

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Surface-mounted package
Excellent switching performance and avalanche energy value

Applications

LED

Quick reference

$V_{DS} = 400\text{ V}$

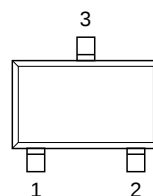
$I_D = 1\text{ A}$

$R_{DS(ON)} \leq 8500\text{ m}\Omega @ V_{GS}=10\text{V}$ (Type: 7200 m Ω)

Pin Description

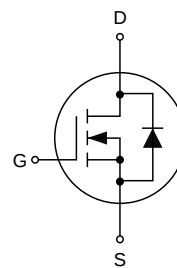
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline



Top View
SOT23-3L

Symbol



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape Width	Quantity
KJ1N40S	SOT23-3L	1N40	7 inch	-	3000

2. Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	400	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current, $V_{GS}@10\text{V}$	1	A
I_{DM}	Pulsed Drain Current ¹	4	A
E_{AS}	Single Pulse Avalanche Energy ²	15	mJ
P_D	Power Dissipation ³	33.2	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	125	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance from Junction to Case	5	$^\circ\text{C/W}$

3. Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	400	450	-	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250 μA, Referenced to 25°C	-	0.43	-	V/°C
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA	1.2	1.8	2.5	V
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =400 V, V _{GS} =0 V	-	-	1	μA
		V _{DS} =320 V, T _C =125°C	-	-	10	μA
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10 V, I _D =0.5 A	-	7200	8500	mΩ
C _{iss}	Input Capacitance	V _{DS} =25 V, V _{GS} =0 V, f=1.0 MHz	-	83	-	pF
C _{oss}	Output Capacitance		-	8.9	-	
C _{rss}	Reverse Transfer Capacitance		-	1	-	
Q _g	Total Gate Charge	V _{DS} =320 V, V _{GS} =10 V, I _D =1 A	-	9.6	-	nC
Q _{gs}	Gate-Source Charge		-	3.0	-	
Q _{gd}	Gate-Drain Charge		-	2.5	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =320 V, V _{GS} =10 V, I _D =1 A, R _G =25 Ω	-	29	-	ns
t _r	Turn-on Rise Time		-	6	-	
t _{d(off)}	Turn-off Delay Time		-	42	-	
t _f	Turn-off Fall Time		-	31	-	
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	1	A
V _{SD}	Diode Forward Voltage	V _{GS} =0 V, I _S =0.5 A	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} =0 V, I _S =1 A, dI _F /dt=100 A/μs	-	180	-	ns
Q _{rr}	Reverse Recovery Charge		-	0.28	-	μC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. The test condition is Pulse Test: Pulse width ≤ 300 μs, Duty Cycle ≤ 1%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

4. Typical Characteristics

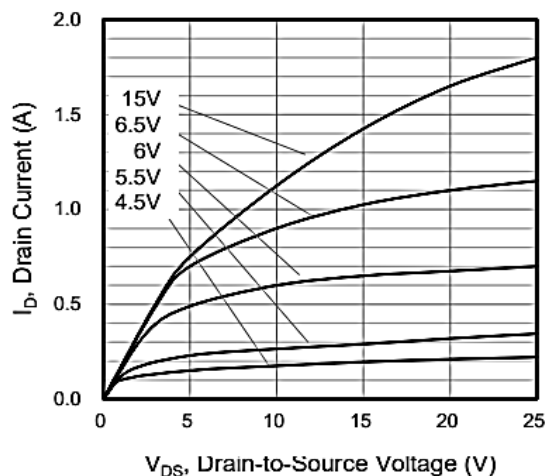


Figure 1. Output Characteristics

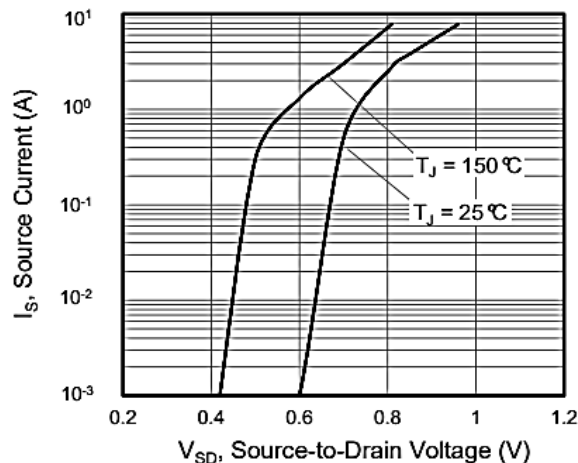


Figure 2. Body Diode Forward Voltage

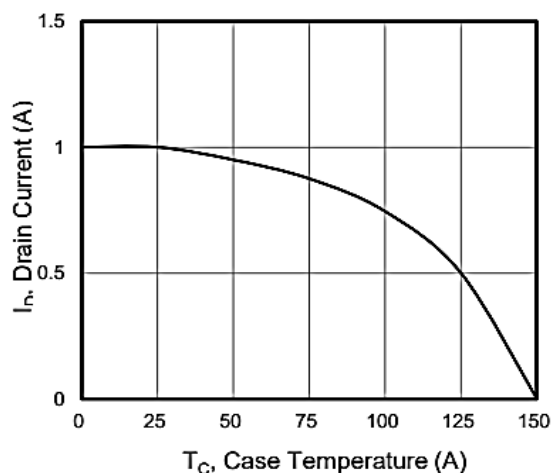


Figure 3. Drain Current vs. Temperature

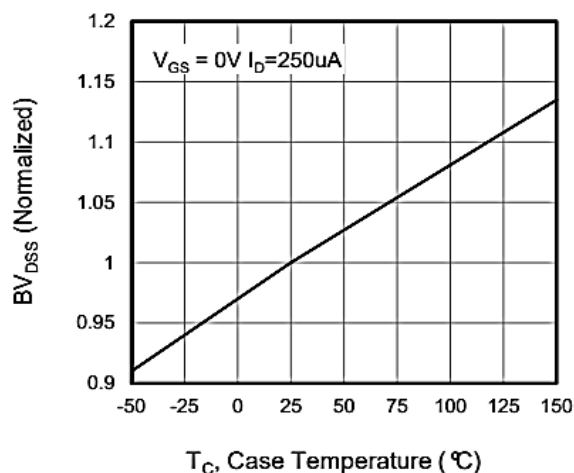


Figure 4. BV_{DSS} Variation vs. Temperature

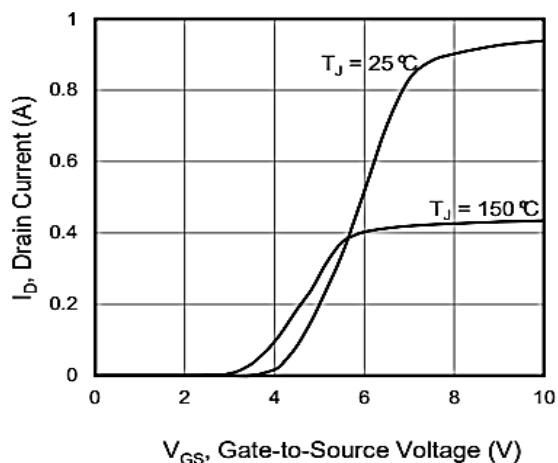


Figure 5. Transfer Characteristics

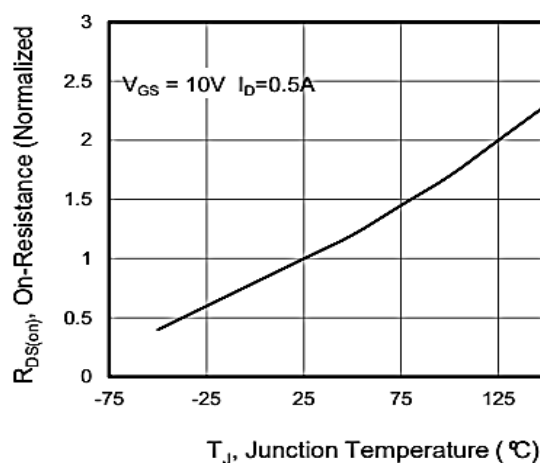


Figure 6. On-Resistance vs. Temperature

4. Typical Characteristics (Cont.)

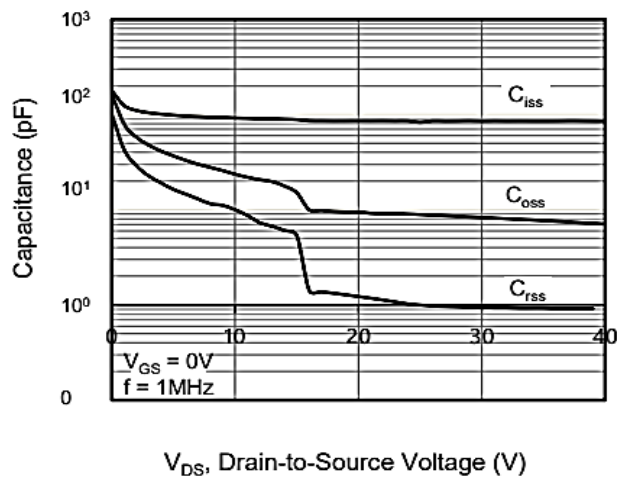


Figure 7. Capacitance

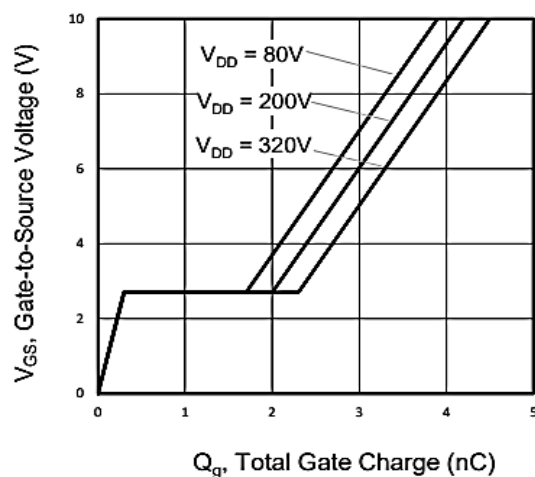


Figure 8. Gate Charge

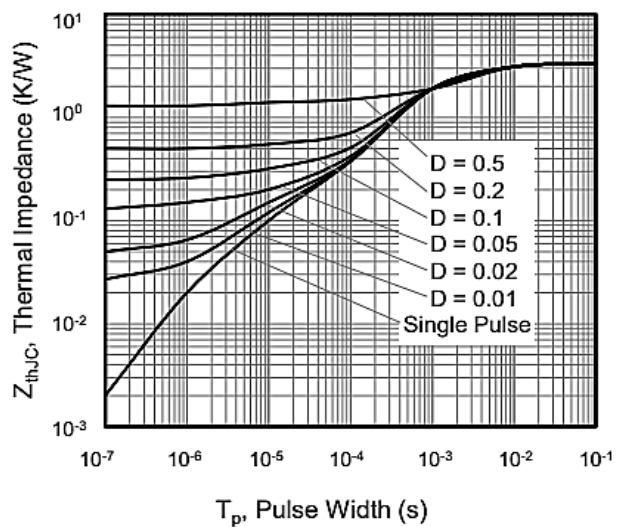
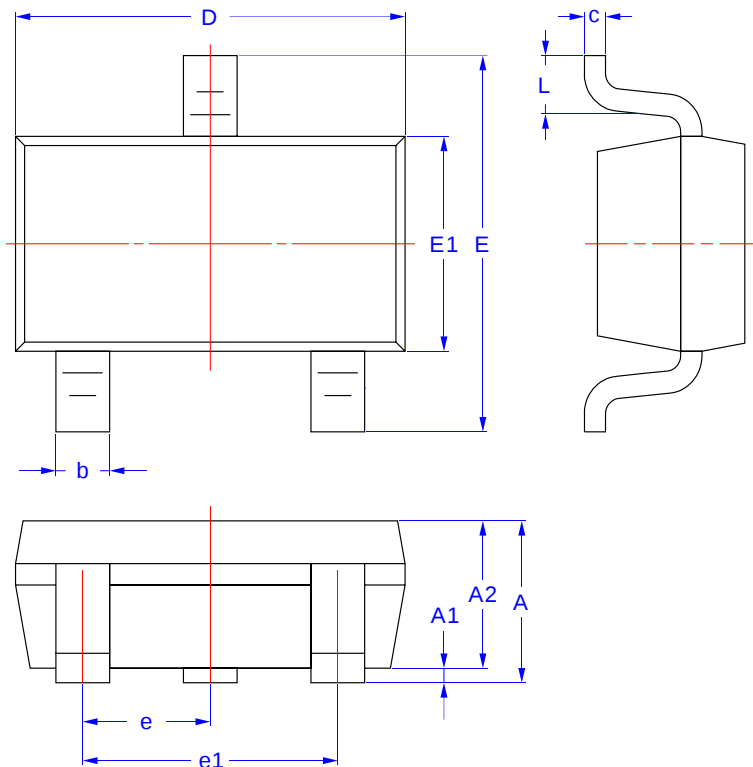


Figure 9. Transient Thermal Impedance

5. Package Mechanical Data

SOT23-3L Package



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.00	1.45
A1	0.00	0.15
A2	1.00	1.30
D	2.70	3.10
E	2.60	3.00
E1	1.50	1.70
c	0.08	0.25
b	0.30	0.50
e	0.95 BSC	
e1	1.90 BSC	
L	0.30	0.60