

• General Description

The CH20N04A combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

• Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

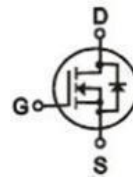
• Ordering Information:

Part NO.	CH20N04A
Marking	20N04A
Packing Information	REEL TAPE
Basic ordering unit (pcs)	1000

• Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	20	V
Continuous Drain Current	$I_D@TC=25^\circ\text{C}$	20	A
	$I_D@TC=75^\circ\text{C}$	15	A
	$I_D@TC=100^\circ\text{C}$	10	A
Pulsed Drain Current	I_{DM}	100	A
Total Power Dissipation($TC=25^\circ\text{C}$)	$P_D@TC=25^\circ\text{C}$	30	W
Total Power Dissipation($TA=100^\circ\text{C}$)	$P_D@TC=100^\circ\text{C}$	15	W
Operating Junction Temperature	T_J	-55 to 175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 175	$^\circ\text{C}$
Single Pulse Avalanche Energy@ $L=0.1\text{mH}$	E_{AS}	150	mJ
Avalanche Current@ $L=0.1\text{mH}$	I_{AS}	55	A

• Product Summary

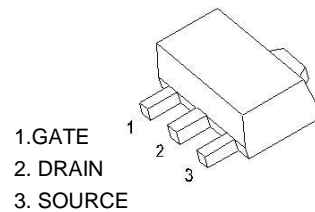


$V_{DS} = 40\text{V}$

$R_{DS(ON)} = 16\text{m}\Omega$

$I_D = 20\text{A}$

SOT-89-3L



1. GATE
2. DRAIN
3. SOURCE

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	4		$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	100	$^{\circ}C/W$
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	125	$^{\circ}C$

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1	1.6	2.1	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 1A$		16	18	m Ω
		$V_{GS} = 4.5V, I_D = 1A$		18	22	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 15V, I_D = 10A$		18		S
Source-drain voltage	V_{SD}	$I_S = 1A$			1.0	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$	-	840	-	pF
Output capacitance	C_{oss}		-	92	-	
Reverse transfer capacitance	C_{rss}		-	60	-	

•Gate Charge characteristics($T_a = 25^{\circ}C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DS} = 10V$	-	20	-	nC
Gate - Source charge	Q_{gs}	$I_D = 25A$	-	2.5	-	
Gate - Drain charge	Q_{gd}	$V_{GS} = 10V$	-	4.5	-	

Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;

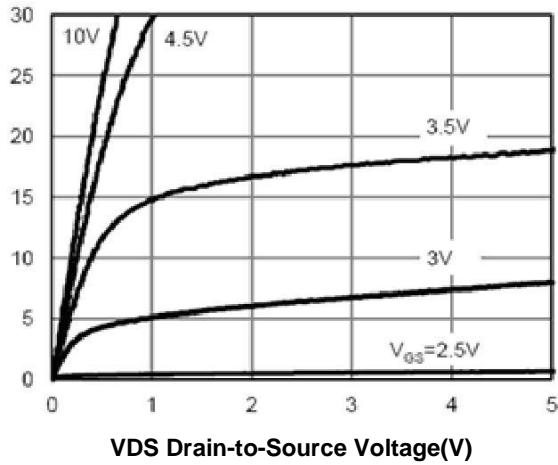
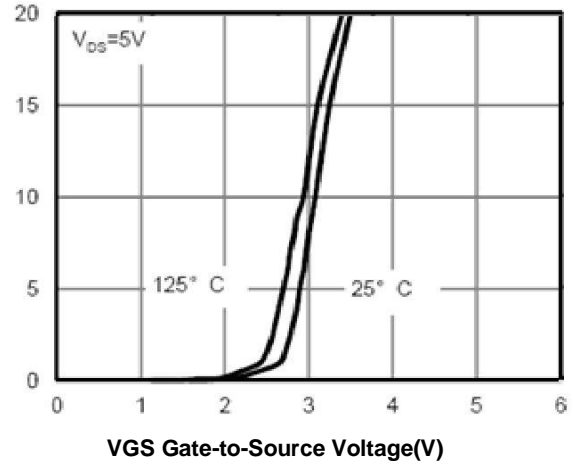
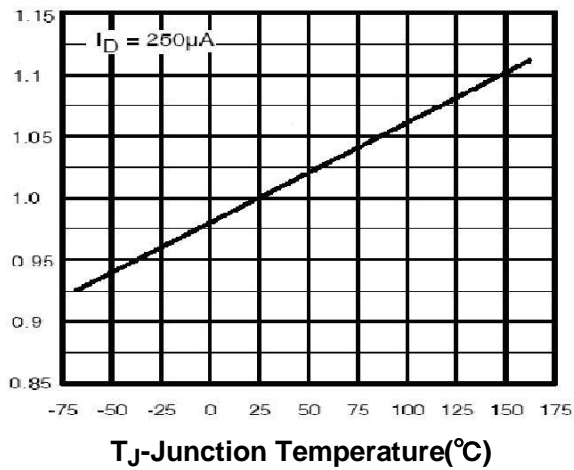
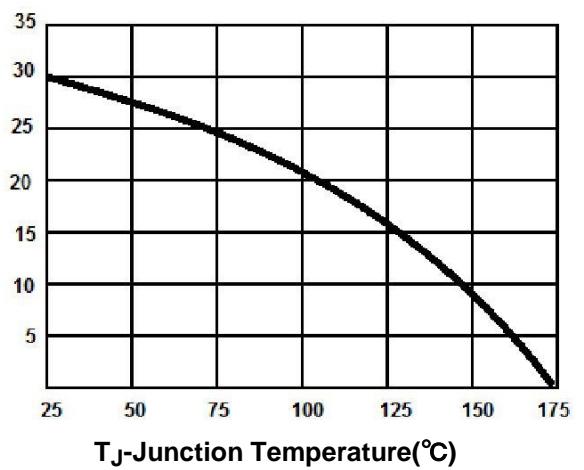
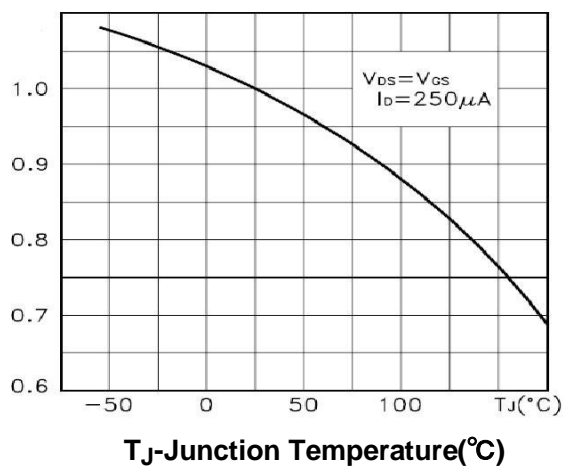
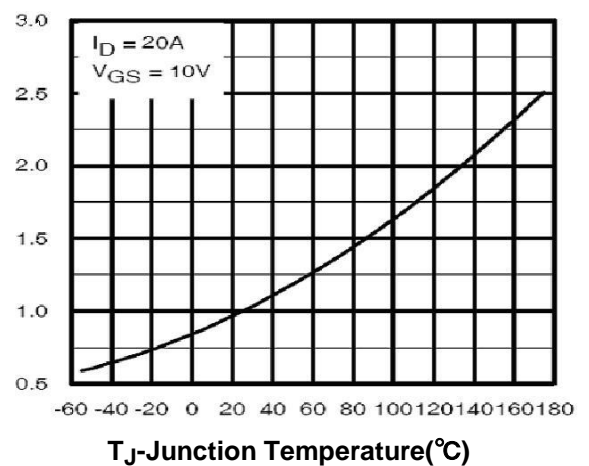
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)
Figure 1. Output Characteristics

Figure 2. Transfer Characteristics

Figure 3. Max BV_{DSS} vs Junction Temperature

Figure 4. Drain Current

Figure 5. $V_{GS(th)}$ vs Junction Temperature

Figure 6. $R_{DS(on)}$ vs Junction Temperature


Figure 7. Gate Charge Waveforms

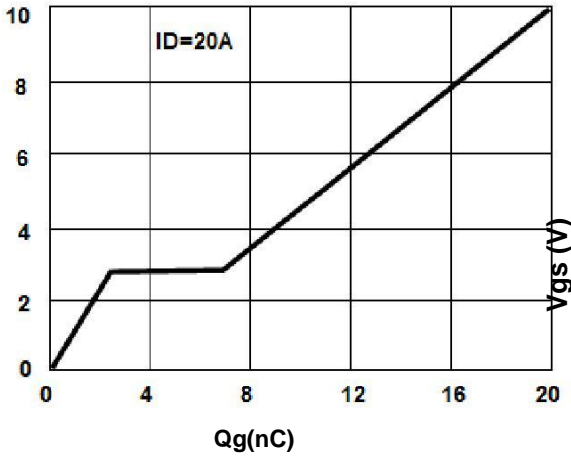


Figure 8. Capacitance

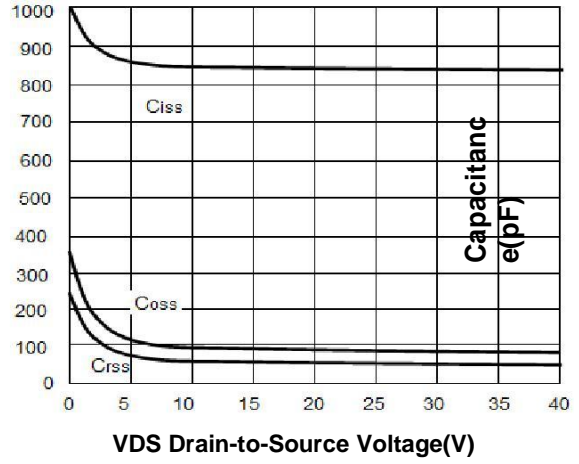


Figure 9. Body-Diode Characteristics

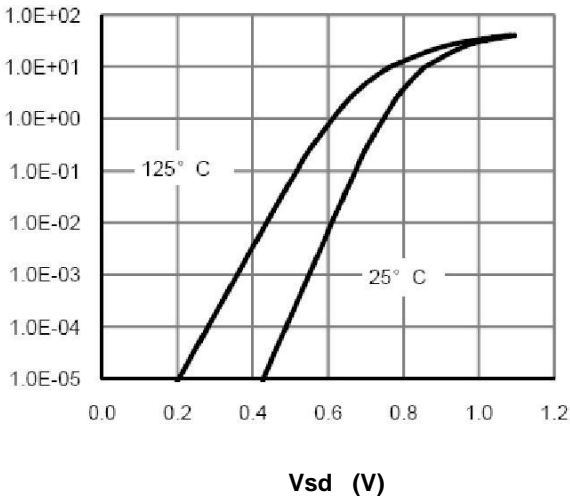


Figure 10. Maximum Safe Operating Area

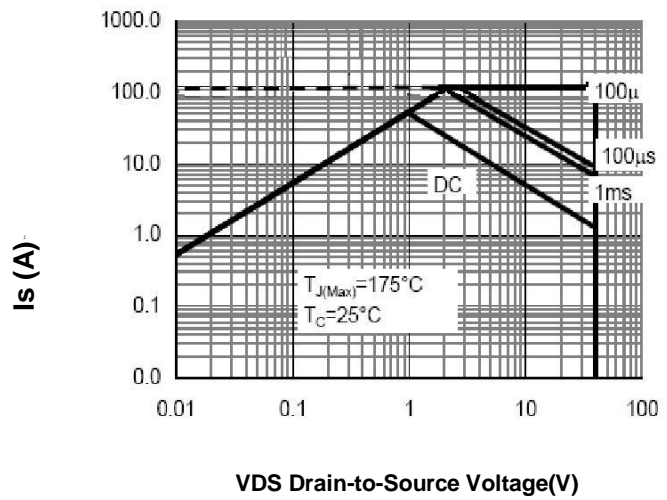
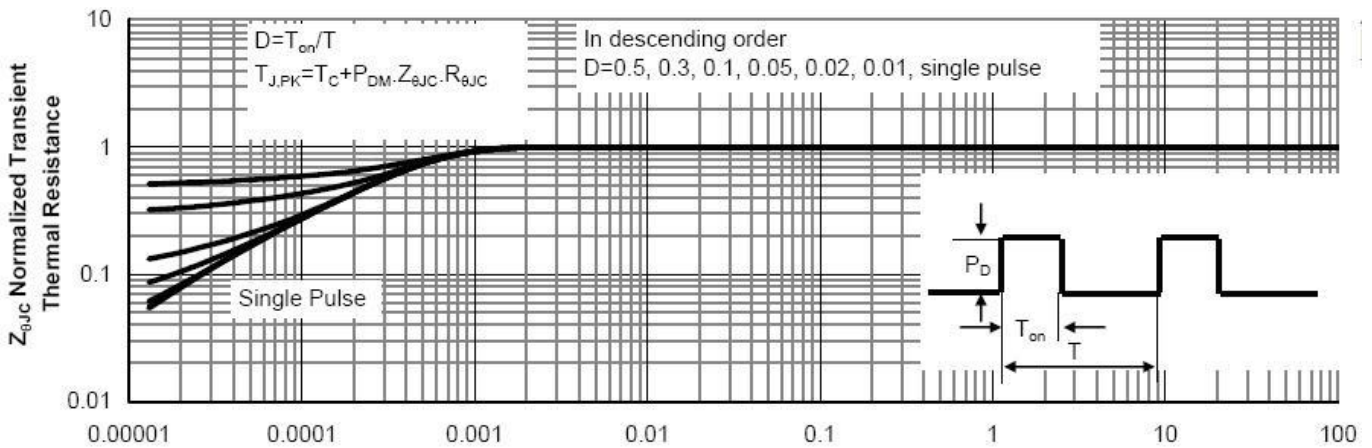
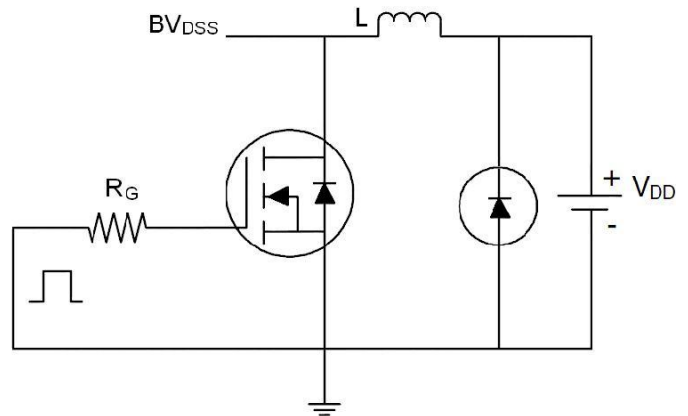
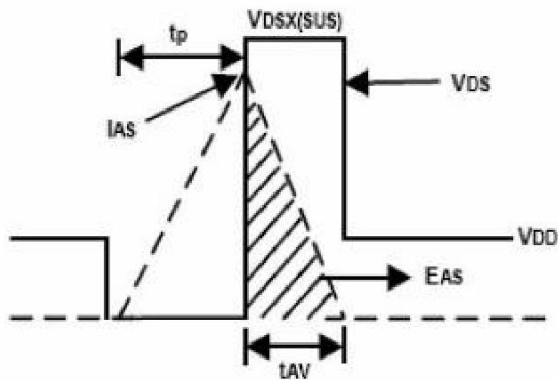


Figure 11. Normalized Maximum Transient Thermal Impedance

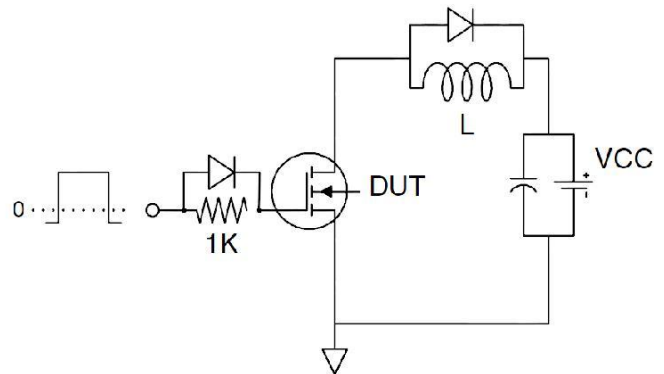
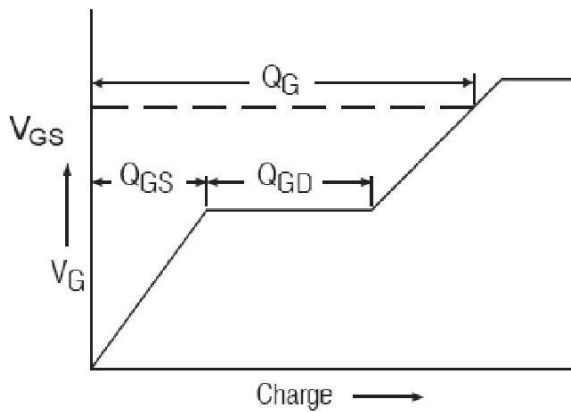


Test Circuit

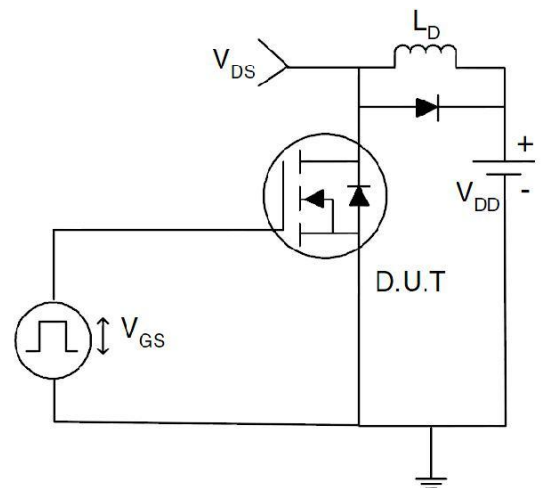
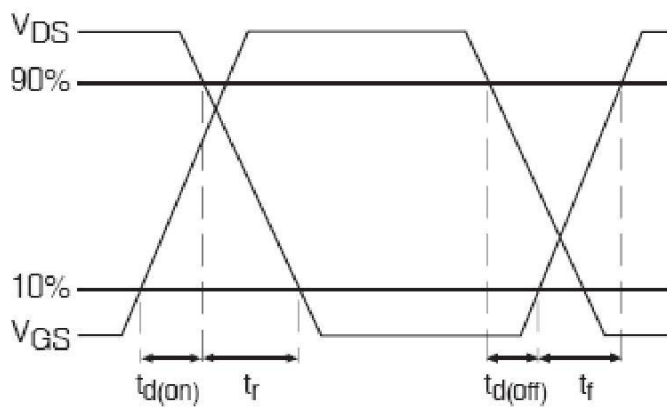
1) E_{AS} Test Circuits

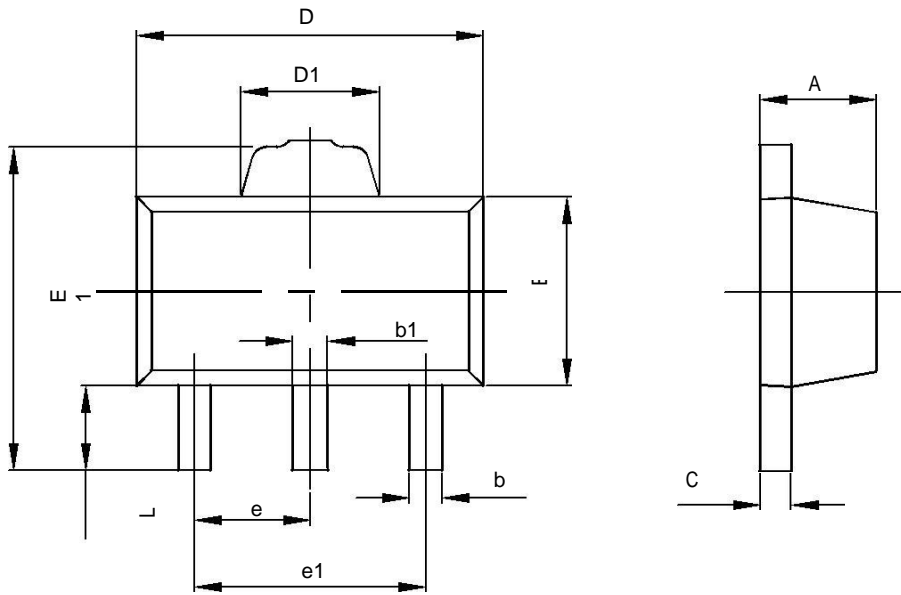


2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



SOT-89-3L PACKAGE OUTLINE DIMENSIONS


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043