

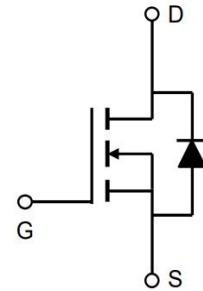
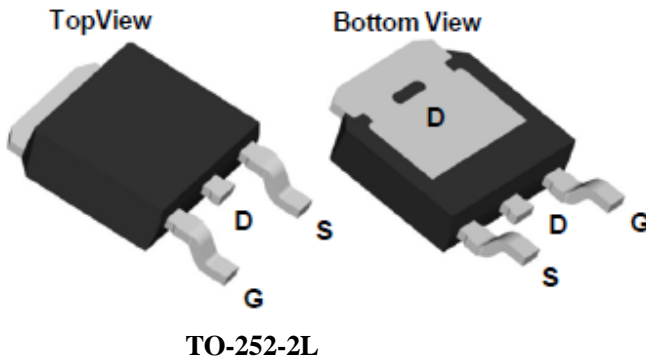
Features

The TW50N04D is the high cell density trenched N ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The TW50N04D meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	RDSON	ID
40V	11mΩ	45A



Maximum Ratings(Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	40	V
Gate-Source Voltage	VGS	±20	
Continuous Drain Current, VGS @10V ¹	ID@TC=25°C	45	A
Continuous Drain Current, VGS @10V ¹	ID@TC=100°C	25	
Pulsed Drain Current ①	IDM	80	
Single Pulse Avalanche Energy	EAS	19	mJ
Avalanche Current	I _{AS}	30	A
Power Dissipation ②	PD	20	W
Thermal Resistance Junction-ambient	RθJA	55	°C/W
Thermal Resistance Junction-Case	RθJC	4.32	°C/W
Operating Junction	TJ	-55~+150	°C
Storage Temperature	TSTG	-55~+150	°C

Electrical Characteristics(T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250μA	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250μA	1	1.5	2.0	V
Gate-Body leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40V, V _{GS} =0V			1	μA
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 8A		11.0	16	mΩ
	R _{DS(on)}	V _{GS} = 4.5V, I _D = 1A		18.9	24	mΩ
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V, F=1.0MHz		964		pF
Output Capacitance	C _{oss}			109		pF
Reverse Transfer Capacitance	C _{rss}			96		pF
Total Gate Charge	Q _g	V _{DS} =20V,I _D =8A, V _{GS} =10V		22.9		nC
Gate Source Charge	Q _{gs}			3.5		nC
Gate Drain Charge	Q _{gd}			5.3		nC
Switching Parameters						
Turn-On DelayTime	t _{d(on)}	V _{DD} =20V, R _L =2.5Ω V _{GS} =10V,R _{GEN} =3Ω		5.5		ns
Turn-On Rise Time	t _r			14		ns
Turn-Off DelayTime	t _{d(off)}			24		ns
Turn-Off Fall Time	t _f			12		ns
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S =9A		0.8	1.2	V

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

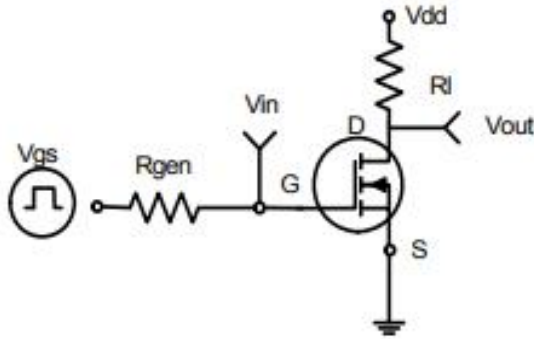


Figure 1: Switching Test Circuit

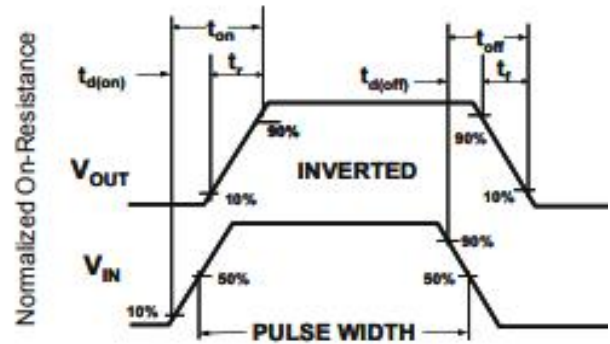


Figure 2: Switching Waveforms

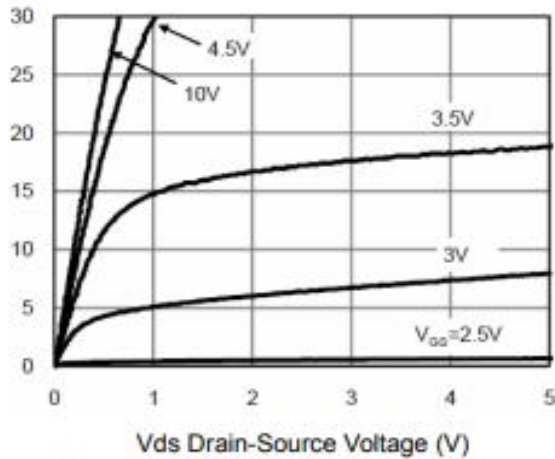


Figure 3 Output Characteristics

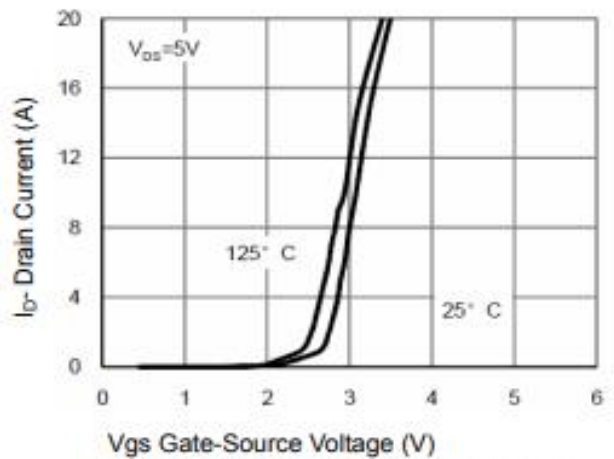


Figure 4 Transfer Characteristics

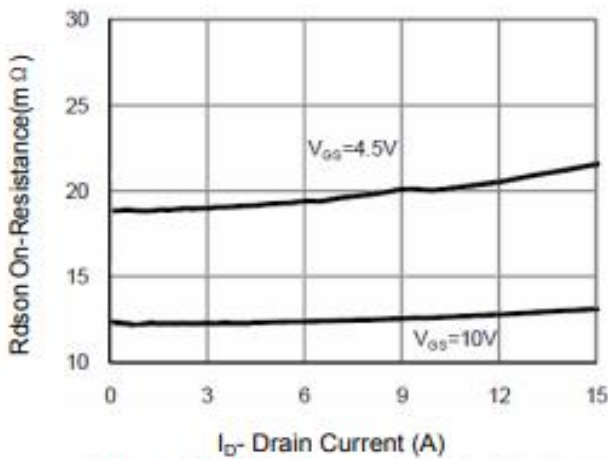


Figure 5 Drain-Source On-Resistance

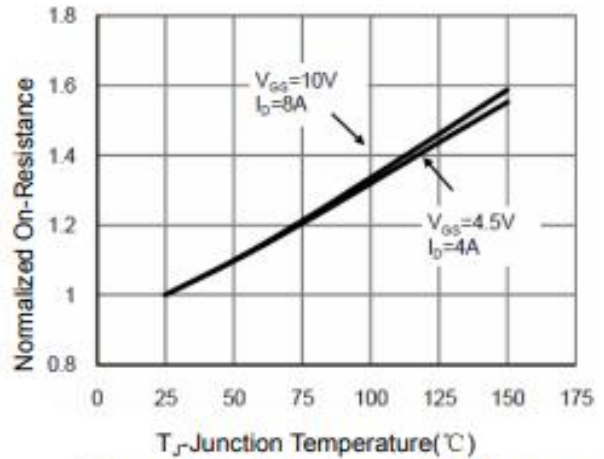
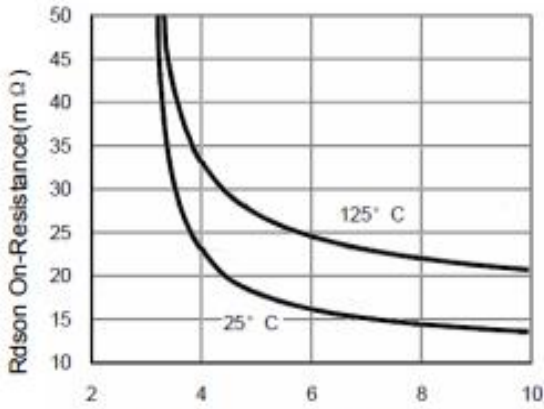
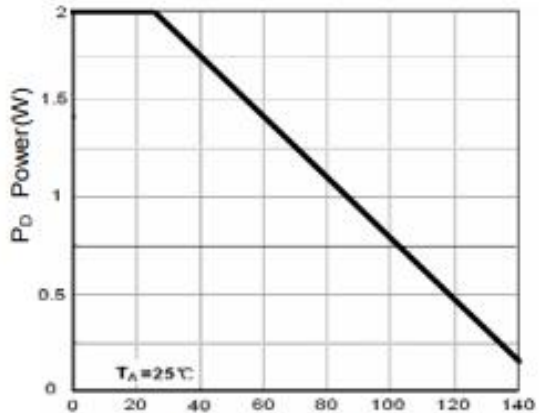


Figure 6 Drain-Source On-Resistance

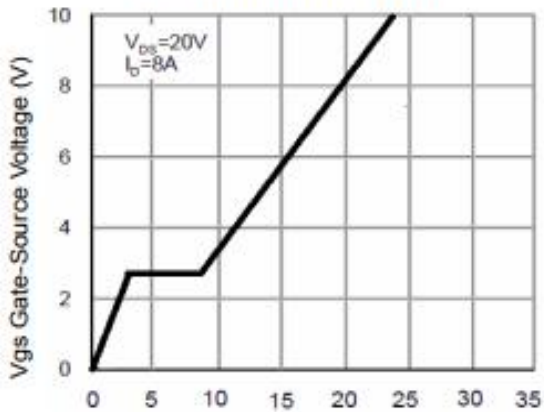
Typical Electrical and Thermal Characteristics



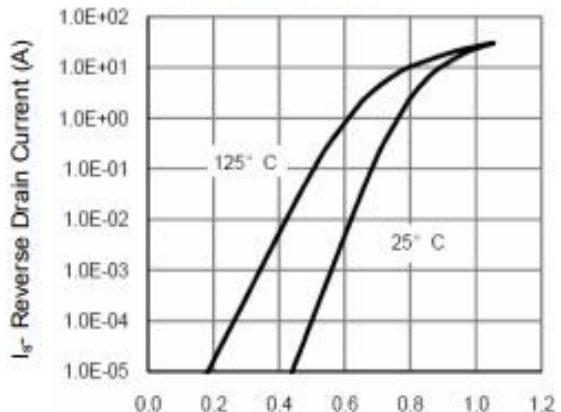
Vgs Gate-Source Voltage (V)
Figure 7 Rdson vs Vgs



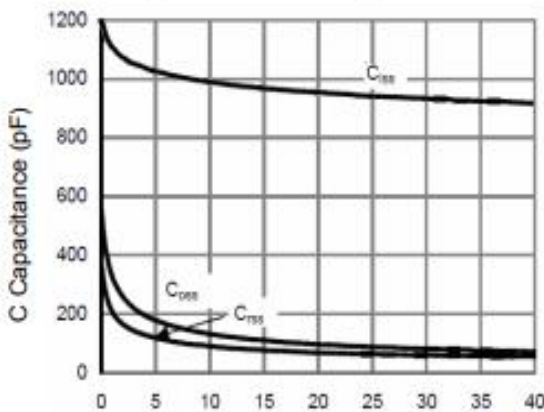
Tj Junction Temperature (°C)
Figure 8 Power Dissipation



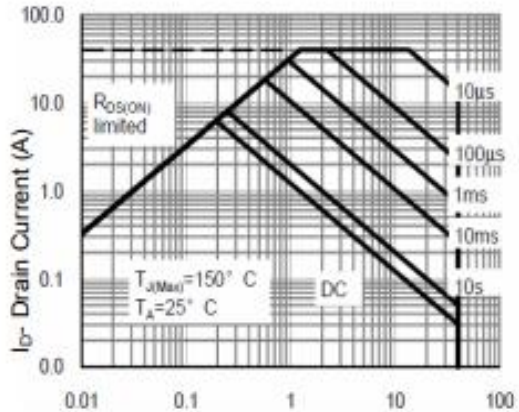
Qg Gate Charge (nC)
Figure 9 Gate Charge



Vds Drain-Source Voltage (V)
Figure 10 Source-Drain Diode Forward



Vds Drain-Source Voltage (V)
Figure 11 Capacitance vs Vds



Vds Drain-Source Voltage (V)
Figure 12 Safe Operation Area

Package Mechanical Data

Unit : mm

TO-252(DPAK)

