Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	10mΩ@4.5V	7A

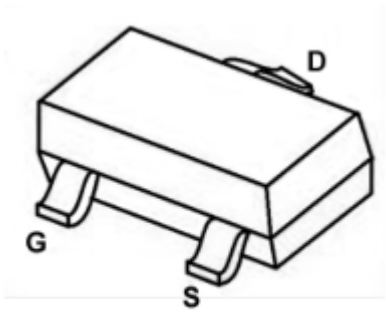
Feature

- 20V/7A,
- $R_{DS\ (ON)}$ =10mΩ(Typ.)@V_{GS}=4.5V
  $R_{DS\ (ON)}$ =13mΩ(Typ.)@V_{GS}=2.5V
- Low $R_{DS\ (ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

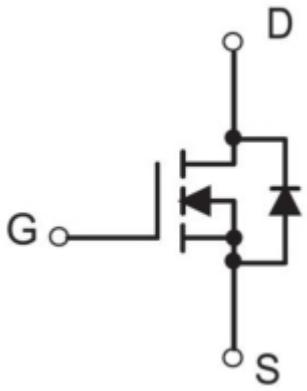
- Power Management

Package

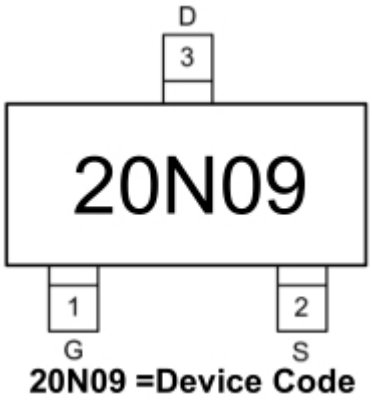


SOT-23-3L

Circuit diagram



Marking



20N09 =Device Code

Absolute maximum ratings

(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	7	A
Pulsed Drain Current	I_{DM}	28	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Electrical characteristics

(T_A=25℃, unless otherwise noted)

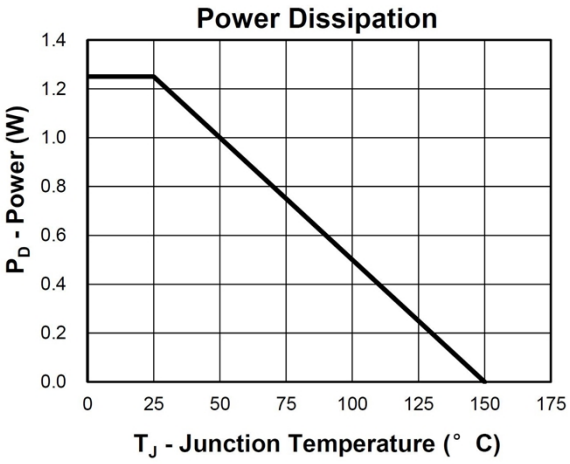
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D =250μA	20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =20V,V_{GS} = 0V			1	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V , V_{DS}=0V			±100	uA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.5	0.7	1.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} =4.5V, I_D =6A		10	13	mΩ
		V_{GS} =2.5V, I_D =5A		13	18	
Dynamic characteristics (2)						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1MHz		900		pF
Output Capacitance	C_{oss}			162		
Reverse Transfer Capacitance	C_{rss}			105		
Switching Characteristics (2)						
Turn-On Delay Time	$T_{d(on)}$	V_{GS}=10V, V_{DS}=10V, R_L=0.5Ω, R_{GEN}=3Ω		4.5		nS
Rise Time	T_r			9.2		
Turn-Off Delay Time	$T_{d(off)}$			18.7		
Fall Time	T_f			3.3		
Total Gate Charge(4.5V)	Q_g	V_{GS}=10V, V_{DS}=10V, I_D=20A		15		nC
Gate-Source Charge	Q_{gS}			1.8		
Gate-Drain Charge	Q_{gd}			2.8		
Drain-Source Diode Characteristics						
Diode Forward Voltage (3)	V_{SD}	I_S=1A, V_{GS} = 0V			1.2	V

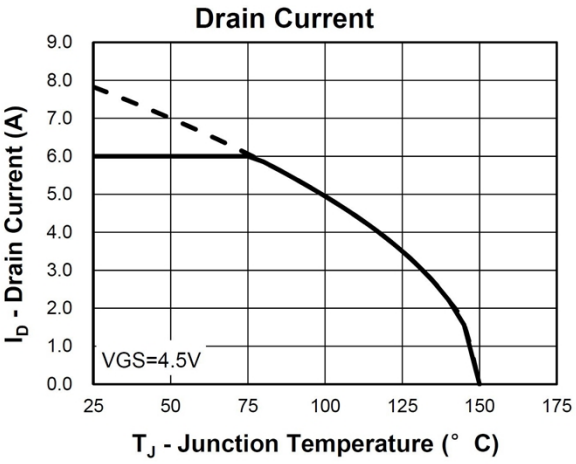
Notes:

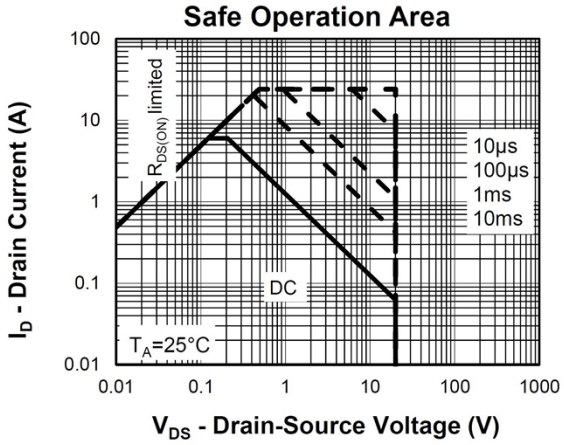
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

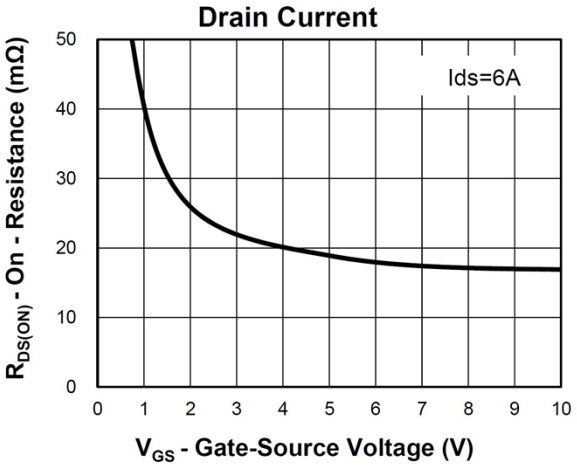
2. Guaranteed by design, not subject to production

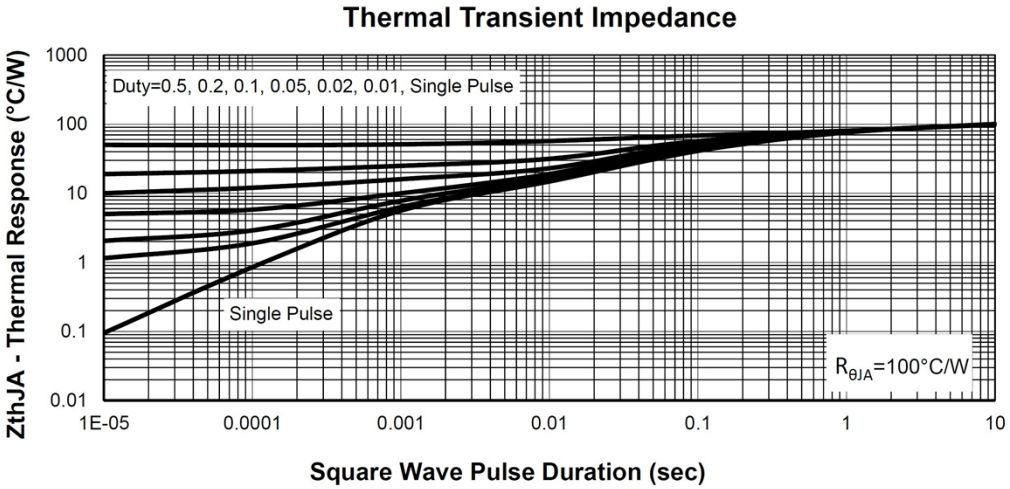
Typical Characteristics

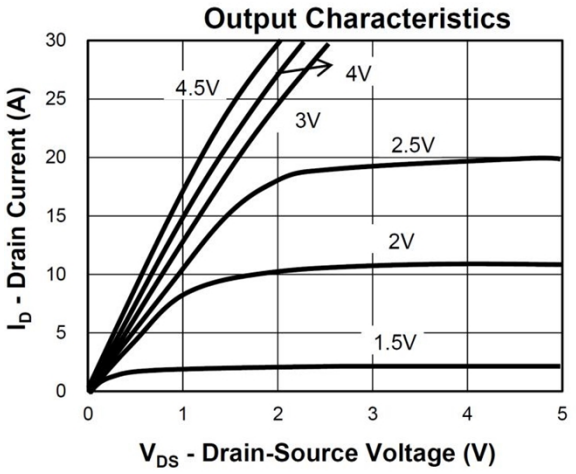


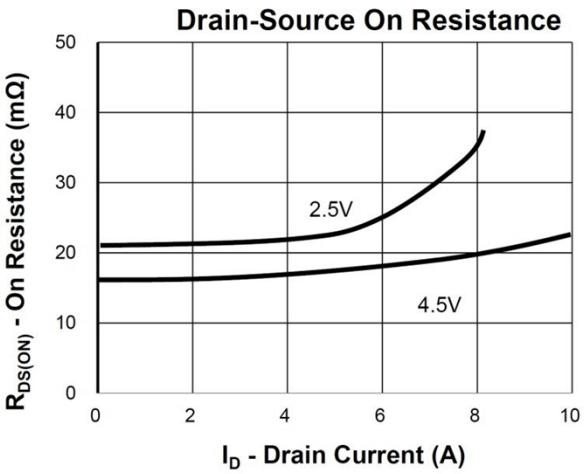


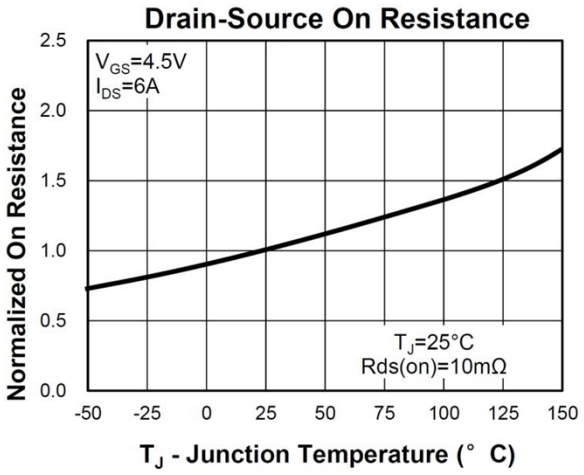


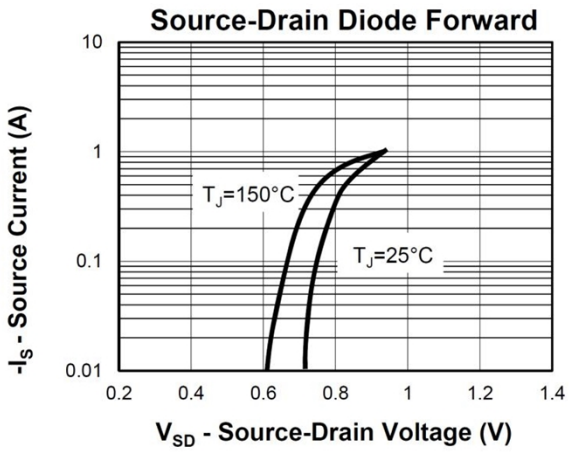


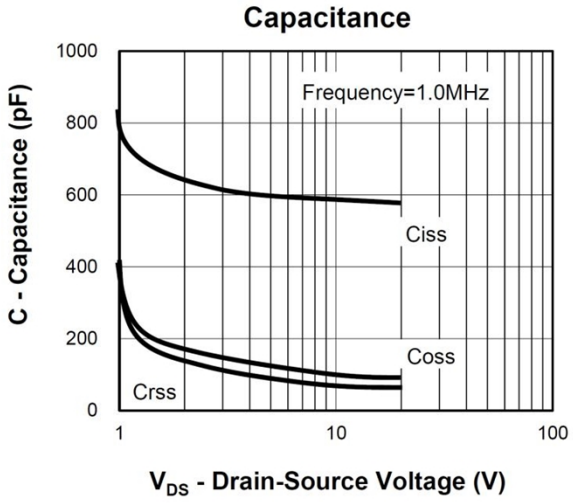


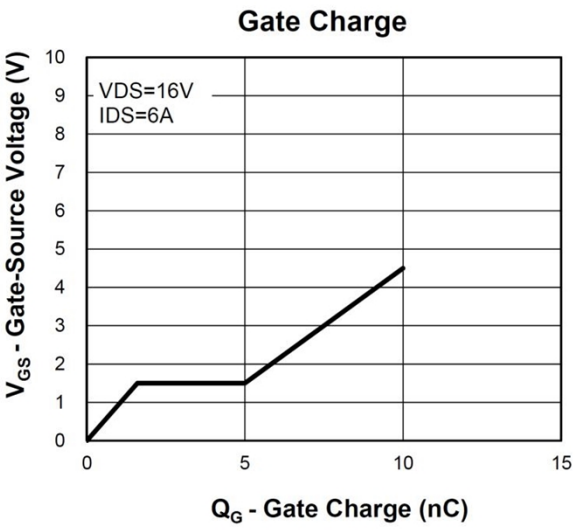

Output Characteristics
4.5V
4V
3V
2.5V
2V
1.5V
I_D - Drain Current (A)
V_{DS} - Drain-Source Voltage (V)


Drain-Source On Resistance
2.5V
4.5V
$R_{DS(ON)}$ - On Resistance (mΩ)
I_D - Drain Current (A)

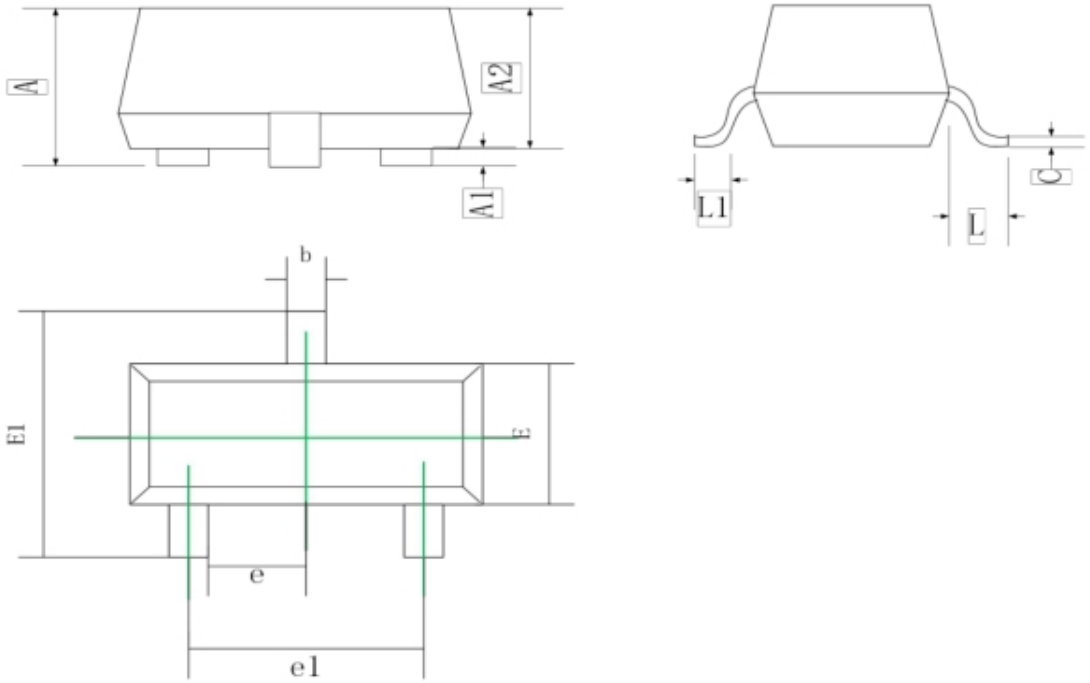

Drain-Source On Resistance
V_{GS}=4.5V
I_{DS}=6A
T_J=25°C
Rds(on)=10mΩ
Normalized On Resistance
T_J - Junction Temperature (° C)


Source-Drain Diode Forward
T_J=150°C
T_J=25°C
$-I_S$ - Source Current (A)
V_{SD} - Source-Drain Voltage (V)


Capacitance
Frequency=1.0MHz
Ciss
Coss
Crss
C - Capacitance (pF)
V_{DS} - Drain-Source Voltage (V)


Gate Charge
VDS=16V
IDS=6A
V_{GS} - Gate-Source Voltage (V)
Q_G - Gate Charge (nC)

SOT-23-3L Package Information



Symbol	Dimensions in millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 Typ.	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°