

N-Channel Trench Power MOSFET

General Description

The UCB3404 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

Features

- $V_{DS} = 30V, I_D = 5.8A$
 $R_{DS(ON)} < 23m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 33m\Omega @ V_{GS} = 4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management

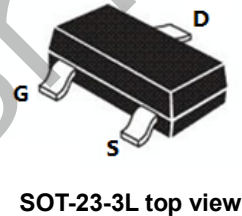
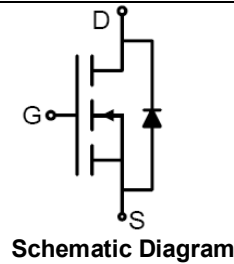


Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	30	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous	5.8	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	30	A
P_D	Maximum Power Dissipation	1.5	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

Table 2. Thermal Characteristic

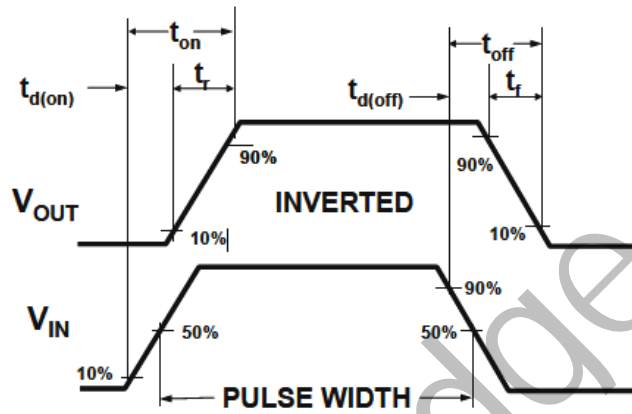
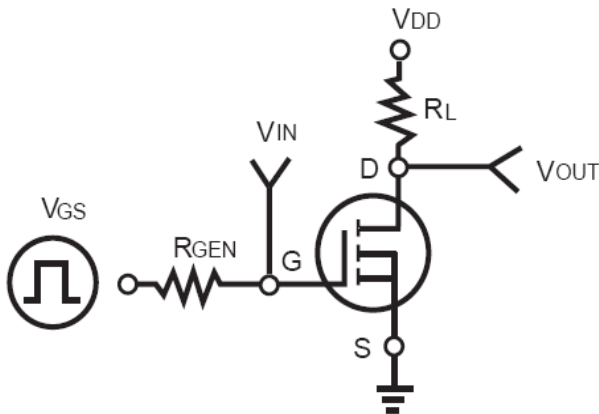
Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	85	°C/W

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V			1	μA
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 =250μA	1	1.5	2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =5A	3	5.8		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =5A		20	23	mΩ
		V _{GS} =4.5V, I _D =4A		25	33	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz		560		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			90		pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =15V, I _D =5.5A, R _L =15Ω V _{GS} =10V, R _G =2.5Ω		10		nS
t _r	Turn-on Rise Time			4		nS
t _{d(off)}	Turn-Off Delay Time			27		nS
t _f	Turn-Off Fall Time			5		nS
Q _g	Total Gate Charge	V _{DS} =10V, I _D =3.6A, V _{GS} =5V		7		nC
Q _{gs}	Gate-Source Charge			1.5		nC
Q _{gd}	Gate-Drain Charge			3		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				5.8	A
V _{SD}	Forward on Voltage (Note 1)	V _{GS} =0V, I _S =1A		0.78	1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Switch Time Test Circuit and Switching Waveforms:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

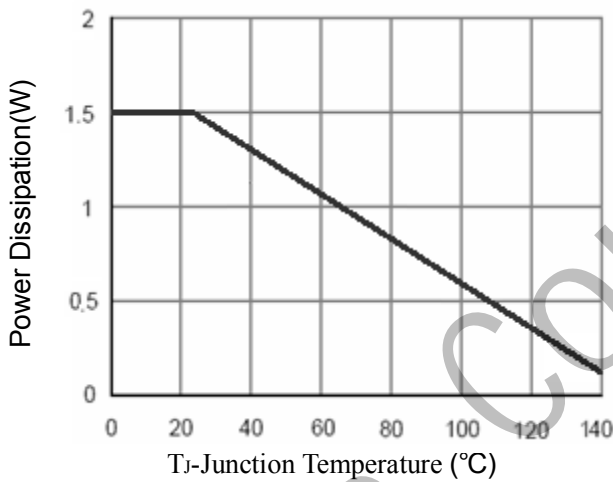


Figure2. Drain Current

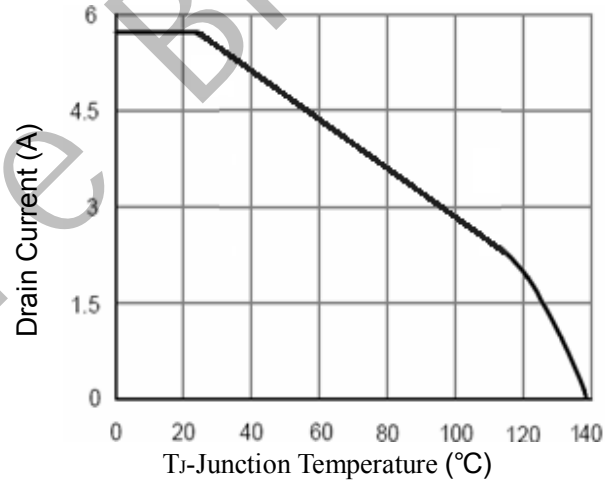


Figure3. Output Characteristics

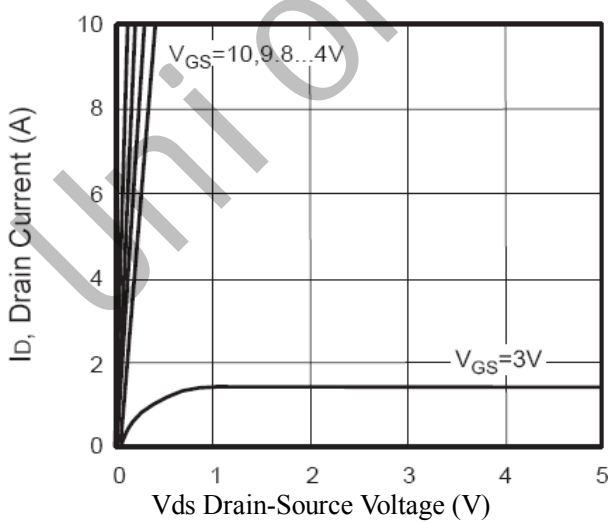


Figure4. Transfer Characteristics

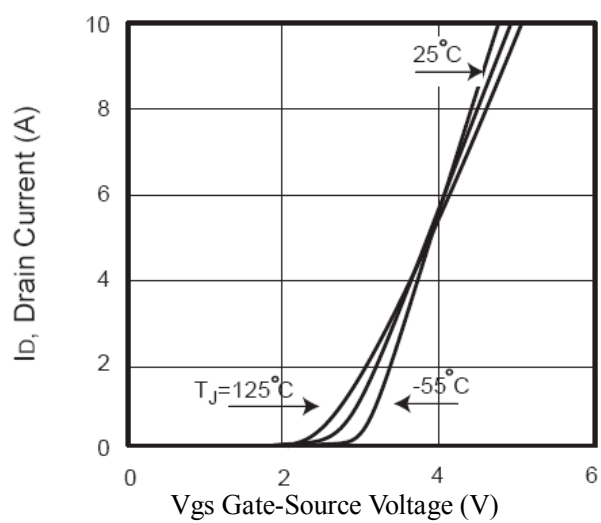


Figure5. Capacitance

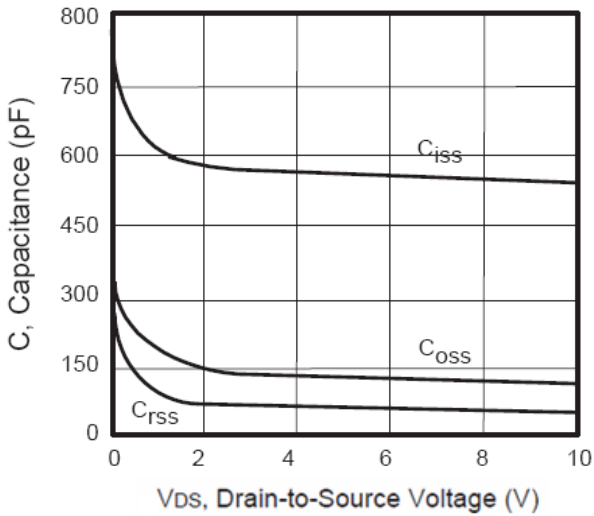


Figure6. $R_{DS(ON)}$ vs Junction Temperature

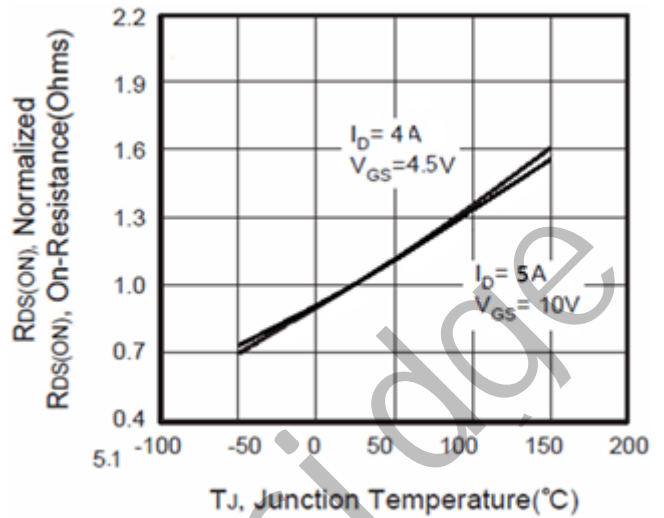


Figure7. Max BV_{DSS} vs Junction Temperature

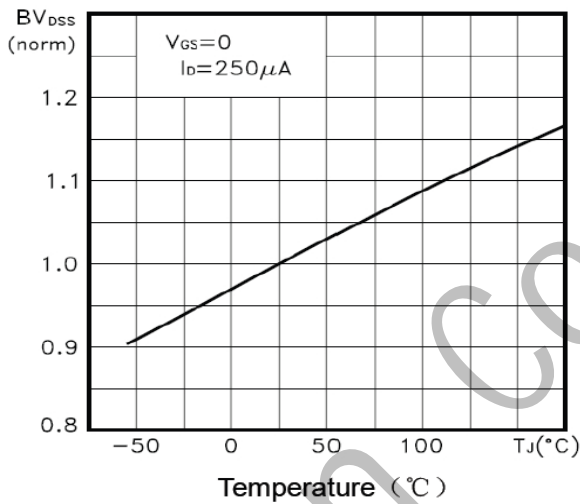


Figure8. $V_{GS(th)}$ vs Junction Temperature

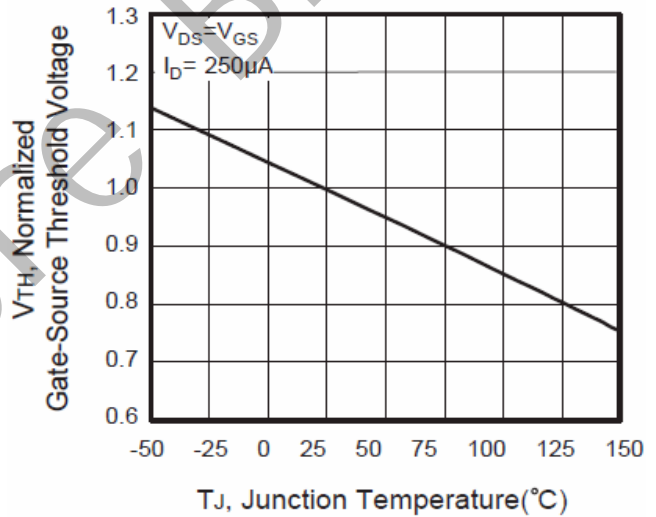


Figure9. Gate Charge Waveforms

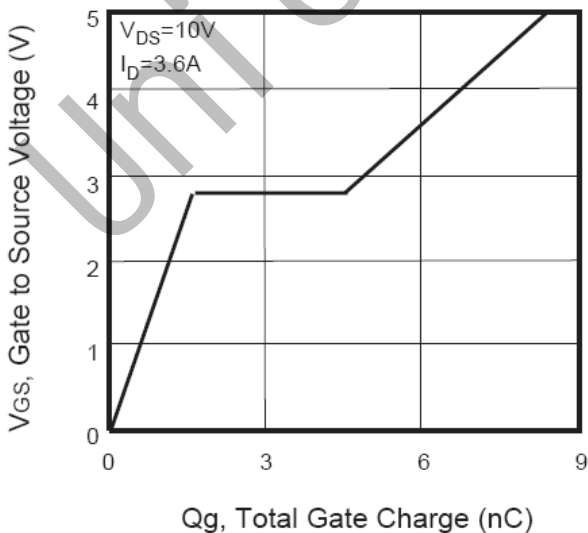


Figure10. Maximum Safe Operating Area

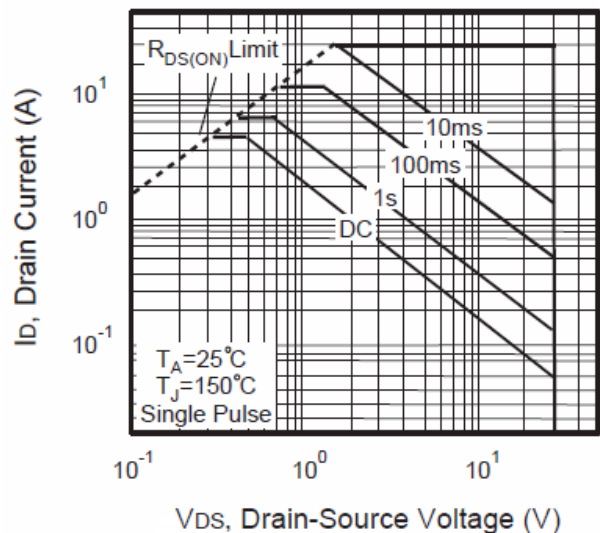
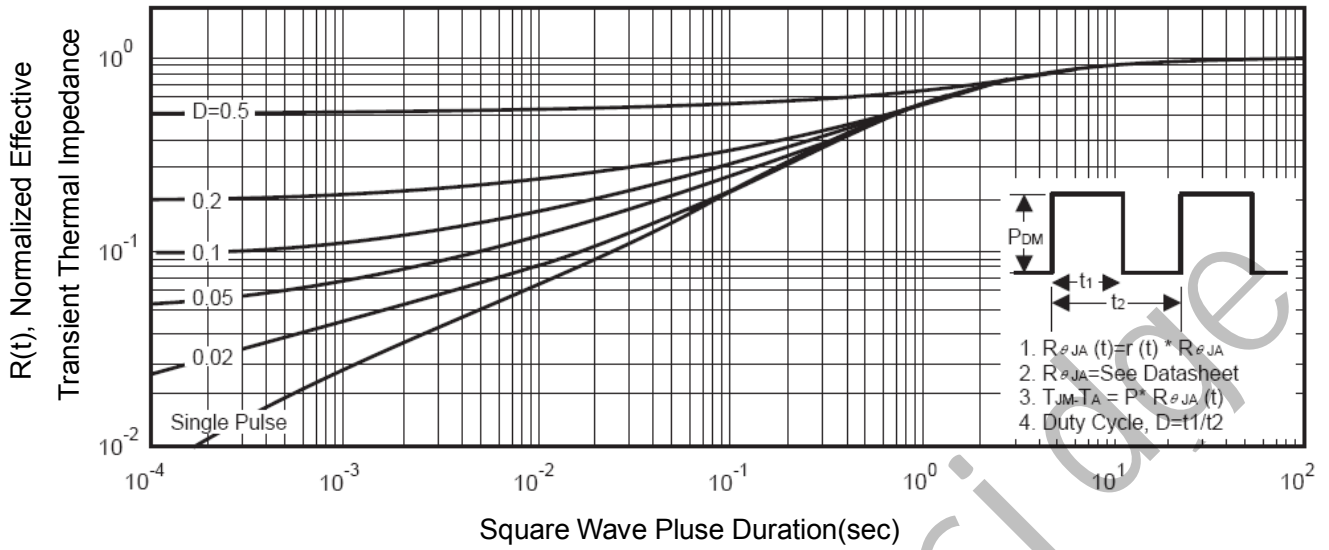


Figure11. Normalized Maximum Transient Thermal Impedance



SOT-23-3L Package Information

