

General Description

The CH20P04A 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

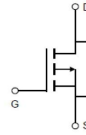
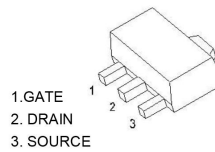
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Ordering Information:

Part NO.	CH20P04A
Marking	CH20P04A
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
	$I_D@TC=75^\circ\text{C}$	- 10	A
	$I_D@TC=100^\circ\text{C}$	-8	A
Pulsed Drain Current ^①	I_{DM}	-40	A
Total Power Dissipation	$P_D@TC=25^\circ\text{C}$	4.6	W
Total Power Dissipation	$P_D@TA=25^\circ\text{C}$	1.5	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Single Pulse Avalanche Energy	E_{AS}	160	mJ

Product Summary
 $V_{DS} = -40\text{V}$
 $I_D = -20\text{A}$
 $R_{DS(ON)}$ Typ = 26 m Ω
 @ $V_{GS} = -10\text{V}$

SOT-89-3L


•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.3	$^{\circ}C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	27	$^{\circ}C/W$
Soldering temperature, wavesoldering for 10s	T_{solid}	-	-	265	$^{\circ}C$

•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	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.7	-2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-40V, V_{GS}=0V$			-1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-5A$		26	34	m Ω
		$V_{GS}=-4.5V, I_D=-3A$		34	46	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-5A$		10		s
Source-drain voltage	V_{SD}	$I_S=-5A$			1.28	V

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$	-	1834	-	μF
Output capacitance	C_{oss}		-	157	-	
Reverse transfer capacitance	C_{rss}		-	89.5	-	

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD}=-20V$	-	22	-	nC
Gate - Source charge	Q_{gs}	$I_D=-5A$	-	4.5	-	
Gate - Drain charge	Q_{gd}	$V_{GS}=-10V$	-	3.8	-	

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: $T_J = 25^{\circ}C, V_{DD} = -20V, V_G = -10V, L = 0.5mH, R_G = 25\Omega, I_{AS} = -10A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

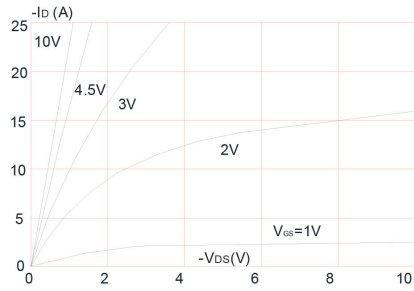


Figure 2: Typical Transfer Characteristics

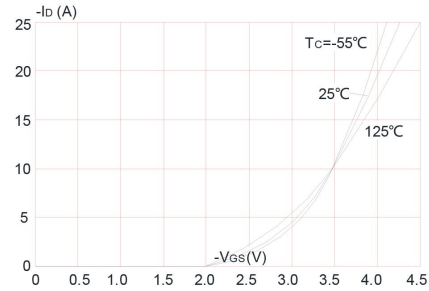


Figure 3: On-resistance vs. Drain Current

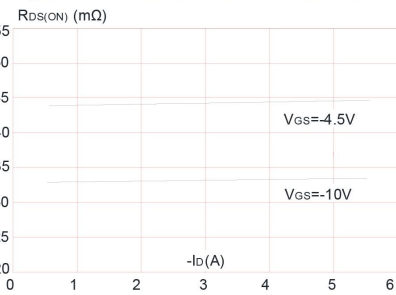


Figure 4: Body Diode Characteristics

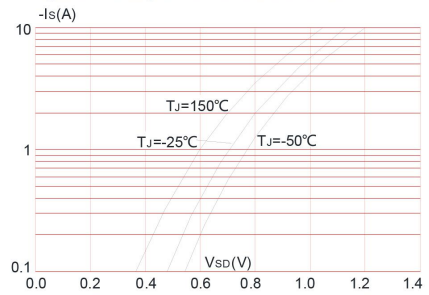


Figure 5: Gate Charge Characteristics

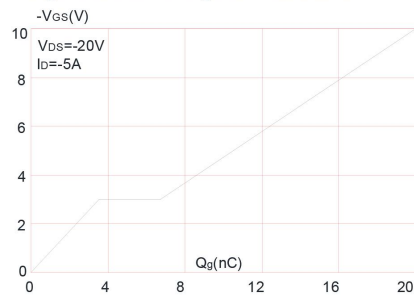
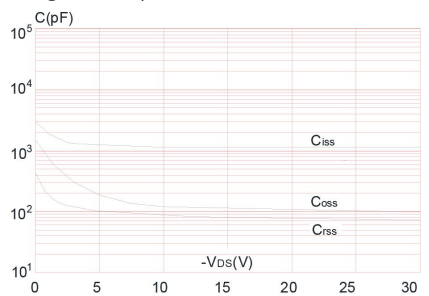


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 1: Output Characteristics

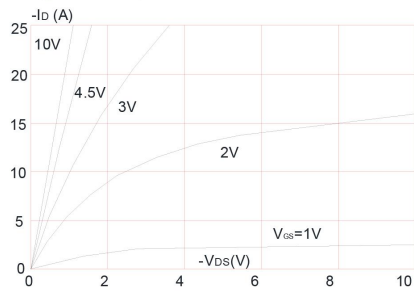


Figure 2: Typical Transfer Characteristics

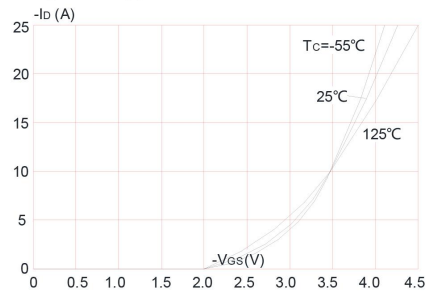


Figure 3: On-resistance vs. Drain Current

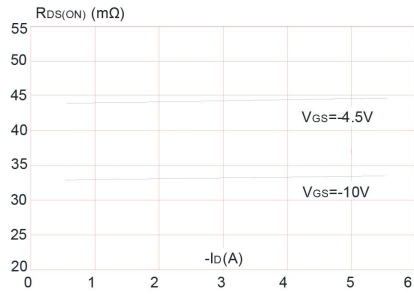


Figure 4: Body Diode Characteristics

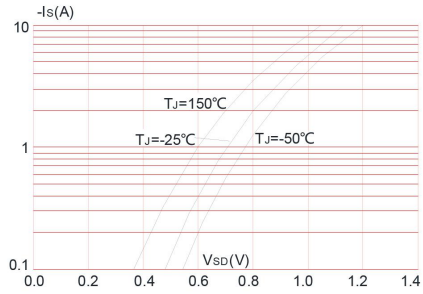


Figure 5: Gate Charge Characteristics

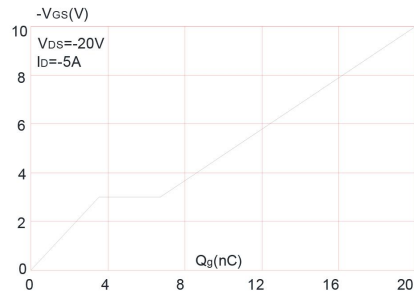


Figure 6: Capacitance Characteristics

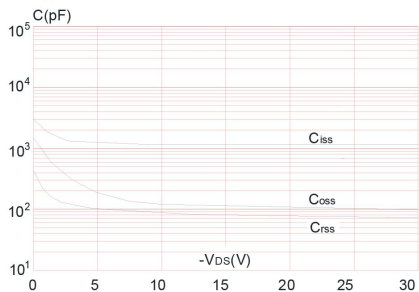


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

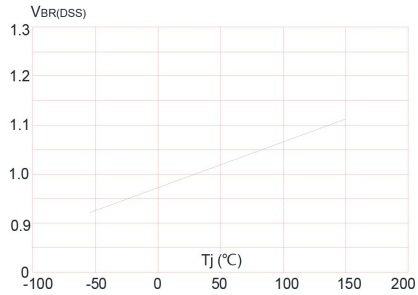


Figure 8: Normalized on Resistance vs. Junction Temperature

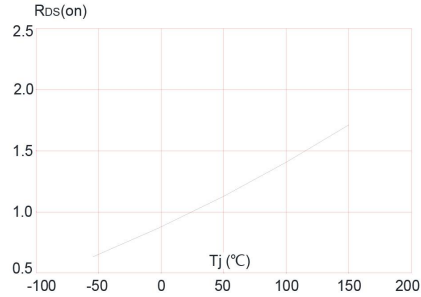


Figure 9: Maximum Safe Operating Area

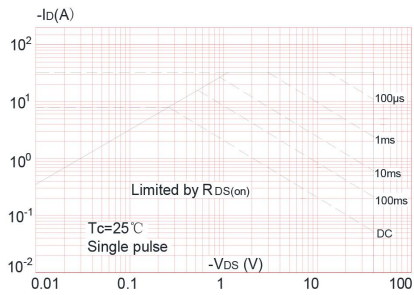


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

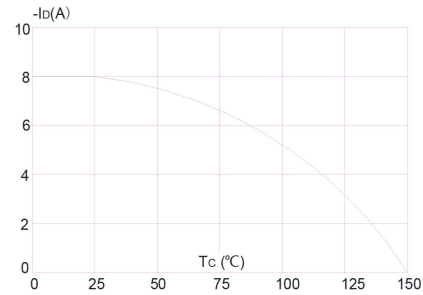
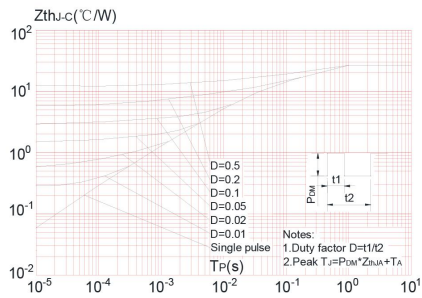
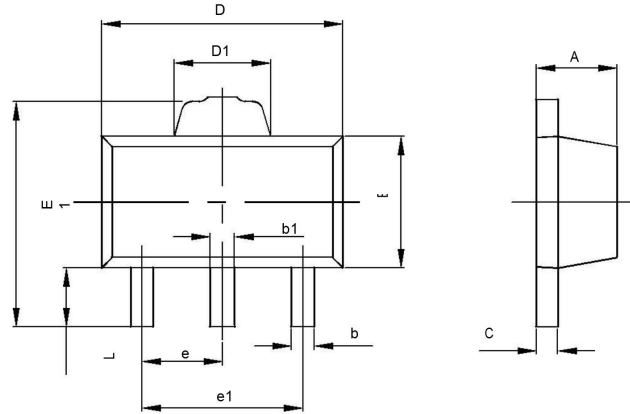


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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