DMN2004K-7

20V N Channel Enhancement MOSFET

Description

The DMN2004K-7 is the new generation trench N-ch MOSFET has been designed to minimize the on-state resistance (RDS(ON)) yet maintain superior switching performance, making it ideal for high efficiency power management applications

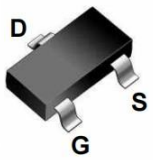
V_{DSS}	20V
I_D	3.0A
$R_{DS(ON)}$	37mΩ@ V_{GS}=2.5V
$R_{DS(ON)}$	50mΩ@ V_{GS}=4.5V

Features

- 20V,3.0A, RDS(ON) =37mΩ@VGS = 4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Outline

SOT-23

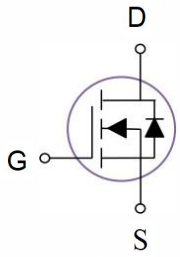


Applications

- Notebook
- Load Switch
- Power Management

Equivalent

(1)Gate
(2)Source
(3)Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
DMN2004K-7	SOT-23		3000

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Drain Current-Continuous(Note2)	T_A=25°C	I_D	3.0	A
	T_A=70°C		2.6	A
-Pulsed(Note 1、Note 2)		I_{DM}	12	A
Maximum Power Dissipation	T_A=25°C	P_D	1.56	W
	T_A=70°C		1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	80	°C /W

Electrical Characteristics (TC=25 ℃, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	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	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D=250uA	0.5	0.6	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} =4.5V , I_D =3A		37	44	mΩ
		V_{GS} =2.5V , I_D =2A		50	60	mΩ
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C_{ISS}	V_{DS} =10V , V_{GS} =0 V , f =1.0MHz		300		pF
Output Capacitance	C_{OSS}			60		pF
Reverse Transfer Capacitance	C_{RSS}			40		pF
Total Gate Charge	Qg	V_{DS} =10V , I_D =3A , V_{GS} =4.5V		3.5		nC
Gate-Source Charge	Qgs	V_{DS} =10V , I_D =3A , V_{GS} =4.5V		0.5		nC
Gate-Drain Charge	Qgd			1.5		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} =10V , I_D =1A , V_{GS} =4.5V , R_G =25Ω		4		ns
Rise Time	tr			10		ns
Turn-Off Delay Time	$t_{D(OFF)}$			20		ns
Fall Time	tf			8		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V_{SD}	V_{GS}=0V , I_S=3A			1	V

Notes：

1、Pulse Test Width < 300us,Duty Cycle< 2%

2、Drain current limited by maximum junction temperature.

3、Guaranteed by design,not subject to production testing.

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

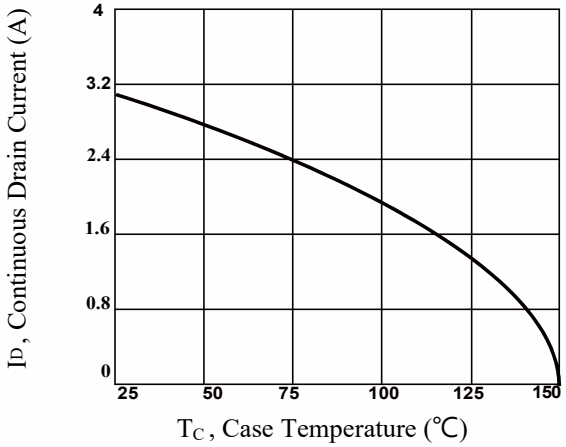


Fig.2 Normalized RDSON vs. TJ

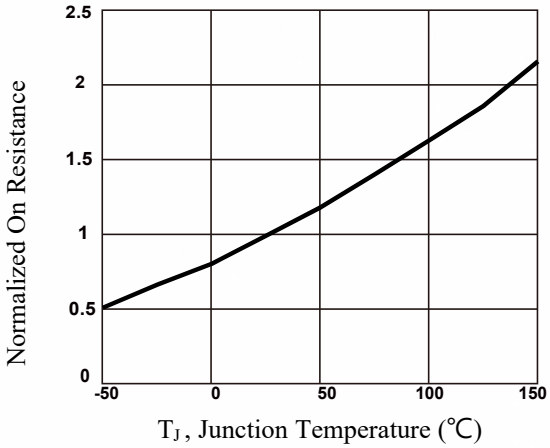


Fig.3 Normalized Vth vs. TJ

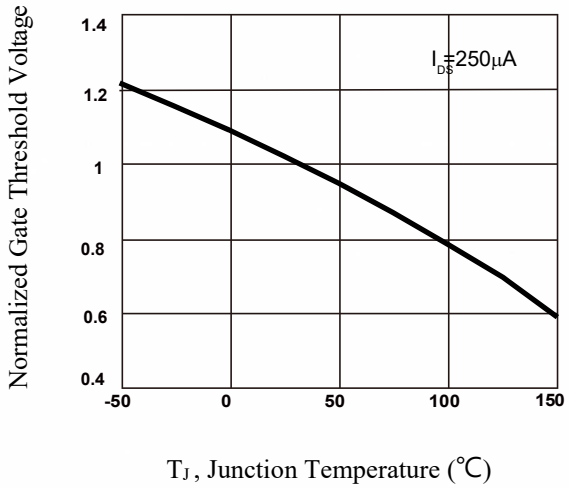


Fig.4 Gate Charge Waveform

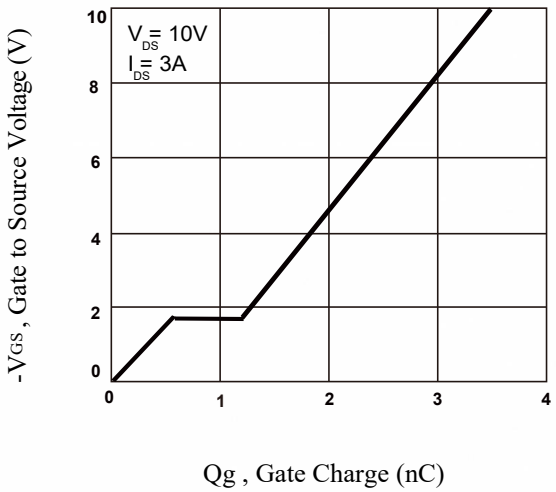


Fig.5 Typical Output Characteristics

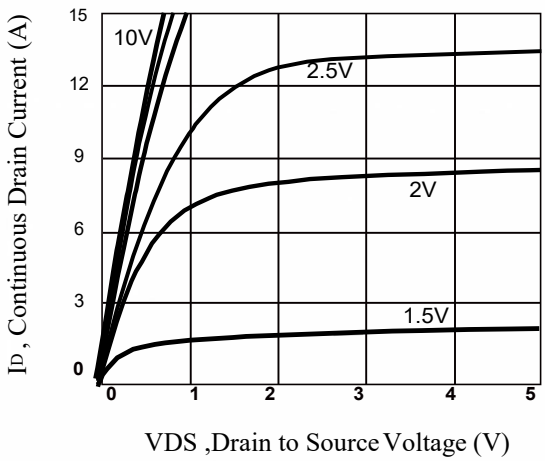


Fig.6 Capacitance

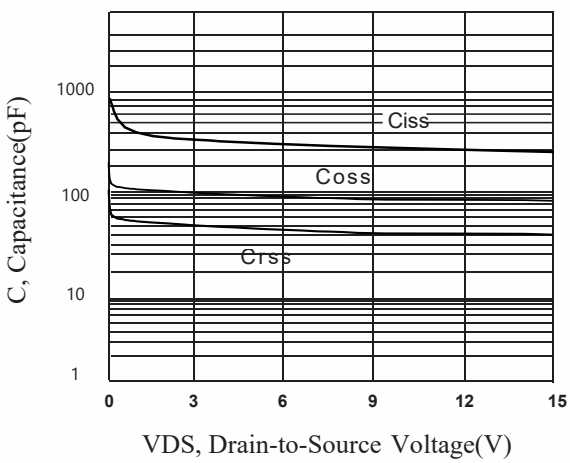


Fig.7 Turn-On Resistance vs. ID

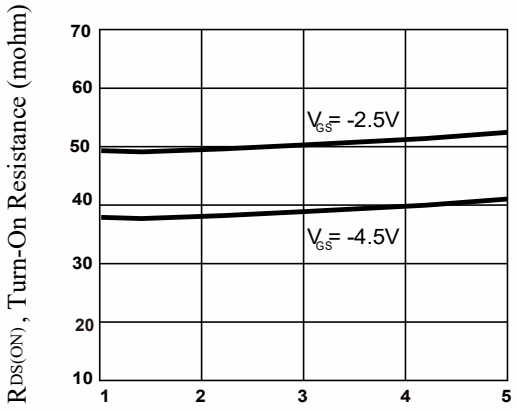


Fig.8 Typical Source-Drain Diode Forward Voltage

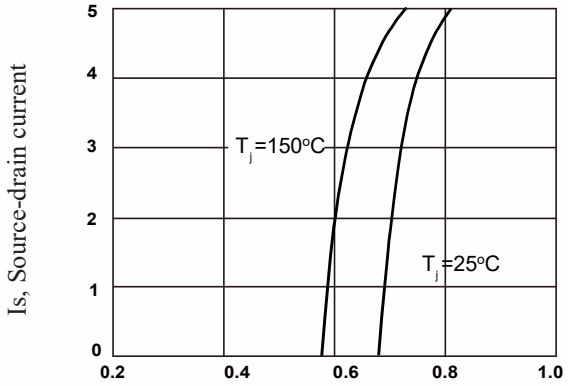


Fig.9 Normalized Transient Impedance

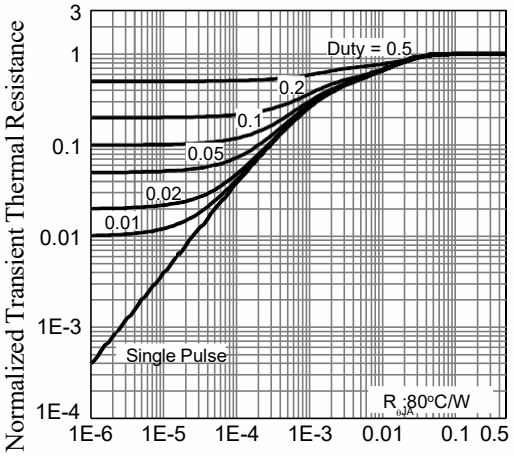


Fig.10 Maximum Safe Operation Area

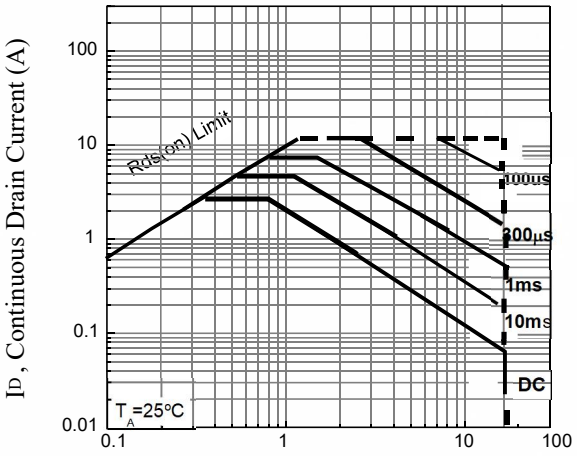


Figure11a. Switching Test Circuit

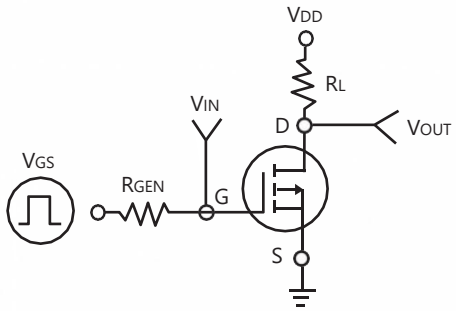
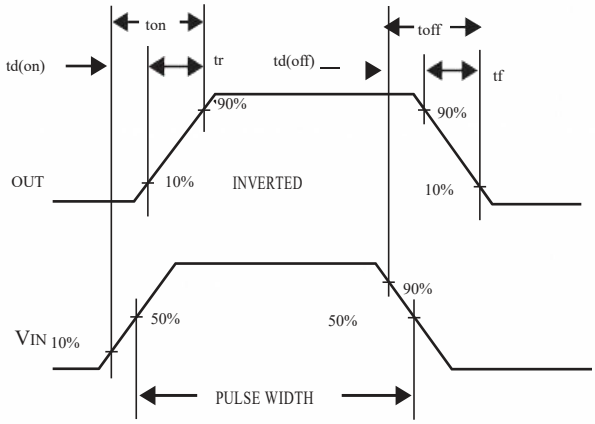
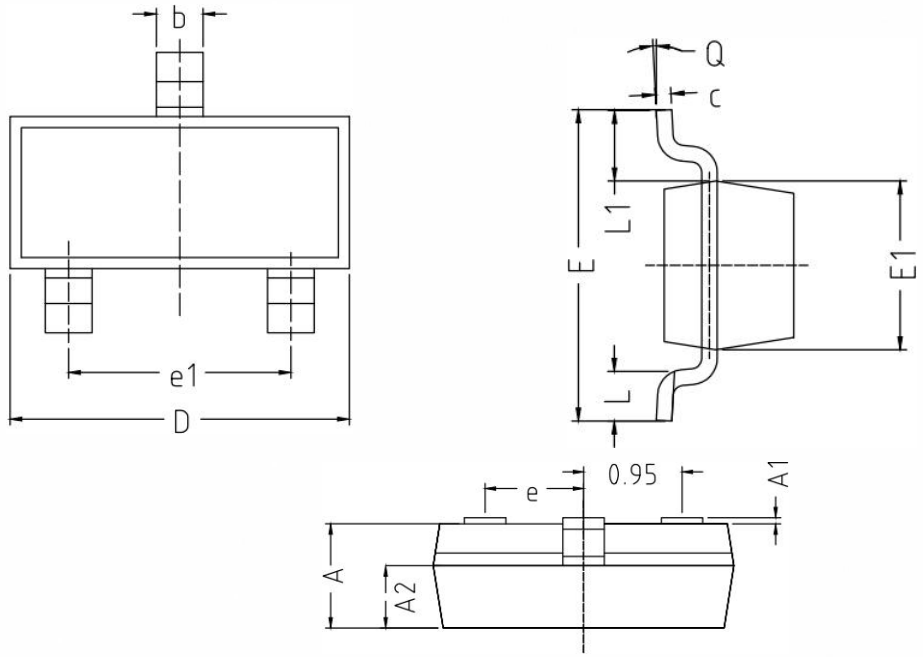


Figure 11b. Switching Waveforms



SOT-23 Package Information



SOT-23 PKG			
SYMBOL	MIN	TYP	MAX
A	0.950	1.000	1.050
A1	0.000	0.050	0.100
A2	0.570	0.600	0.630
b	0.350	0.400	0.450
c	0.100	0.130	0.200
D	2.800	2.900	3.000
E	2.250	2.400	2.550
E1	1.200	1.300	1.400
e		0.950 TYP	
e1	1.800	1.900	2.000
L	0.290	0.390	0.490
L1		0.550REF	
Q	0°	4°	8°