

General Description

The CH50N04D 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.

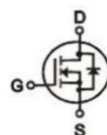
Features

- 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

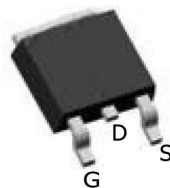
Product Summary



$$V_{DS} = 40V$$

$$R_{DS(ON)} = 14m\Omega$$

$$I_D = 30A$$



TO-252

Ordering Information:

Part NO.	CH50N04D
Marking	CH50N04D
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

Absolute Maximum Ratings ($T_c = 25^\circ C$)

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

•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	2.1	2.6	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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1A$		14	16	m Ω
		$V_{GS}=4.5V, I_D=1A$		24	26	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 $\leq 2\%$;

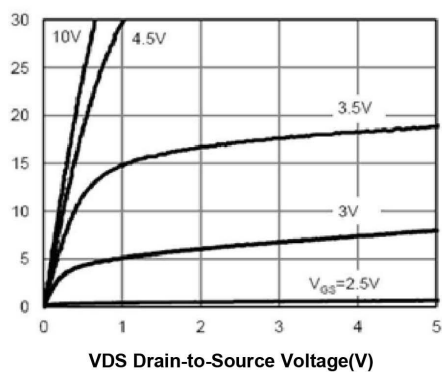
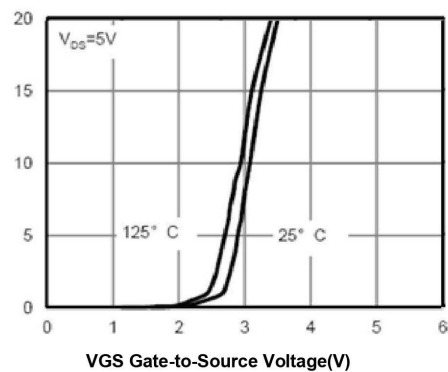
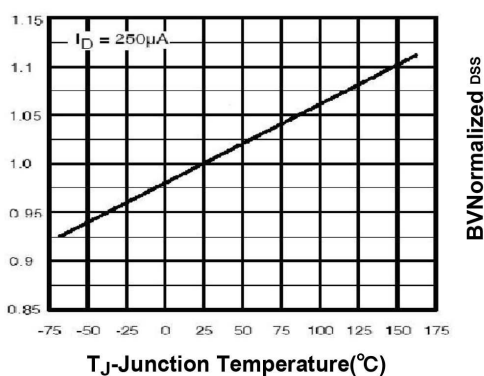
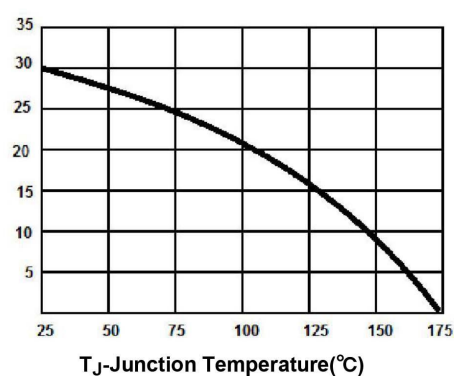
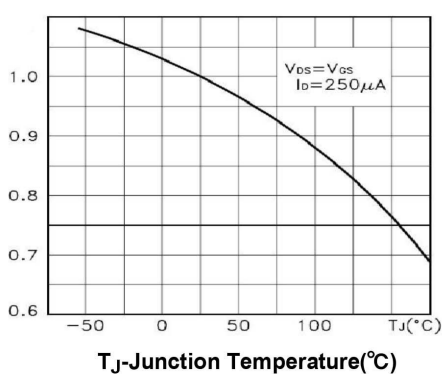
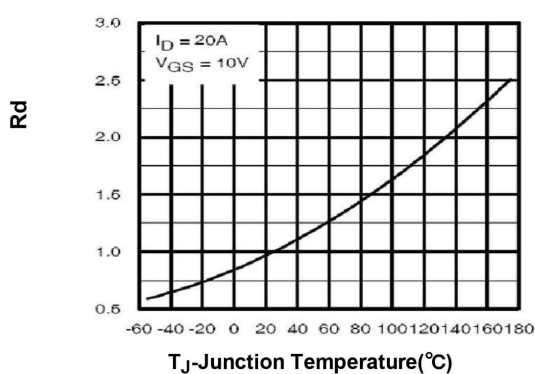
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)
Figure 1. Output Characteristics

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

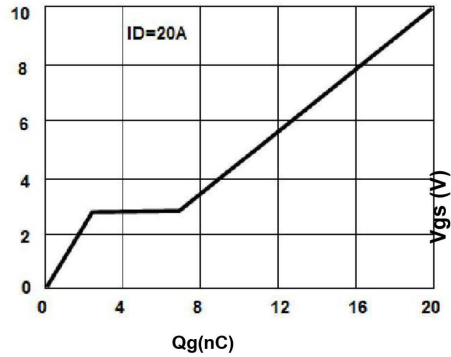


Figure 8. Capacitance

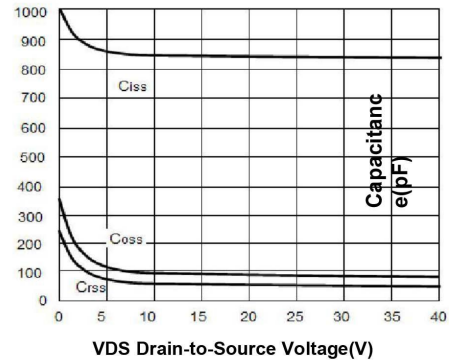


Figure 9. Body-Diode Characteristics

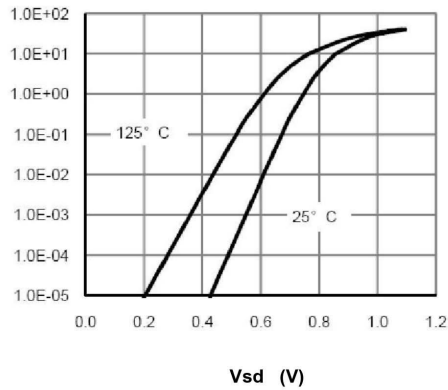


Figure 10. Maximum Safe Operating Area

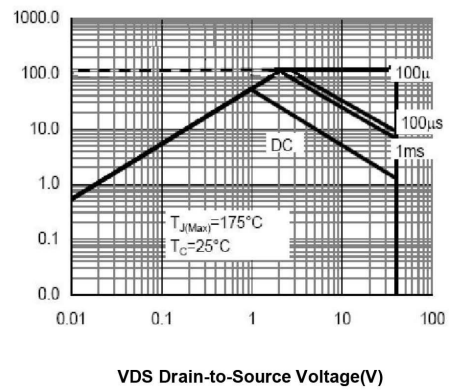
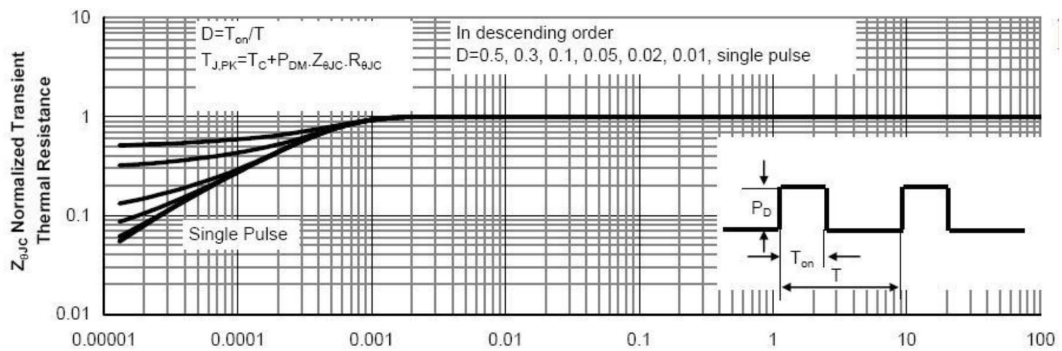
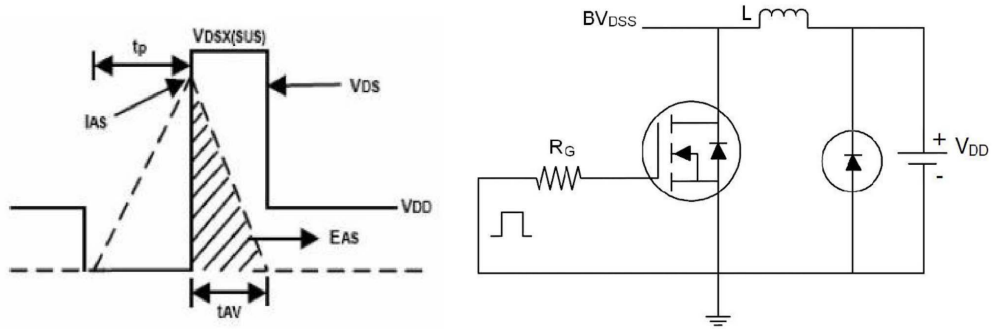


Figure 11. Normalized Maximum Transient Thermal Impedance

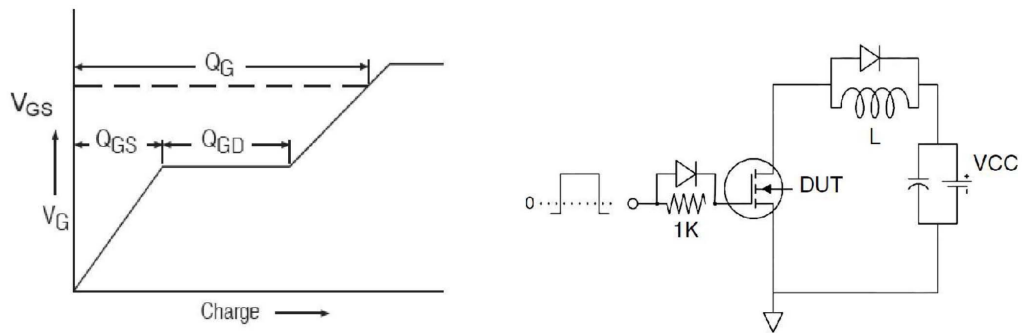


Test Circuit

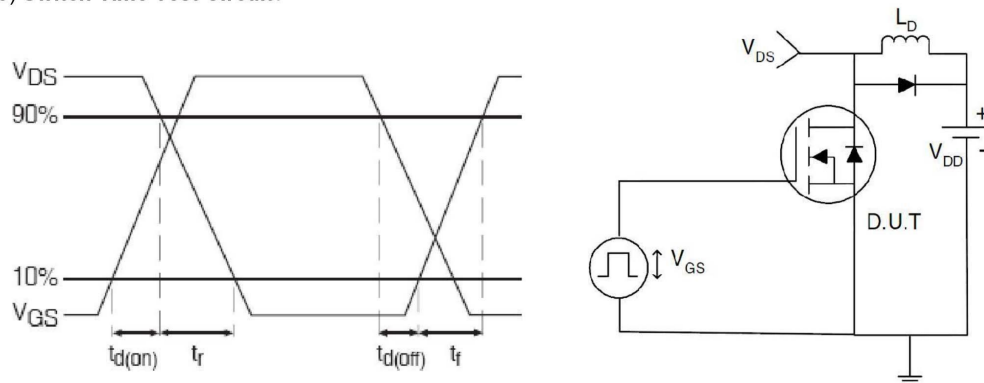
1) EAS Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



• Dimensions (TO-252)

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			

