

General Description

The ZM040P04D 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.

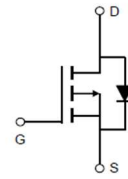
Features

- 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

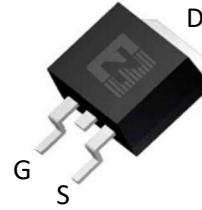
Product Summary



$$V_{DS} = -40V$$

$$R_{DS(ON)} = 4m\Omega$$

$$I_D = -73A$$



TO-252



Ordering Information:

Part NO.	ZM040P04D
Marking	ZM040P04
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	$I_{D@TC=25^\circ C}$	-73	A
	$I_{D@TC=75^\circ C}$	-56	A
	$I_{D@TC=100^\circ C}$	-46	A
Pulsed Drain Current ^①	I_{DM}	-219	A
Total Power Dissipation	$P_D@TC=25^\circ C$	56	W
Total Power Dissipation	$P_D@TA=25^\circ C$	2	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	840	mJ

•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.2	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	60	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° 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		-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	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -30A$		4.0	5.2	m Ω
		$V_{GS} = -4.5V, I_D = -25A$		6.0	7.8	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = -10V, I_D = -20A$		10		s

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz $V_{DS} = -25V$	-	6970	-	pF
Output capacitance	C_{oss}		-	616	-	
Reverse transfer capacitance	C_{rss}		-	243	-	

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

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD} = -15V$ $I_D = -30A$ $V_{GS} = -10V$	-	130	-	nC
Gate - Source charge	Q_{gs}		-	31	-	
Gate - Drain charge	Q_{gd}		-	15	-	

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

Fig.1 Power Dissipation Derating Curve

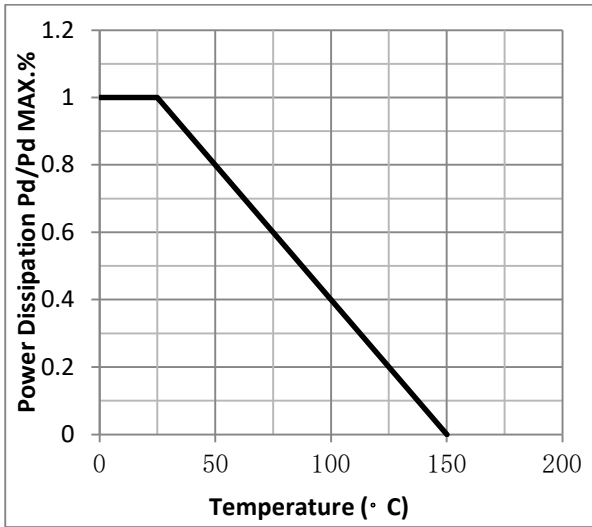


Fig.2 Typical output Characteristics

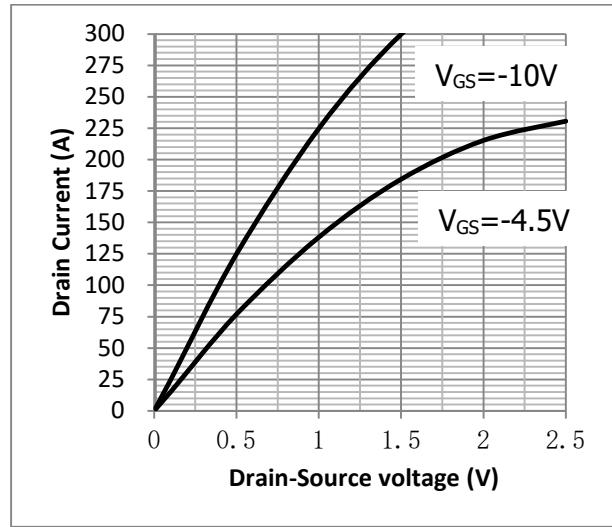


Fig.3 Threshold Voltage V.S Junction Temperature

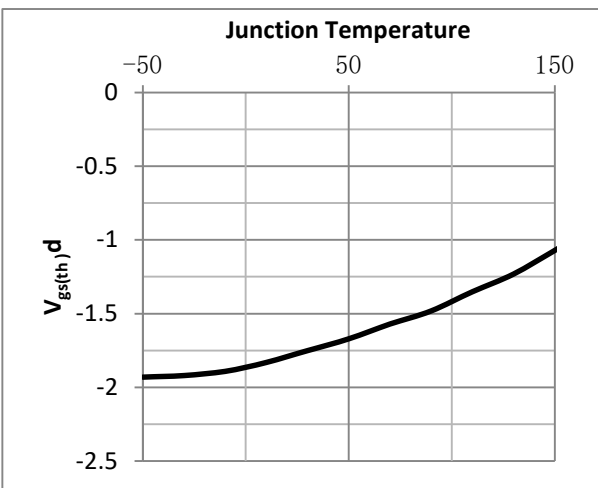


Fig.4 Resistance V.S Drain Current

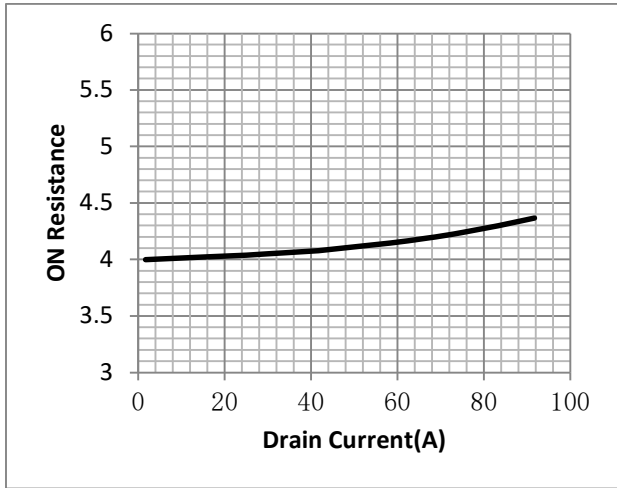


Fig.5 On-Resistance VS Gate Source Voltage

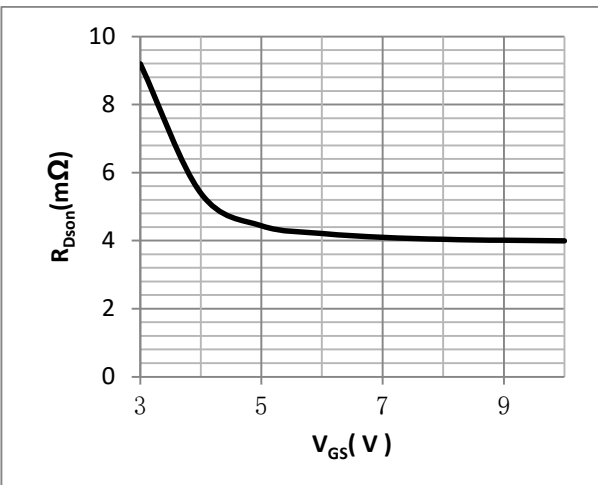


Fig.6 On-Resistance V.S Junction Temperature

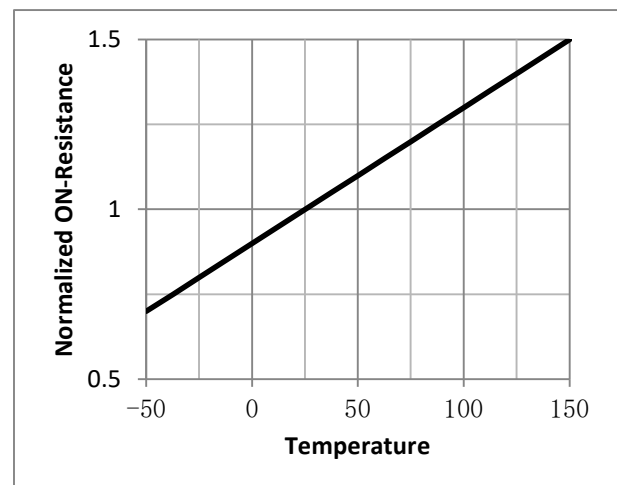


Fig.7 Gate Charge Measurement Circuit

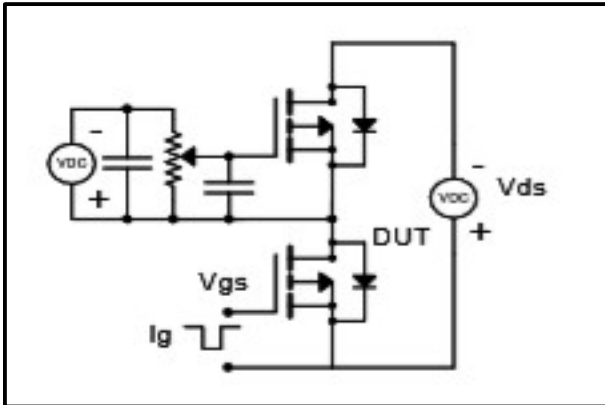


Fig.8 Gate Charge Waveform

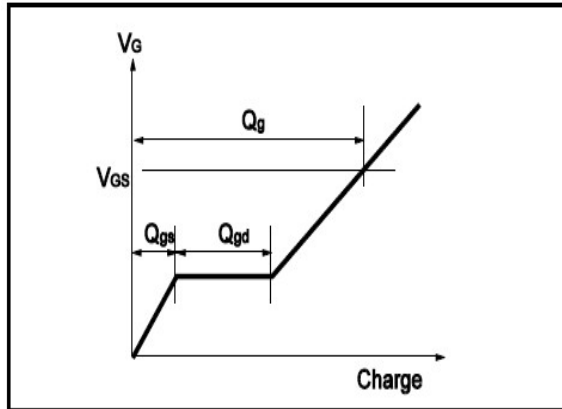


Fig.9 Switching Time Measurement Circuit

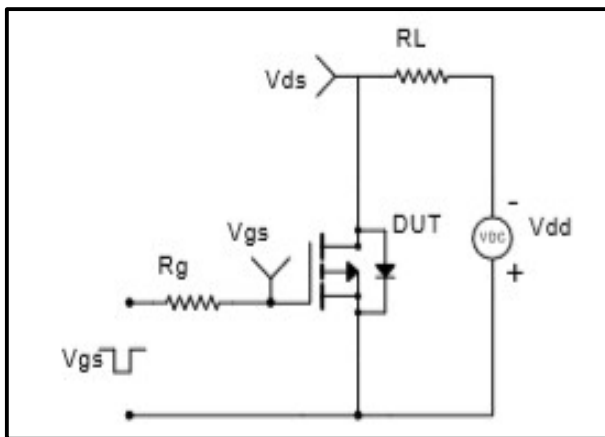


Fig.10 Switching Time Waveform

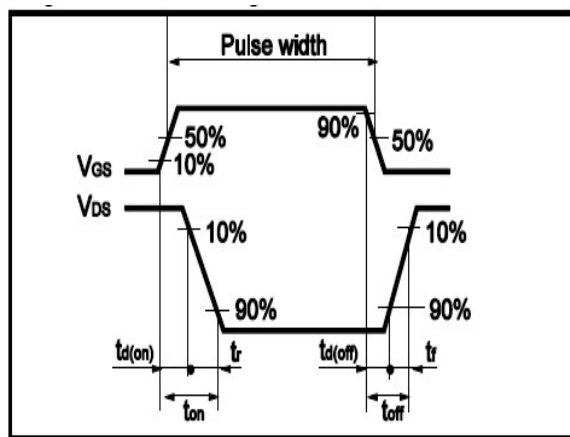


Fig.11 Avalanche Measurement Circuit

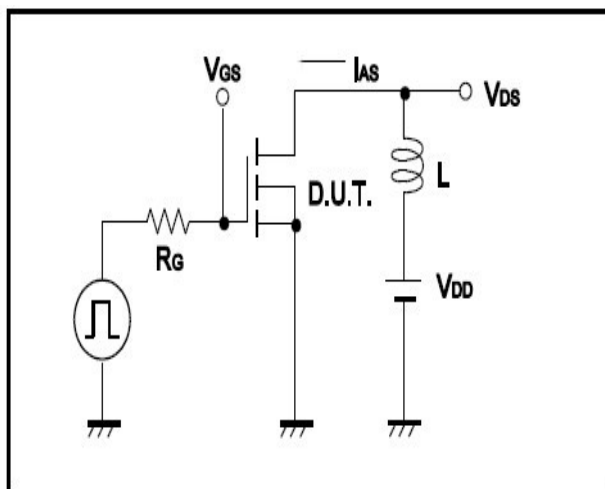
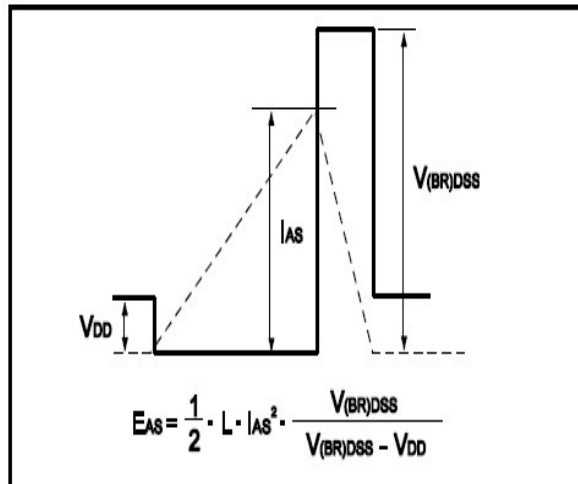
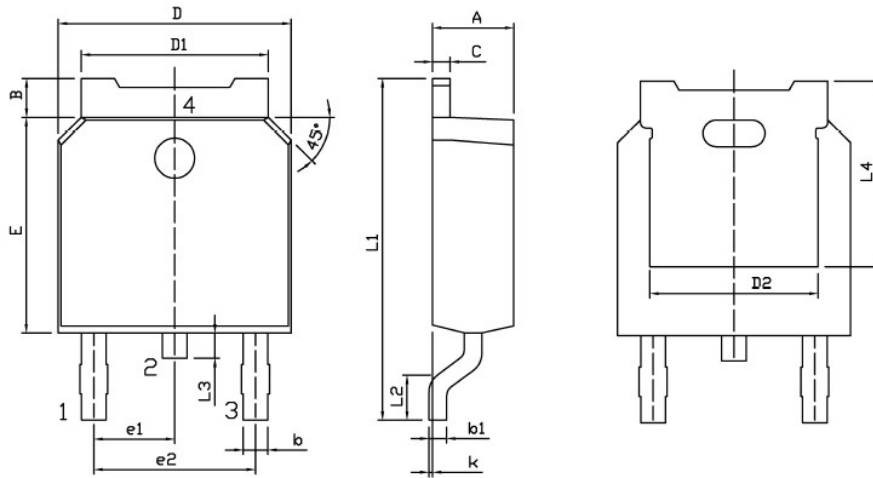


Fig.12 Avalanche Waveform





•Dimensions(TO-252)



Land Pattern
(Only for Reference)

Dimensions In Millimeters					
Symbol	MIN	MAX	Symbol	MIN	MAX
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.70	2.00
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	L4	5.05	
D2	4.85		k	0.00	0.10

