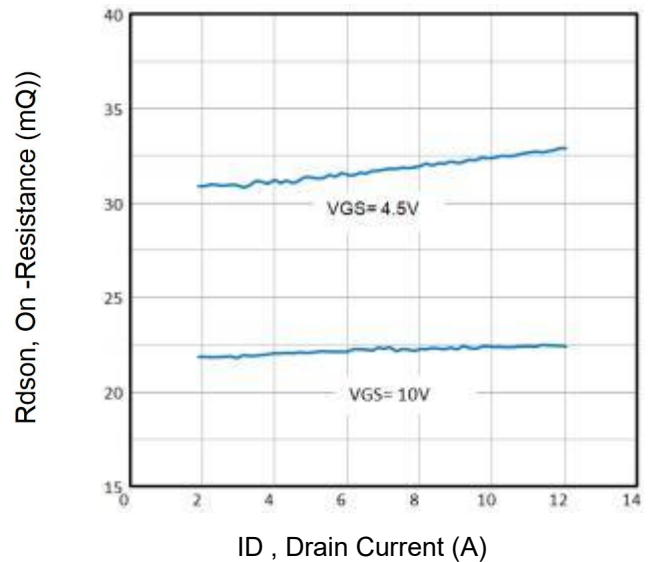


Fig4. On-Resistance vs. Drain Current and V_{GS}

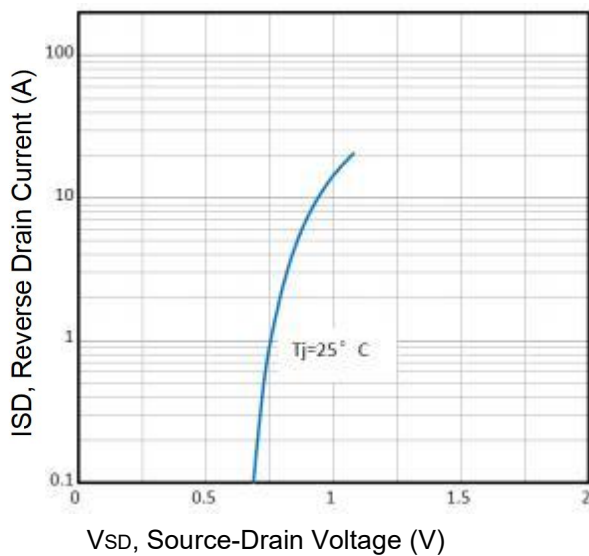


Fig5. Typical Source-Drain Diode Forward Voltage

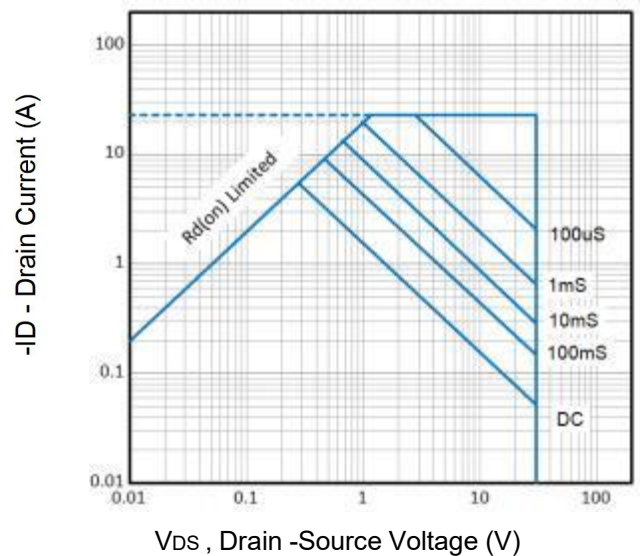


Fig6. Maximum Safe Operating Area

Rating and characteristic curves (HBM3404)

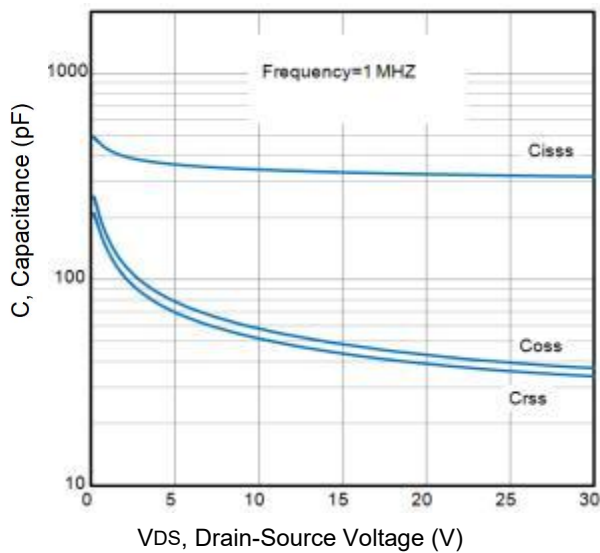


Fig7. Typical Capacitance Vs. Drain-Source Voltage

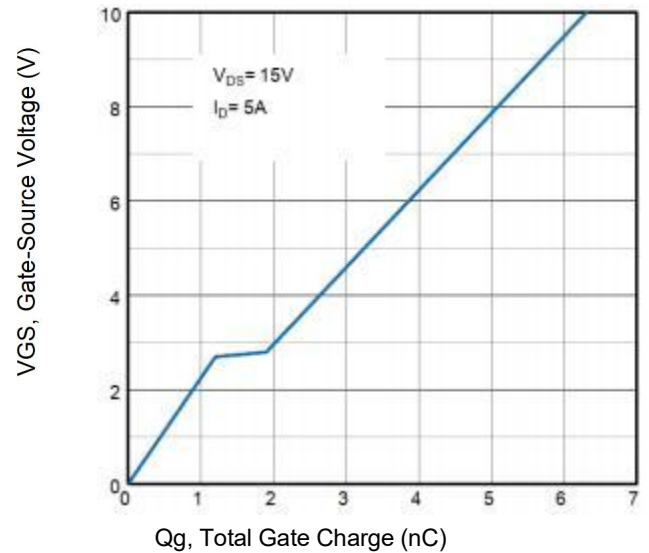


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

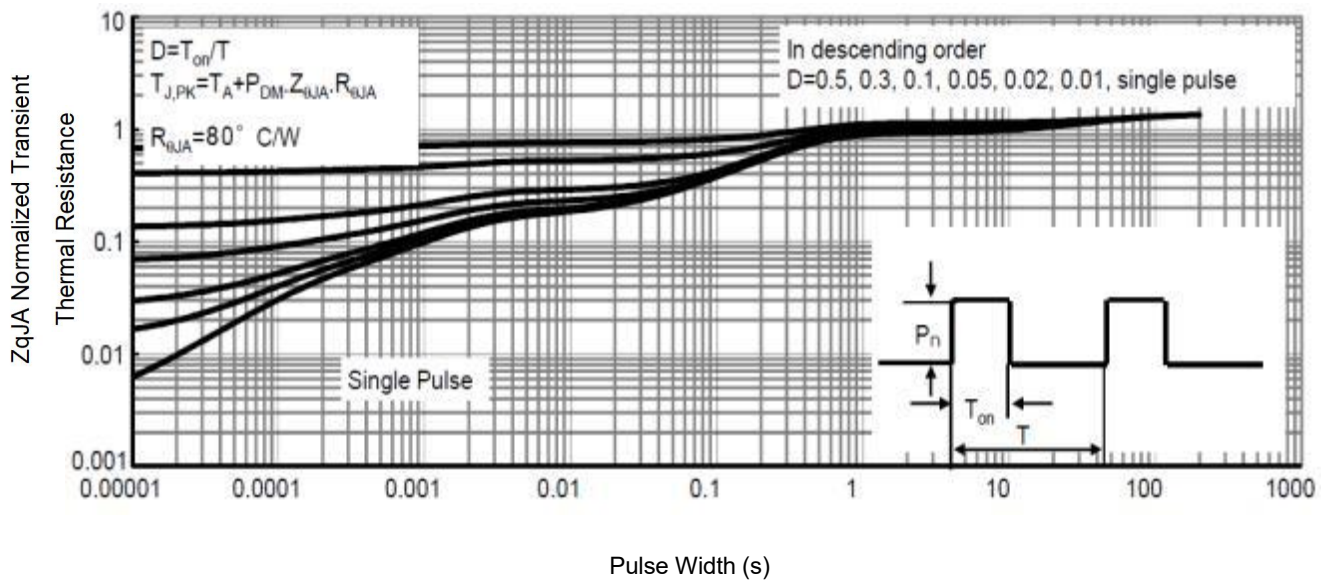


Fig9. Normalized Maximum Transient Thermal Impedance

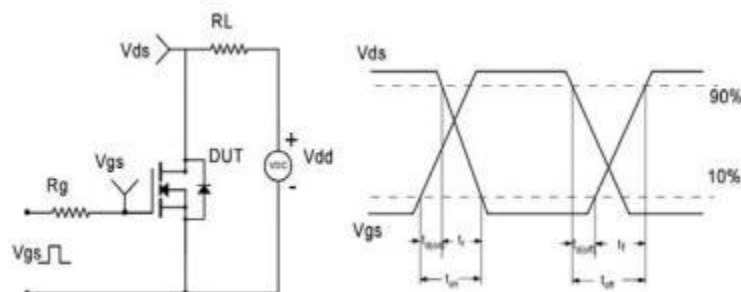
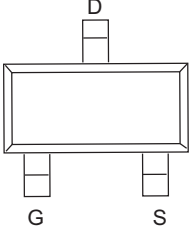
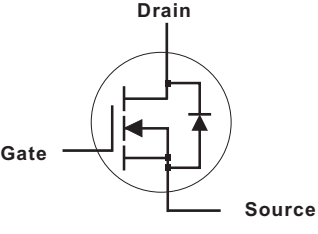


Fig10. Switching Time Test Circuit and waveforms

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Pinning information

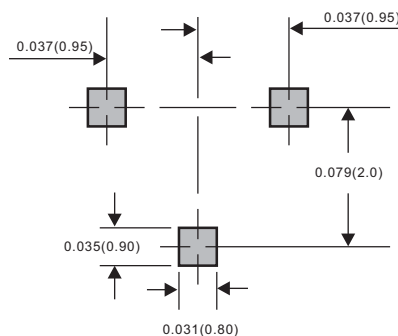
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
HBM3404	R4,A49T

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)