

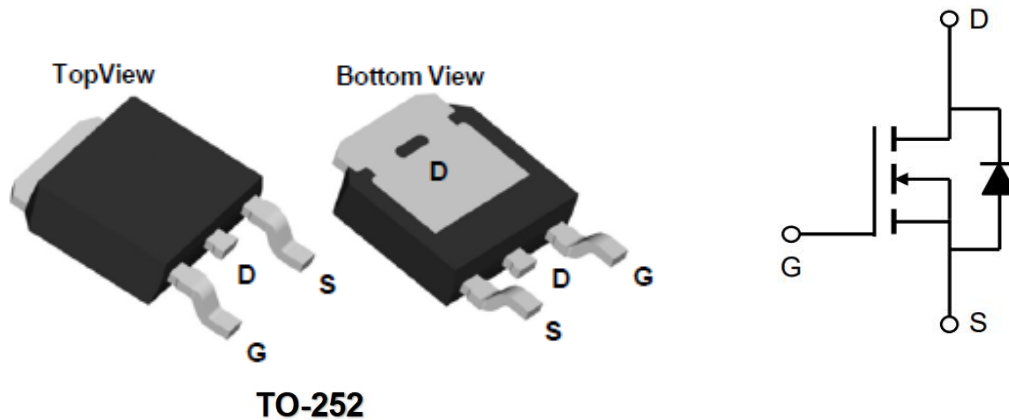
Features

The TW60N02D 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 TW60N02D meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Product Summary

BVDSS	RDSON	ID
20V	4.8mΩ	60A



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	20	V
Gate-Source Voltage	VGS	±20	
Continuous Drain Current, VGS @10V ¹	ID@TC=25°C	60	A
Continuous Drain Current, VGS @10V ¹	ID@TC=100°C	35	
Pulsed Drain Current ①	IDM	240	
Single Pulse Avalanche Energy	EAS	48	mJ
Avalanche Current	I _{AS}	31	A
Power Dissipation ②	PD	38	W
Thermal Resistance Junction-Case	RθJC	4.2	°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	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250μA	0.4	0.7	1.0	V
Gate-Body leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = ±12V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20V, V _{GS} =0V			1	μA
Static Drain-Source On-Resistance	R _{DSON}	V _{GS} = 4.5V, I _D = 25A		4.8	6.5	mΩ
	R _{DSON}	V _{GS} = 2.5V, I _D = 15A		6.8	10	mΩ
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1.0MHz		1832		pF
Output Capacitance	C _{oss}			289		pF
Reverse Transfer Capacitance	C _{rss}			271		pF
Total Gate Charge	Q _g	V _{DS} =10V, I _D =25A, V _{GS} =4.5V		23		nC
Gate Source Charge	Q _{gs}			4.5		nC
Gate Drain Charge	Q _{gd}			7.3		nC
Switching Parameters						
Turn-On DelayTime	t _{d(on)}	V _{DS} =10V, I _D =25A, R _G =3Ω, V _{GS} =4.5V		15		ns
Turn-On Rise Time	t _r			37		ns
Turn-Off DelayTime	t _{d(off)}			52		ns
Turn-Off Fall Time	t _f			21		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain to Source Diode Forward Current		I _s			60	A
Maximum Pulsed Drain to Source Diode Forward Current		I _{SM}			240	A
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =30A, T _J =25°C			1.2	V
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =25A, di/dt =100A/μs		25		ns
Reverse Recovery Charge	Q _{rr}			21		nC

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: Output Characteristics

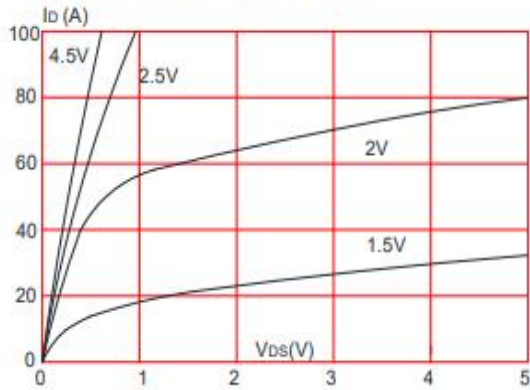


Figure 2: Typical Transfer Characteristics

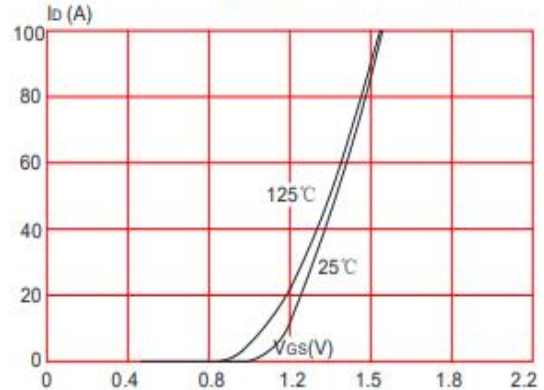


Figure 3: On-resistance vs. Drain Current

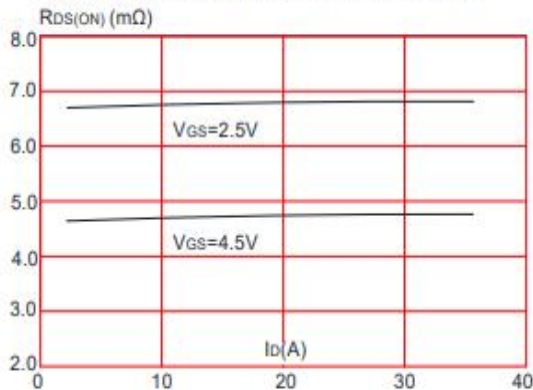


Figure 4: Body Diode Characteristics

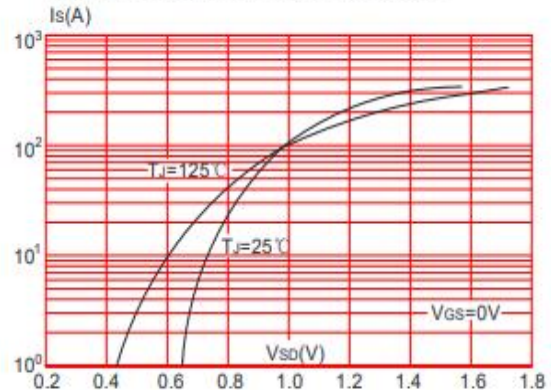


Figure 5: Gate Charge Characteristics

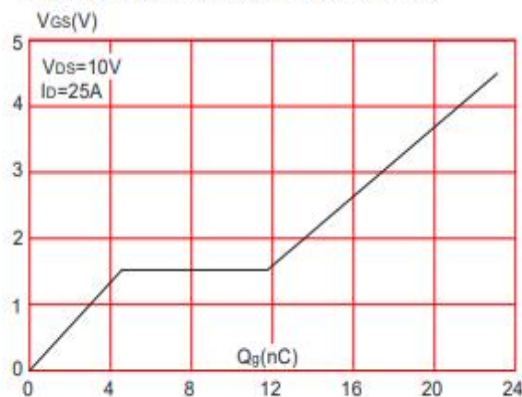
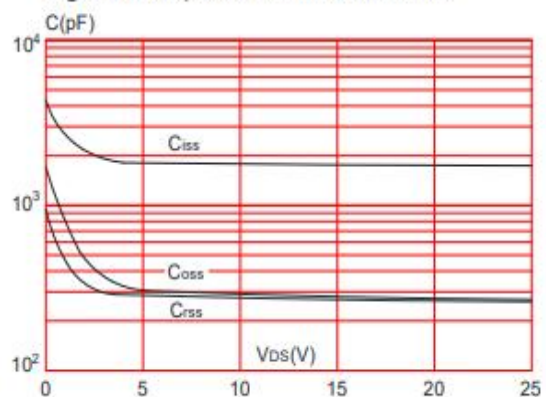


Figure 6: Capacitance Characteristics



Typical Electrical and Thermal Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

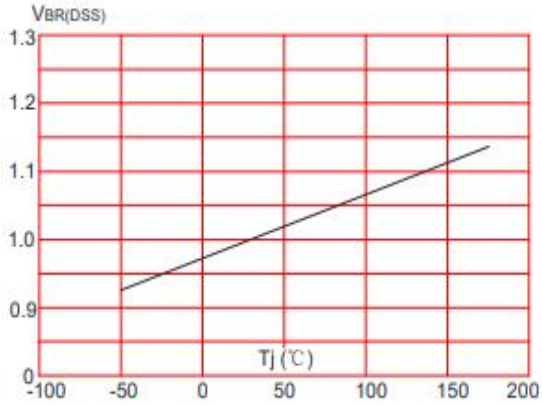


Figure 8: Normalized on Resistance vs. Junction Temperature

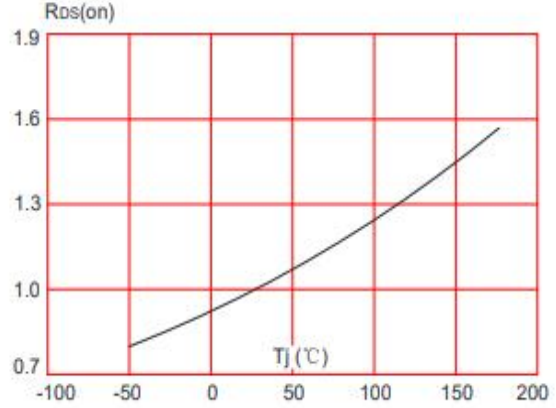


Figure 9: Maximum Safe Operating Area

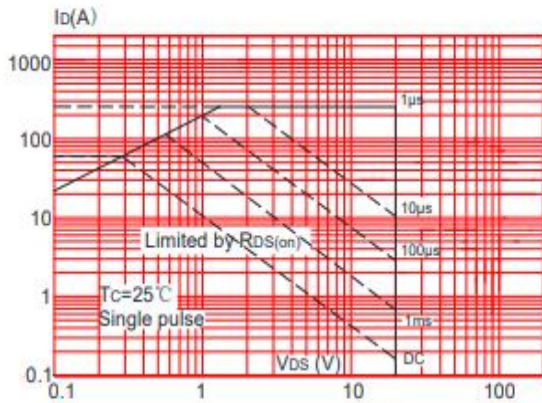


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

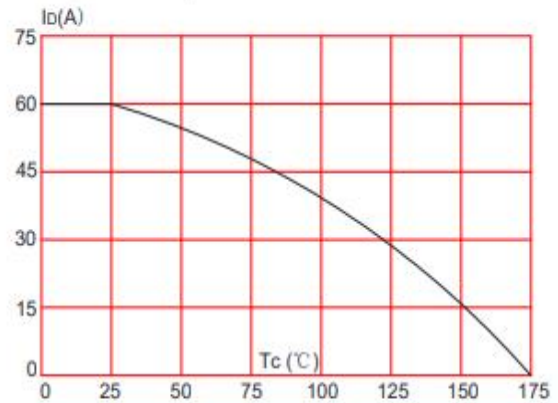
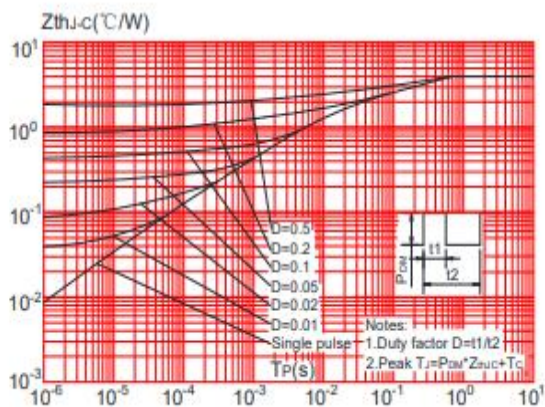


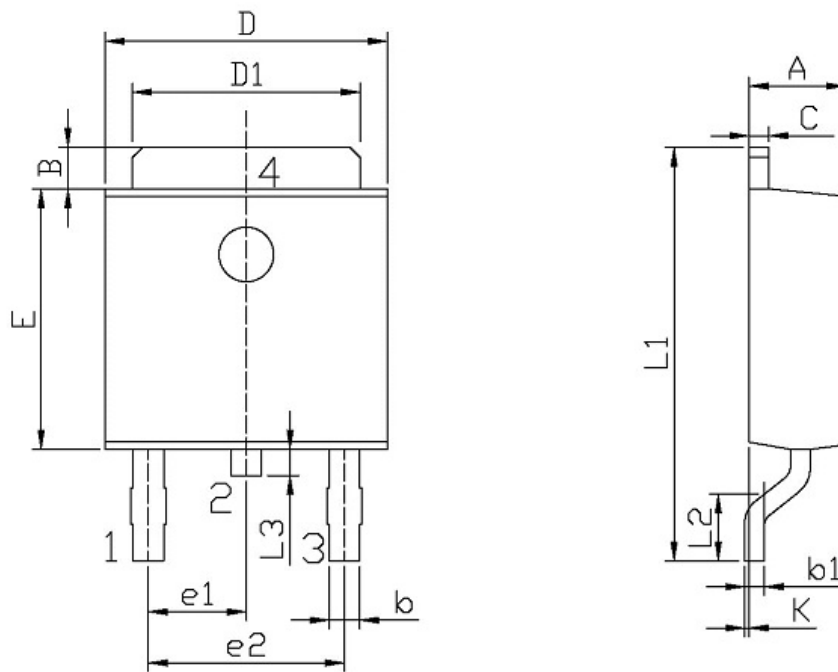
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Package Mechanical Data

Unit : mm

TO-252(DPAK)



单位: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10