SHENZHEN MENGKE ELECTRONICS TECHNOLOGY CO.,LTD

SOT-23-6L Plastic-Encapsulate MOSFETS

MK6401N Dual N-Channel 20-V(D-S) MOSFET

V(BR)DSS	RDS(on)MAX	ID
20 V	70mΩ@4.5V	3A
	95mΩ@2.5V	

FEATURE:

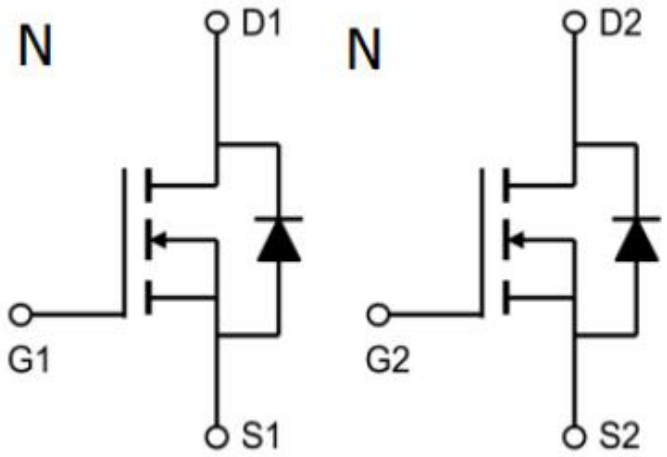
※ TrenchFET Power MOSFET
※ High power and current handling capability

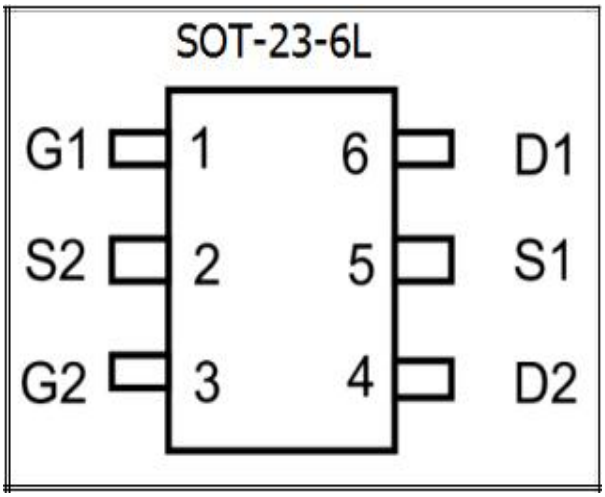
MARKING: **401 f**

General Description :

This Dual N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low RDS(ON) and fast switching speed.

Equivalent Circuit :





Maximum ratings (Ta=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	20	V
Gate-Source Voltage	VGS	±12	
Continuous Drain Current	ID	3.0	A
Pulsed Diode Curren	IDM	12	
Continuous Source-Drain Current(Diode Conduction)	IS	0.8	
Power Dissipation	PD	1.25	W
Thermal Resistance from Junction to Ambient (t≤10s)	RθJA	125	℃/W
Operating Junction	TJ	150	℃
Storage Temperature	TSTG	-55~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

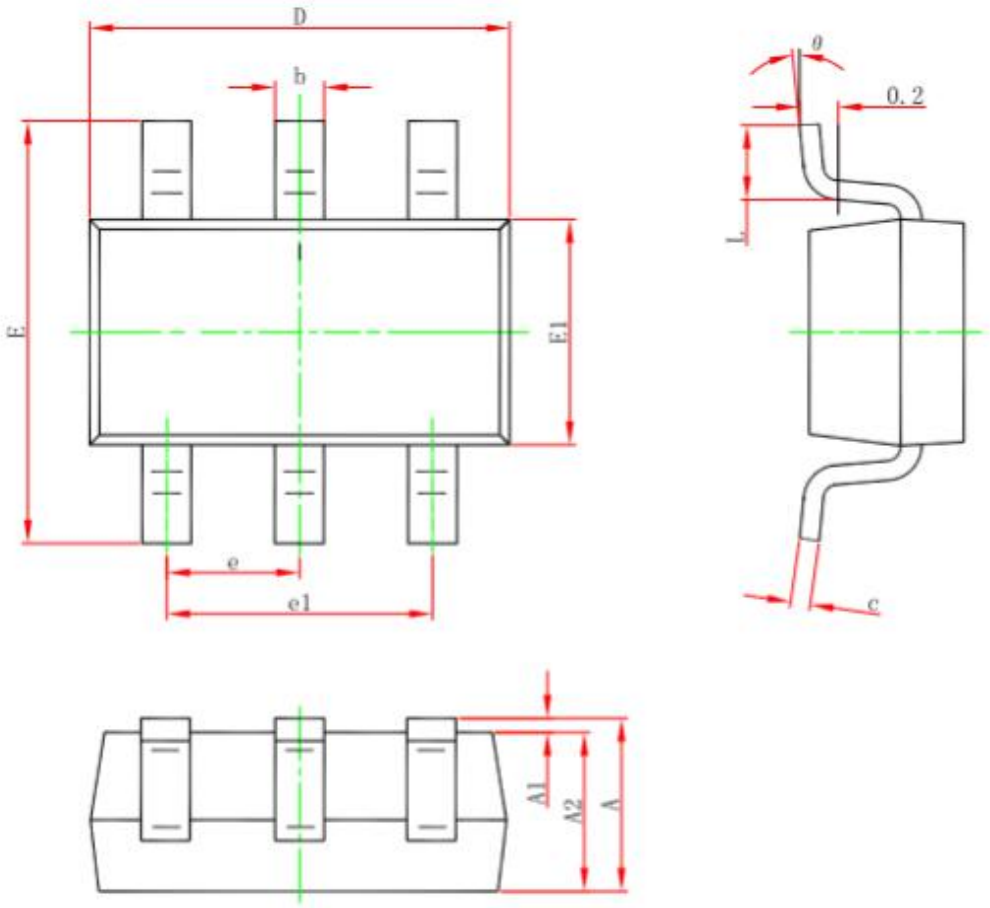
Static Electrical Characteristics (Ta = 25 ℃ Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V(BR)DSS	VGS = 0V, ID = 250μA	20			V
Gate-source threshold voltage	VGS(th)	VDS =VGS, ID = 250μA	0.5		1.5	V
Gate-body leakage current	IGSS	VDS =0V, VGS = ±12V			±100	nA
Zero gate voltage drain current	IDSS	VDS = 16V, VGS =0V			1	μA
Static Drain-Source On-Resistance	RDS(on)	VGS = 4.5V, ID = 3A		29	70	mΩ
		VGS = 2.5V, ID = 2.5A		41	95	mΩ
Forward transconductancea	gfs	VDS = 5V, ID = 3A		10		S
Diode forward voltage	VSD	IS= 0.8A,VGS=0V		0.8	1.2	V
Maximum Body-Diode Continuous Current	IS				1	A
Dynamic						
Input capacitance	Ciss	VDS = 10V, VGS =0V, f=1MHz		324		pF
Output capacitance	Coss			82		pF
Reverse transfer capacitanceb	Crss			42		pF
Total gate charge	Qg	VDS = 10V, VGS = 4.5V, ID = 3A		3.3	4.6	nC
Gate-source charge	Qgs			1		nC
Gate-drain charge	Qgd			0.7		nC
Gate resistance	Rg	f=1MHz		3.5	5.3	Ω
Switchingb						
Turn-on delay time	td(on)	VDS= 10V RL= 3Ω, ID =1A, VGS= 10V,Rg=6Ω		5		ns
Rise time	tr			7		ns
Turn-off delay time	td(off)			13		ns
Fall time	tf			1.6		ns
Body Diode Reverse Recovery Time	Trr	IF= 3A, dI/dt=100A/μs		24		ns
Body Diode Reverse Recovery Charge	Qrr	IF= 3A, dI/dt=100A/μs		12		nC

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

SOT-23-6L PACKAGE OUTLINE DIMENSIONS:



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Typical Electrical Thermal Characteristics:

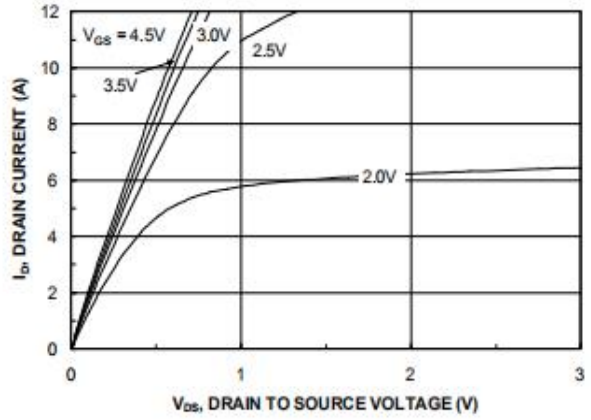


Figure 1. On-Region Characteristics.

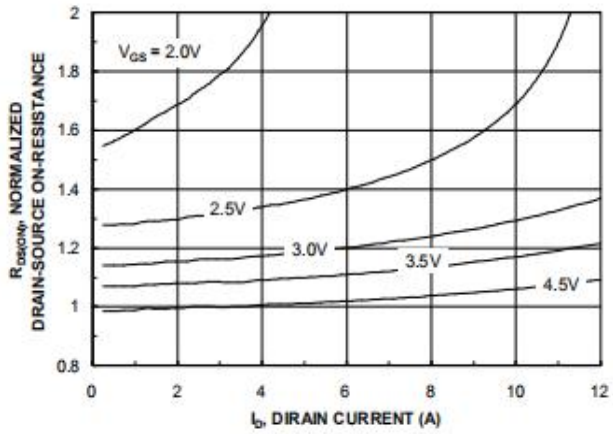


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

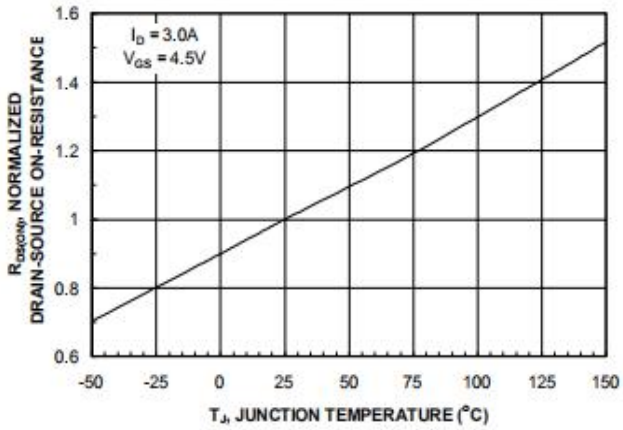


Figure 3. On-Resistance Variation with Temperature.

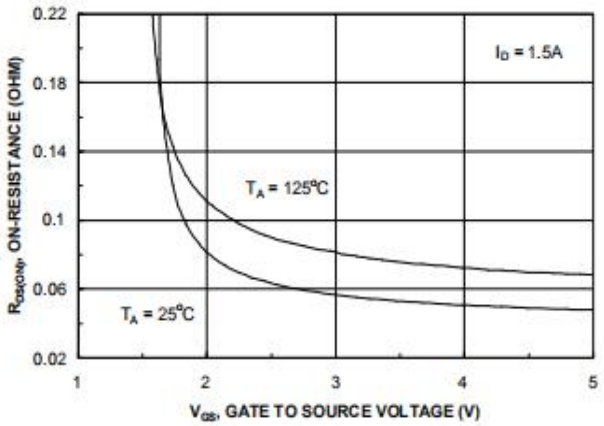


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

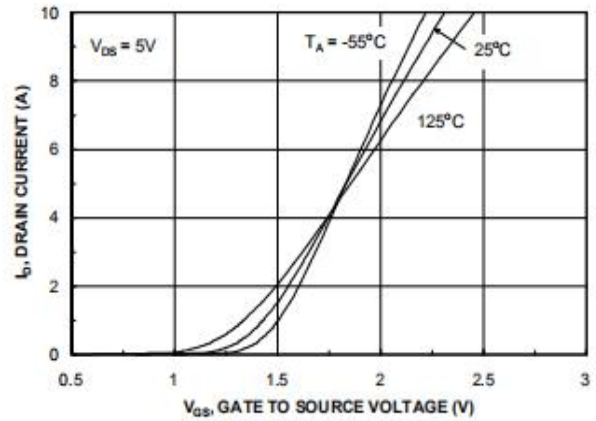


Figure 5. Transfer Characteristics.

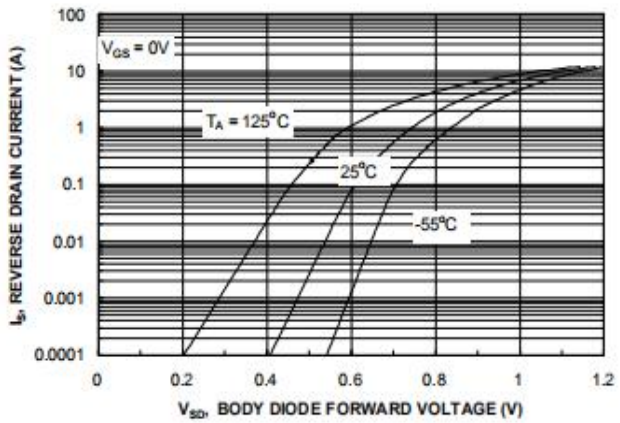


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Electrical Thermal Characteristics:

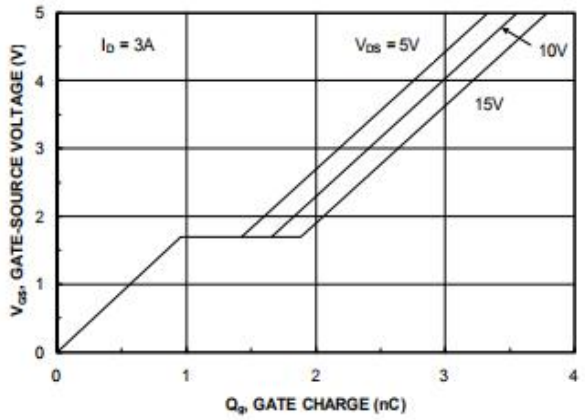


Figure 7. Gate Charge Characteristics.

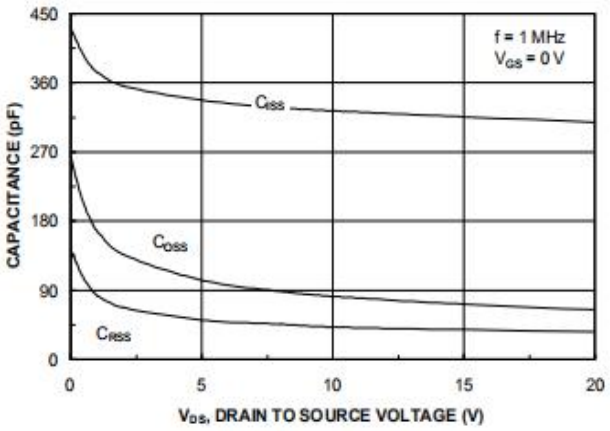


Figure 8. Capacitance Characteristics.

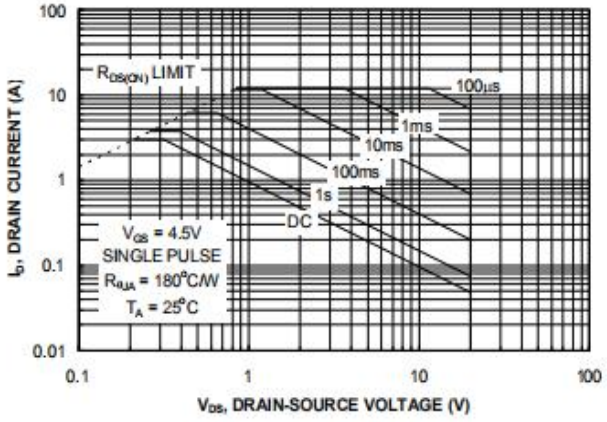


Figure 9. Maximum Safe Operating Area.

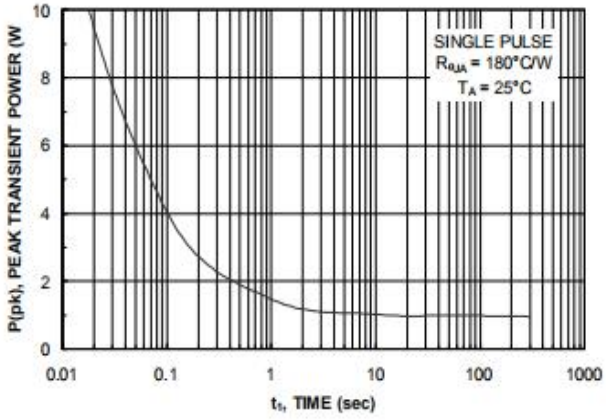


Figure 10. Single Pulse Maximum Power Dissipation.

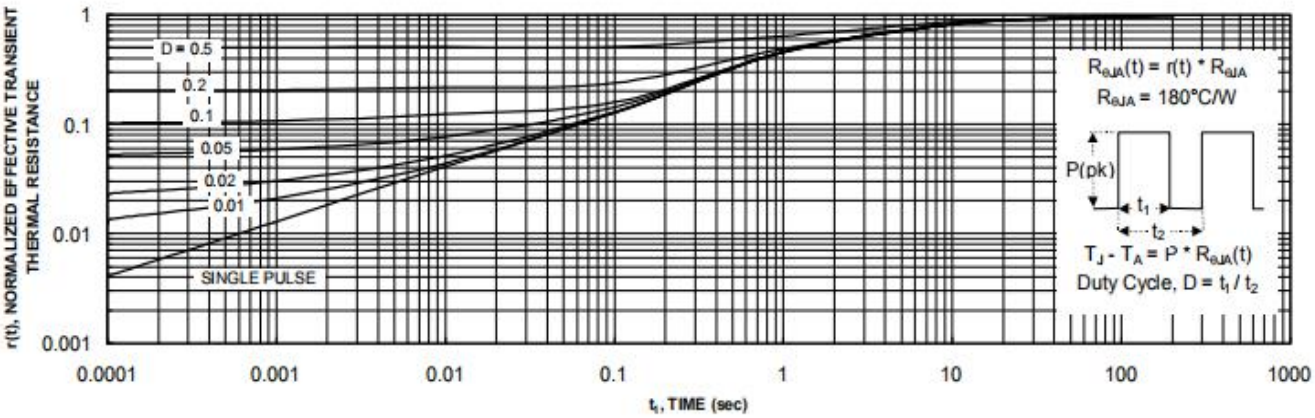


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.