

Product Summary

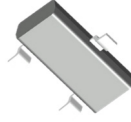
V_{DS}	$R_{DS(ON)_TYP}$	I_{D_MAX}
-30 V	36 mΩ @ $V_{GS} = -10V$	-4.2 A
	40 mΩ @ $V_{GS} = -4.5V$	

Features

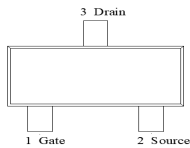
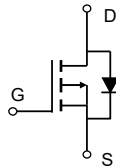
- Fast Switching
- Low Gate Charge
- Low On-Resistance

SOT23-3L


Top View



Bottom View


 PIN Configuration
(Top View)


Schematic Diagram


Applications

- Load Switch
- Motor Control
- Power Management

Mechanical Data

- Green Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- UL Flammability Classification Rating 94V-0

Ordering Information

Orderable Part Number	Package Type	Device Marking	Form	Quantity (pcs)
SMP3401AUL	SOT23-3L	3401	7" Tape&Reel	3,000

Maximum Ratings (@ $T_A = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	-30	V
Gate - Source Voltage	V_{GS}	±12	V
Continuous Drain Current ($V_{GS} = -4.5V$) ⁽¹⁾	I_D	-4.2	A
		-3.4	A
Pulsed Drain Current ⁽²⁾	I_{DM}	-16.8	A
Power Dissipation	P_D	1.3	W
		0.80	W
Junction & Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	°C

Thermal Characteristics

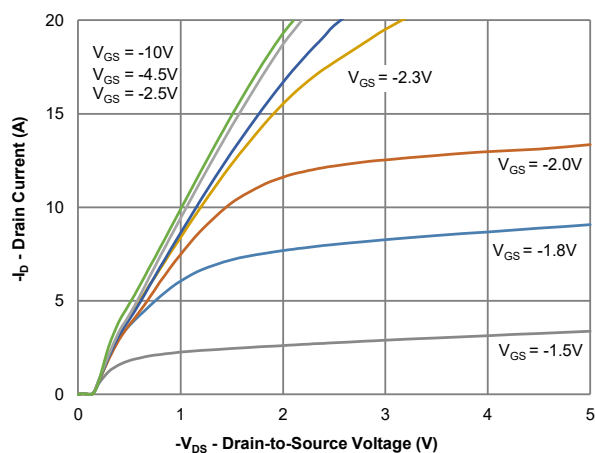
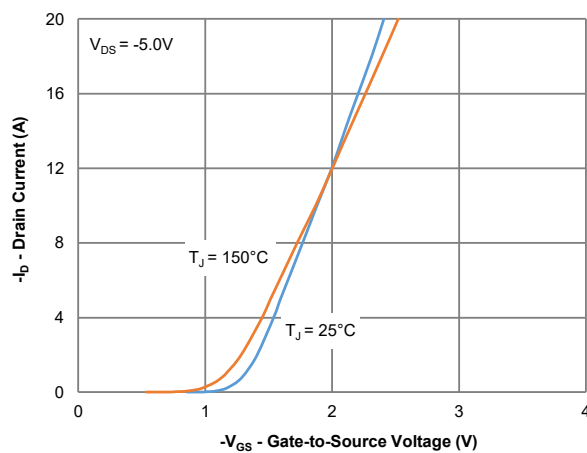
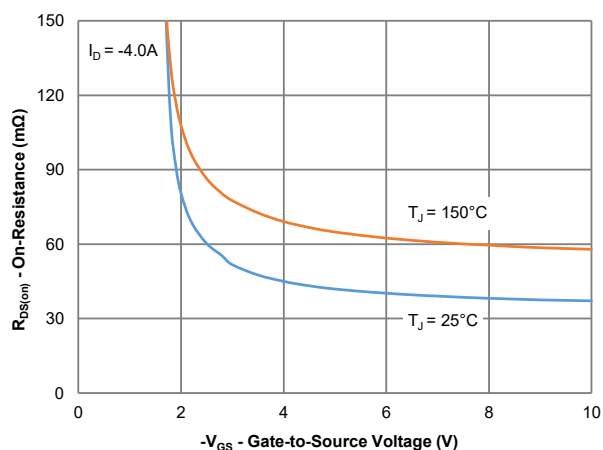
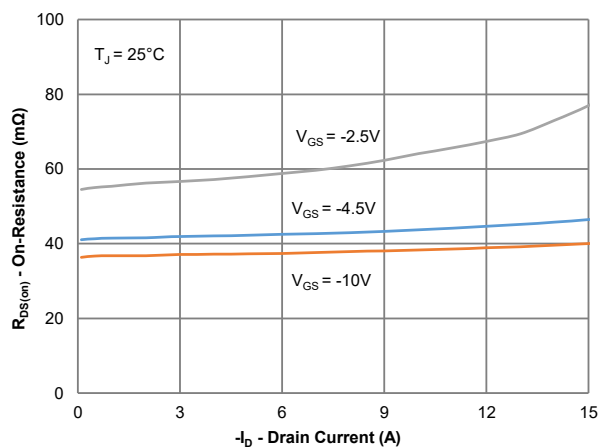
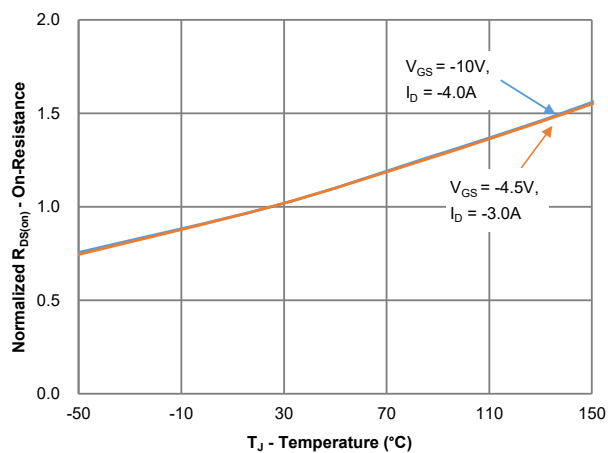
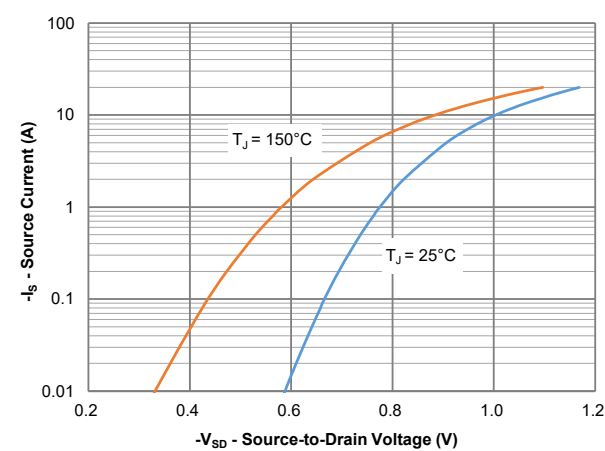
Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient ⁽³⁾	$R_{\theta JA}$	80	100	°C/W

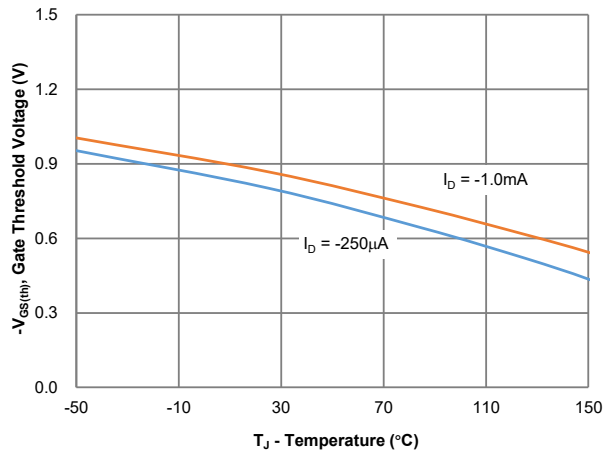
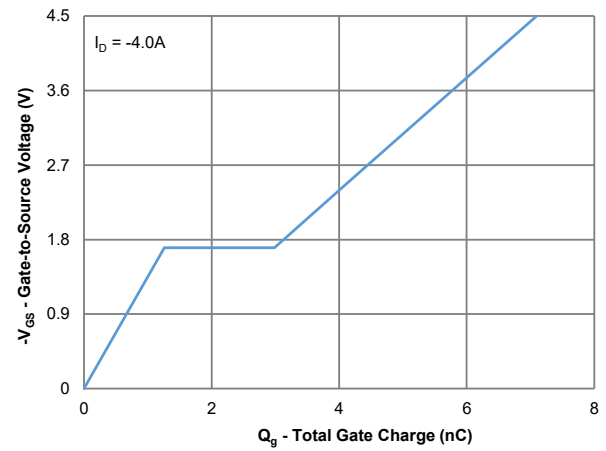
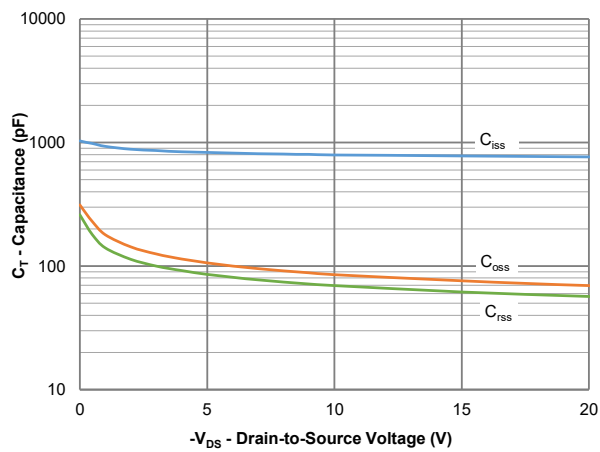
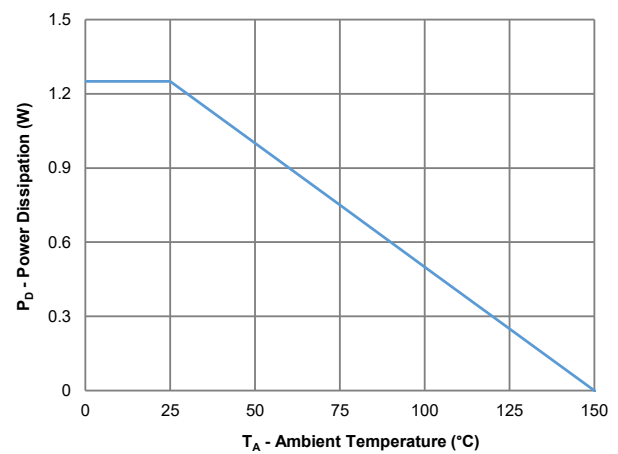
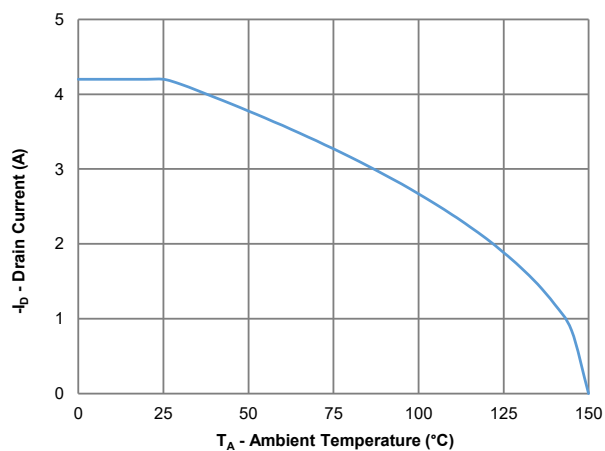
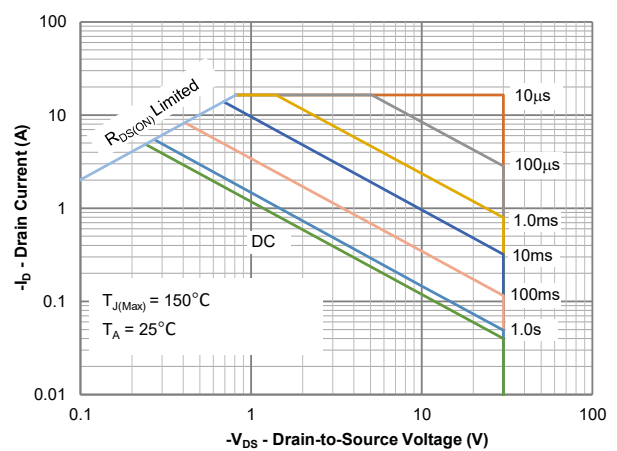
Electrical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

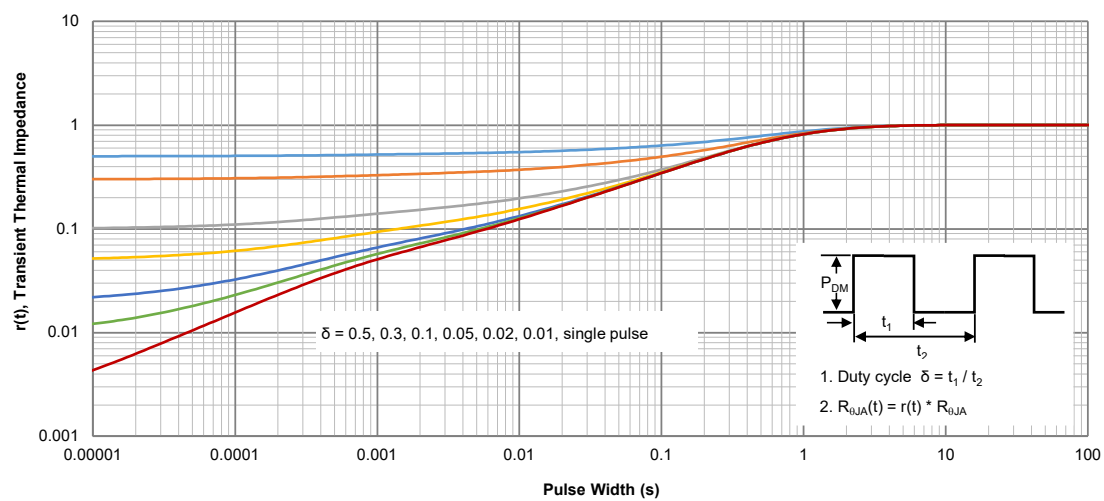
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics ⁽⁴⁾						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	-	-	-1.0	μA
		T _J = 125°C	-	-	-100	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V	-	-	±100	nA
On Characteristics ⁽⁴⁾						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = -250μA	-0.50	-0.85	-1.3	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -4.2A	-	36	45	mΩ
		V _{GS} = -4.5V, I _D = -4.0A	-	40	52	mΩ
		V _{GS} = -2.5V, I _D = -3.0A	-	54	72	mΩ
Forward Transconductance	g _{fs}	V _{DS} = -5.0V, I _D = -4.0A	-	10	-	S
Diodes Forward Voltage	V _{SD}	I _S = -2.0A, V _{GS} = 0V	-	-0.80	-1.2	V
Dynamic Characteristics ⁽⁵⁾						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz	-	779	-	pF
Output Capacitance	C _{oss}		-	76	-	pF
Reverse Transfer Capacitance	C _{rss}		-	62	-	pF
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz	-	11	-	Ω
Switching Characteristics ⁽⁵⁾						
Turn-On DelayTime	t _{d(on)}	V _{GS} = -10V, V _{DS} = -15V I _D = -4.0A, R _{GEN} = 3.0Ω	-	6.8	-	ns
Rise Time	t _r		-	12	-	ns
Turn-Off DelayTime	t _{d(off)}		-	27	-	ns
Fall Time	t _f		-	14	-	ns
Gate Charge Characteristics ⁽⁵⁾						
Total Gate Charge (V _{GS} = -4.5V)	Q _g	V _{DS} = -15V, I _D = -4.0A V _{GS} = -4.5V	-	7.1	-	nC
Total Gate Charge (V _{GS} = -2.5V)	Q _g		-	4.2	-	nC
Gate-Source Charge	Q _{gs}		-	1.3	-	nC
Gate-Drain Charge	Q _{gd}		-	1.7	-	nC
Gate Plateau Voltage	V _{plateau}		-	-1.7	-	V
Drain-Source Diode Characteristics ⁽⁵⁾						
Diode Forward Current	I _S	T _A = 25°C	-	-	-4.2	A

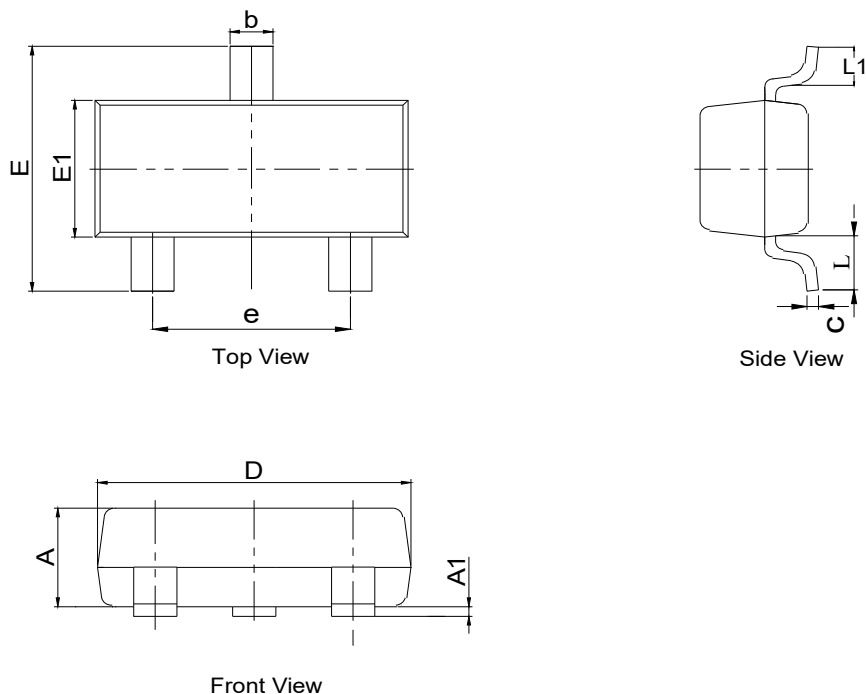
Notes:

1. This current is chip limited, which is calculated based on R_{thja} .
2. This current is calculated on single pulse with 10 μs Single Pulse .
3. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
4. Short duration pulse test used to minimize self-heating effect.
5. Defined by design, not subject to production.

Typical Electrical and Thermal Characteristics

Figure 1: Output Characteristics

Figure 2: Transfer Characteristics

Figure 3: On-Resistance vs. Gate-Source Voltage

Figure 4: On-Resistance vs. Drain Current and Gate Voltage

Figure 5: On-Resistance vs. Junction Temperature

Figure 6: Source-Drain Diode Forward Voltage

Typical Electrical and Thermal Characteristics

Figure 7: Gate Threshold Variation vs. Junction Temperature

Figure 8: Gate Charge Characteristics

Figure 9: Capacitance Characteristics

Figure 10: Power Derating

Figure 11: Current Derating

Figure 12: Safe Operating Area

Typical Electrical and Thermal Characteristics

Figure 13: Normalized Maximum Transient Thermal Impedance

SOT23-3L Package Outline
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.00	1.10	1.20
A1	0.00	-	0.10
D	2.80	2.90	3.00
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
L	0.50	0.60	0.70
L1	0.30	0.40	0.50
b	0.30	0.40	0.50
c	-	0.13	-
e	1.90BSC		

Recommended Soldering Footprint
