

Description

The TW80N04C uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.

General Features

VDS =40V, ID =80A

RDS(ON) <7m @ VGS=10V

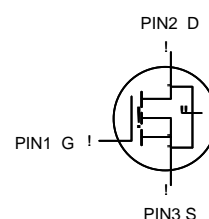
High density cell design for ultra low Rdson

Fully characterized avalanche voltage and current

Good stability and uniformity with high EAS

Excellent package for good heat dissipation

TO-252



Application

PWM

Load Switching

Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous	I _D	80	A
Drain Current-Continuous(T _C =100°C)	I _D (100°C)	56	A
Pulsed Drain Current	I _{DM}	350	A
Maximum Power Dissipation	P _D	80	W
Derating factor		0.53	W/°C
Single pulse avalanche energy ^(Note 5)	E _{AS}	750	mJ
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 175	°C
Thermal Resistance, Junction-to-Case ^(Note 2)	R _{θJC}	1.88	°C/W

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

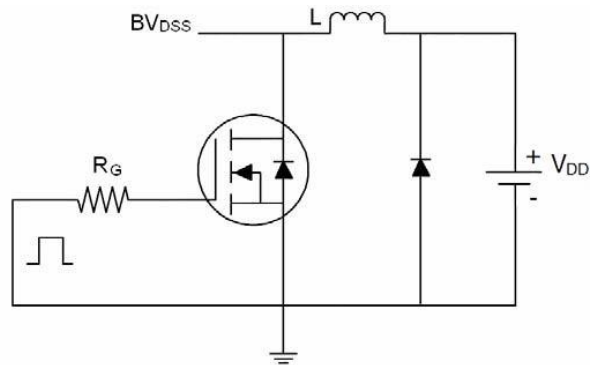
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	40	45	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	-	7	m
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =20A	15	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, F=1.0MHz	-	-	2320	PF
Output Capacitance	C _{oss}		-	-	189	PF
Reverse Transfer Capacitance	C _{rss}		-	-	140	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =20V, R _L =1 V _{GS} =10V, R _G =3	-	12	-	nS
Turn-on Rise Time	t _r		-	11	-	nS
Turn-Off Delay Time	t _{d(off)}		-	39	-	nS
Turn-Off Fall Time	t _f		-	12	-	nS
Total Gate Charge	Q _g	V _{DS} =20V, I _D =20A, V _{GS} =10V	-	61	-	nC
Gate-Source Charge	Q _{gs}		-	15.3	-	nC
Gate-Drain Charge	Q _{gd}		-	14.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =10A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A di/dt = 100A/μs (Note3)	-	-	45	nS
Reverse Recovery Charge	Q _{rr}		-	-	50	nC

Notes:

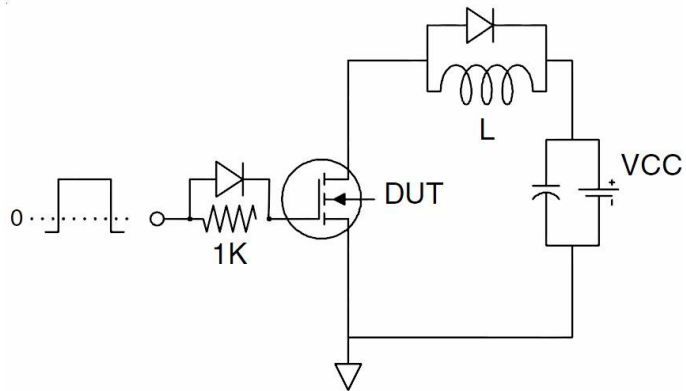
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition : T_J=25°C, V_{DD}=20V, V_G=10V, L=1mH, R_g=25 , I_{AS}=42A

Test circuit

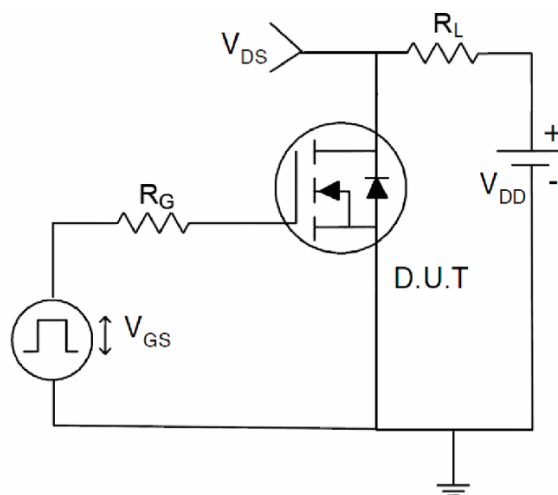
1) EAS Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

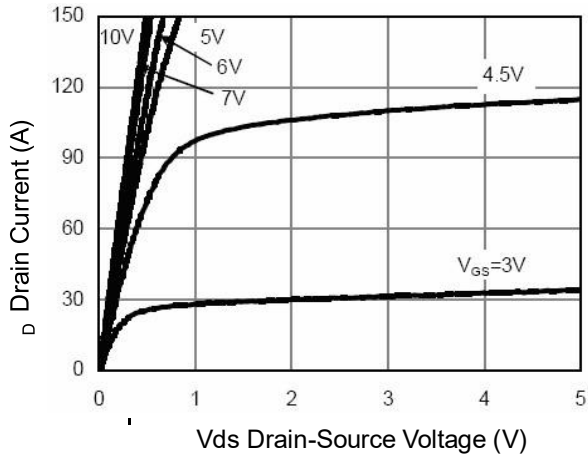


Figure 1 Output Characteristics

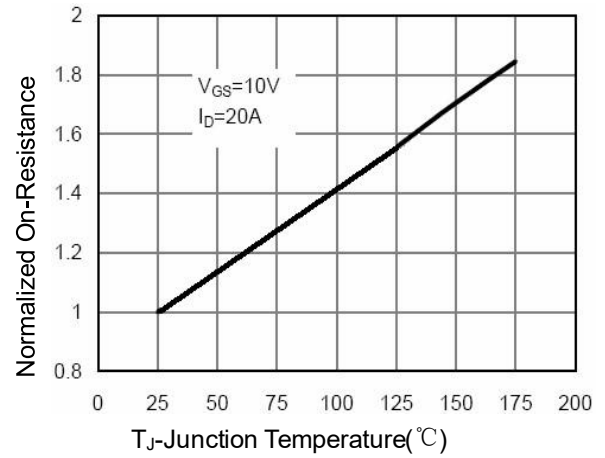


Figure 4 Rdson-Junction Temperature

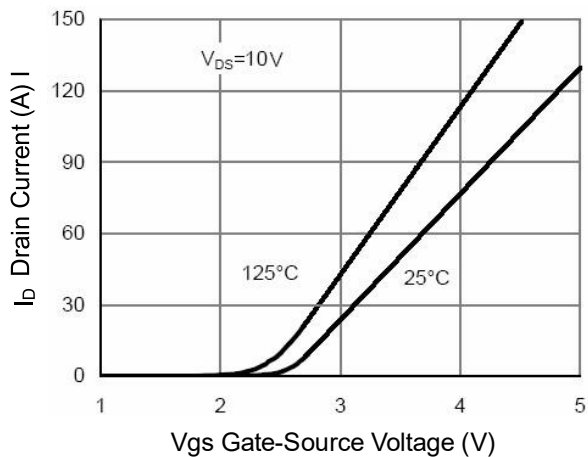


Figure 2 Transfer Characteristics

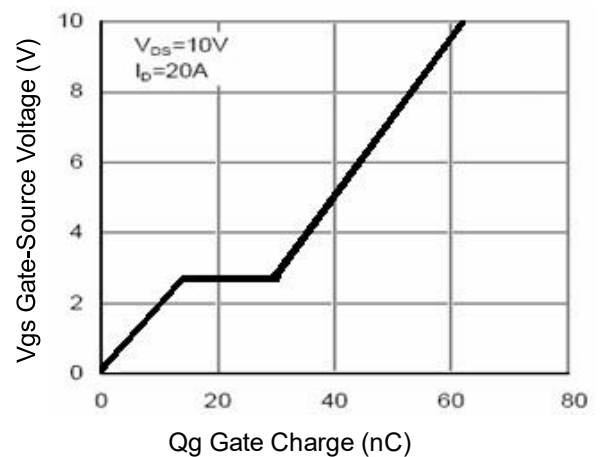


Figure 5 Gate Charge

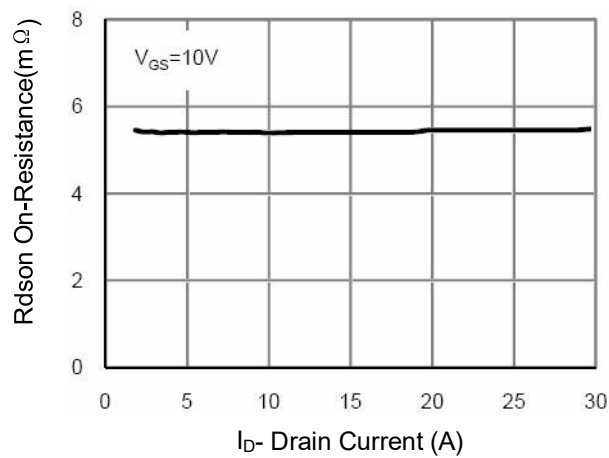


Figure 3 Rdson- Drain Current

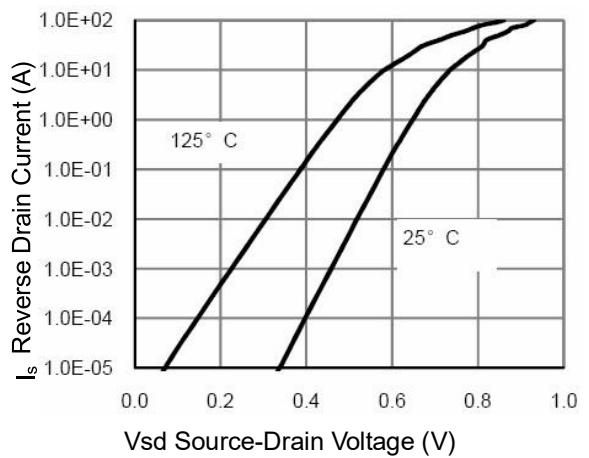


Figure 6 Source- Drain Diode Forward

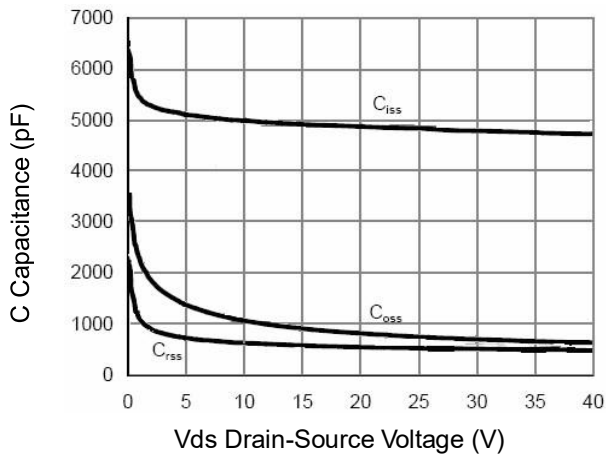


Figure 7 Capacitance vs Vds

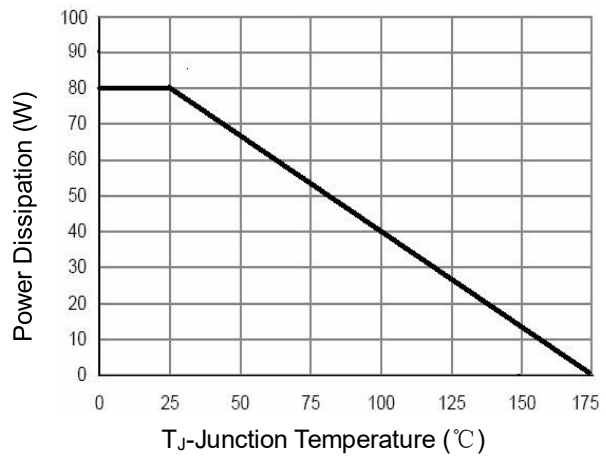


Figure 9 Power De-rating

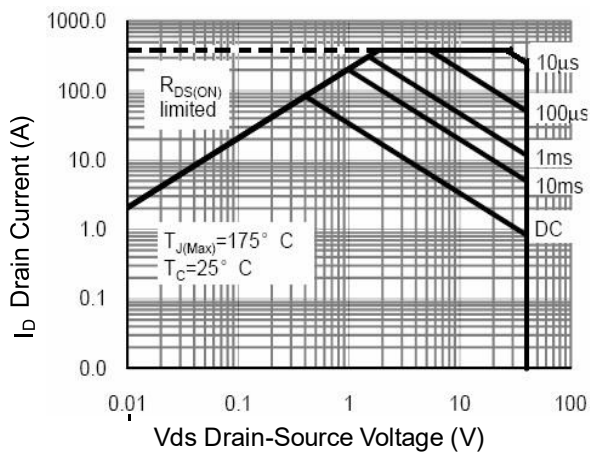


Figure 8 Safe Operation Area

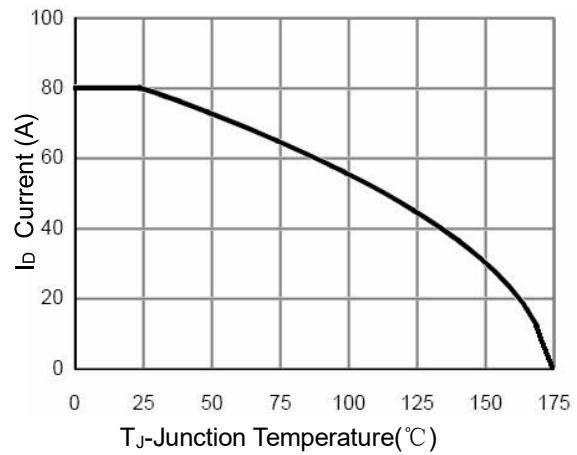
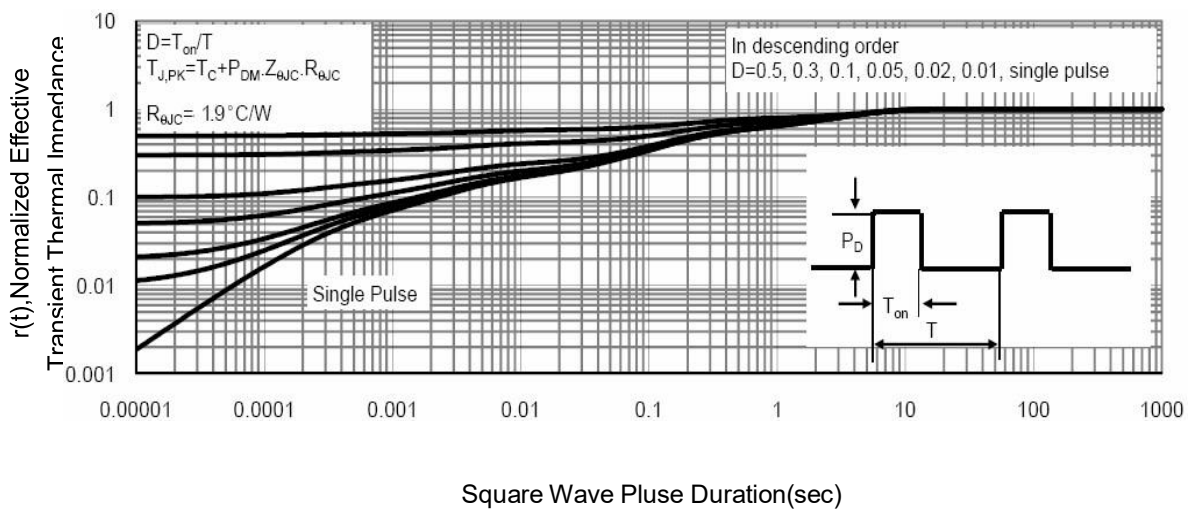


Figure 10 ID Current- Junction Temperature



Square Wave Pulse Duration(sec)

72 3DFNDJH,QIRUP DMRQ

6\ P ERO	' LP HQMRQV ,Q O LQP HMLV		' LP HQMRQV ,Q,QFKHV	
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K				
9	7<3		7<3	