

General Description

The WSC60N03 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.

Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

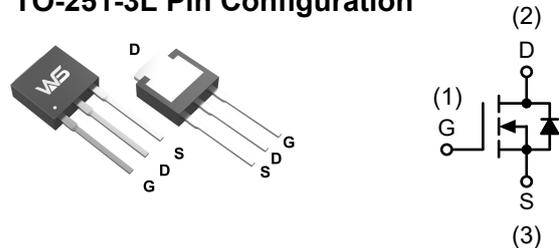
Product Summary

BVDSS	RDSON	ID
30V	4.1mΩ	60A

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

TO-251-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D (T _C =25°C)	Continuous Drain Current, V _{GS} @ 10V	60	A
I _D (T _C =100°C)	Continuous Drain Current, V _{GS} @ 10V	40	A
I _{DM}	Pulsed Drain Current	170	A
EAS	Single pulse avalanche energy ^(Note 5)	306	mJ
P _D (T _C =25°C)	Total Power Dissipation	83	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case ^(Note 2)	---	1.8	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	---	4.1	6.5	mΩ
		V _{GS} =4.5V, I _D =24A	---	6.5	8.0	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =24A	20	---	---	S
Q _g	Total Gate Charge	V _{DS} =10V, I _D =30A, V _{GS} =10V	---	51	---	nC
Q _{gs}	Gate-Source Charge		---	14	---	
Q _{gd}	Gate-Drain Charge		---	11	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V, I _D =30A V _{GS} =10V, R _{GEN} =2.7Ω	---	15	---	ns
T _r	Rise Time		---	20	---	
T _{d(off)}	Turn-Off Delay Time		---	10	---	
T _f	Fall Time		---	60	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	---	2330	---	pF
C _{oss}	Output Capacitance		---	460	---	
C _{rss}	Reverse Transfer Capacitance		---	230	---	

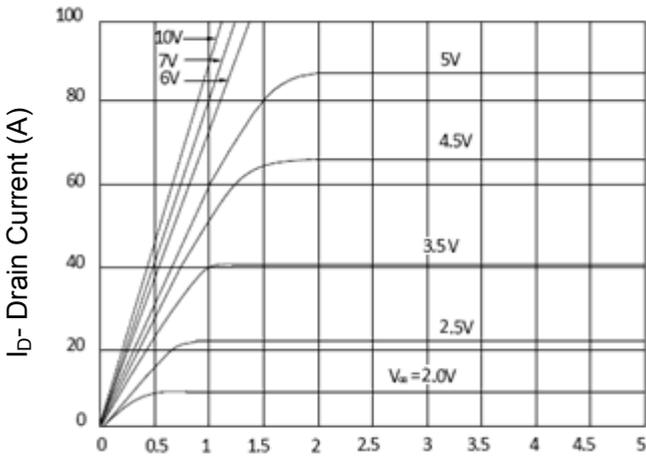
Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	---	60	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =24A	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =30A, di/dt=100A/μs, T _J =25°C	---	32	50	nS
Q _{rr}	Reverse Recovery Charge		---	12	20	nC

Notes:

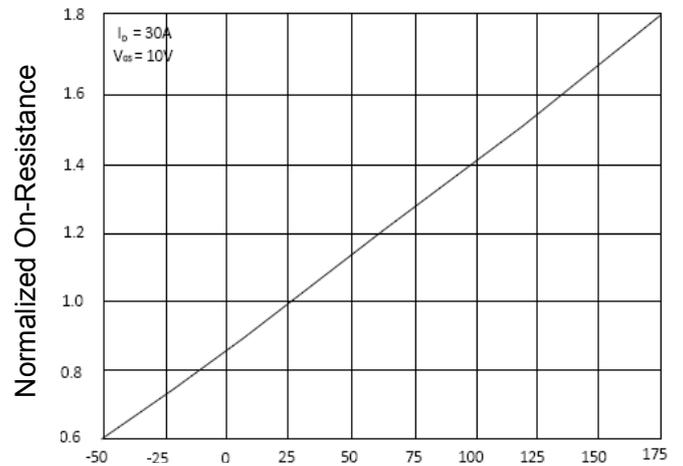
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25Ω, I_{AS}=35A

Typical Electrical and Thermal Characteristics (Curves)



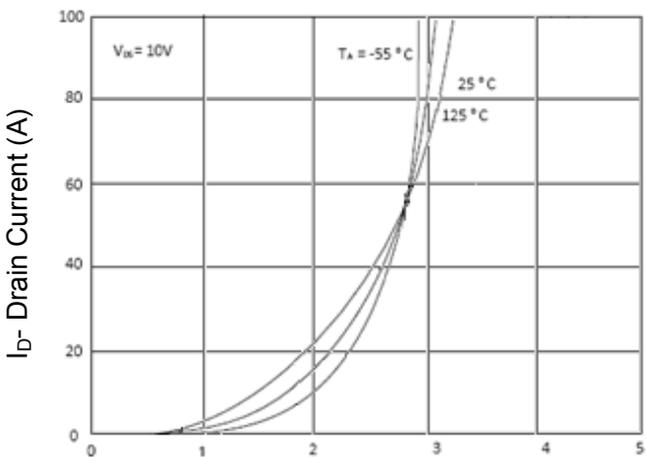
Vds Drain-Source Voltage (V)

Figure 1 Output Characteristics



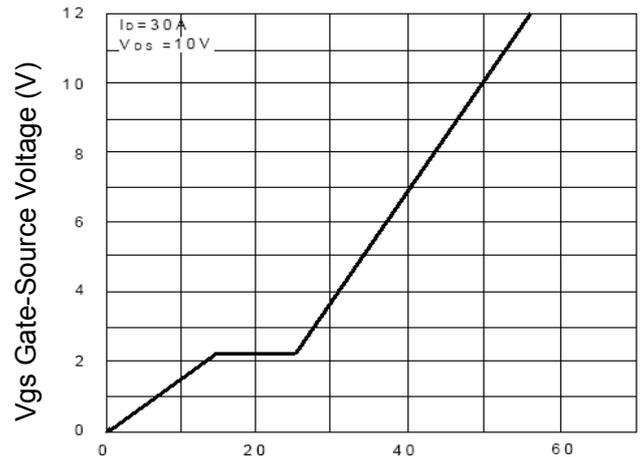
TJ-Junction Temperature(°C)

Figure 4 Rdson-Junction Temperature



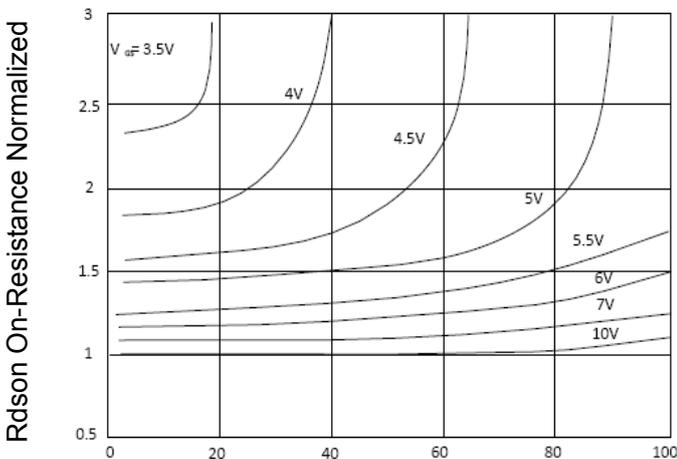
Vgs Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



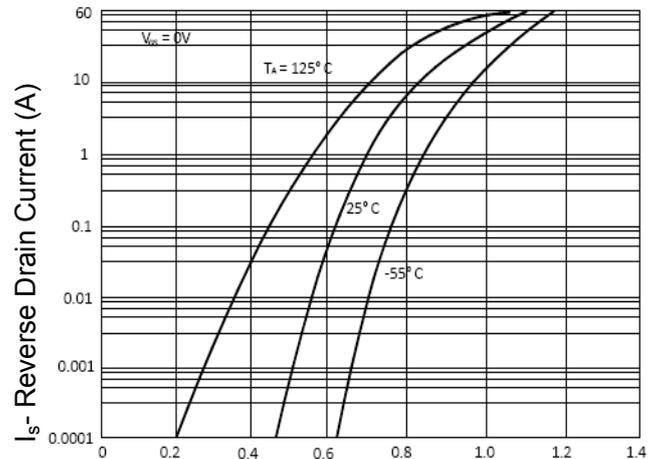
Qg Gate Charge (nC)

Figure 5 Gate Charge



ID- Drain Current (A)

Figure 3 Rdson- Drain Current



Vsd Source-Drain Voltage (V)

Figure 6 Source- Drain Diode Forward

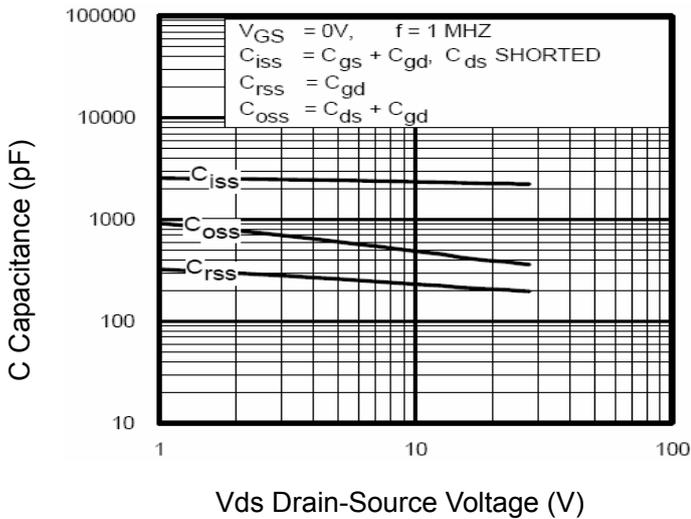


Figure 7 Capacitance vs Vds

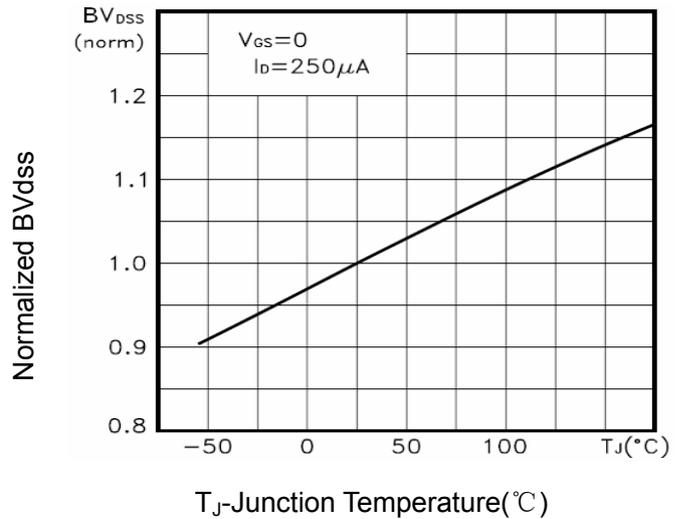


Figure 9 BV_{DSS} vs Junction Temperature

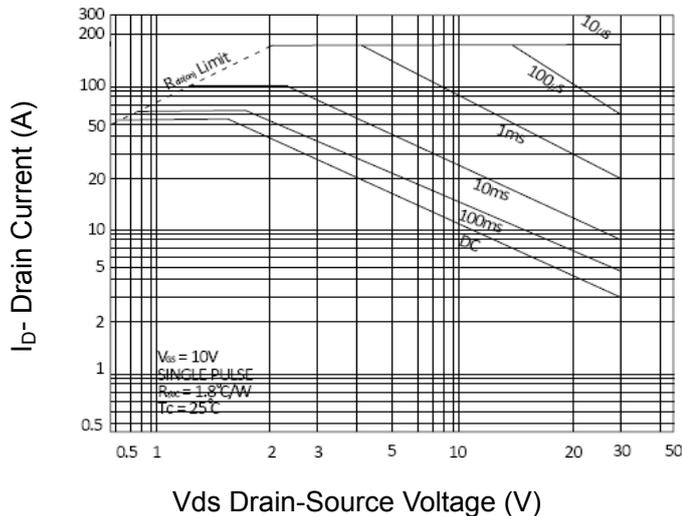


Figure 8 Safe Operation Area

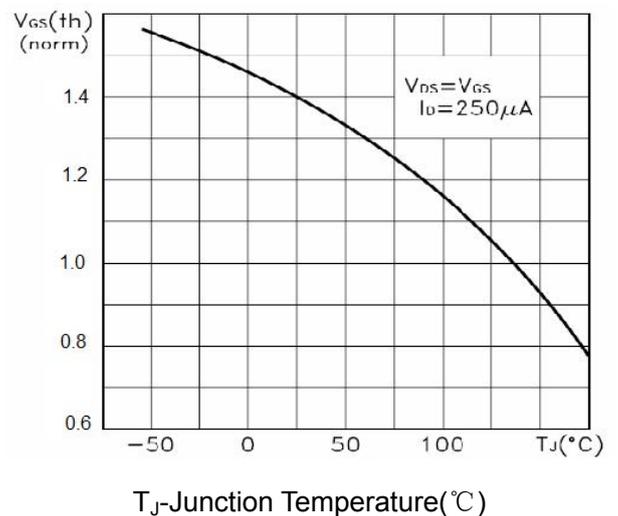


Figure 10 $V_{GS(th)}$ vs Junction Temperature

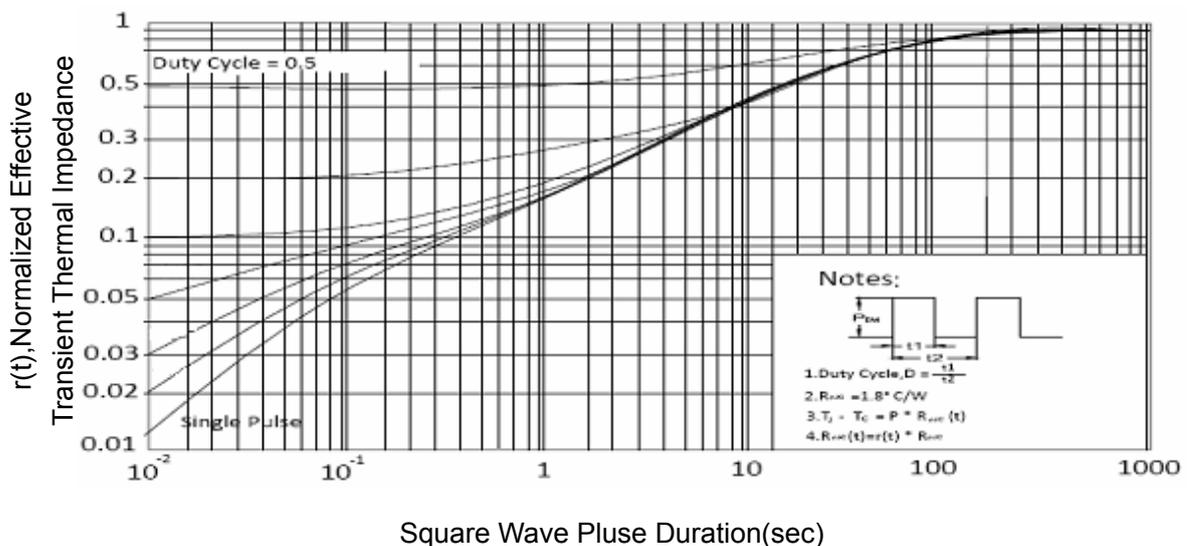
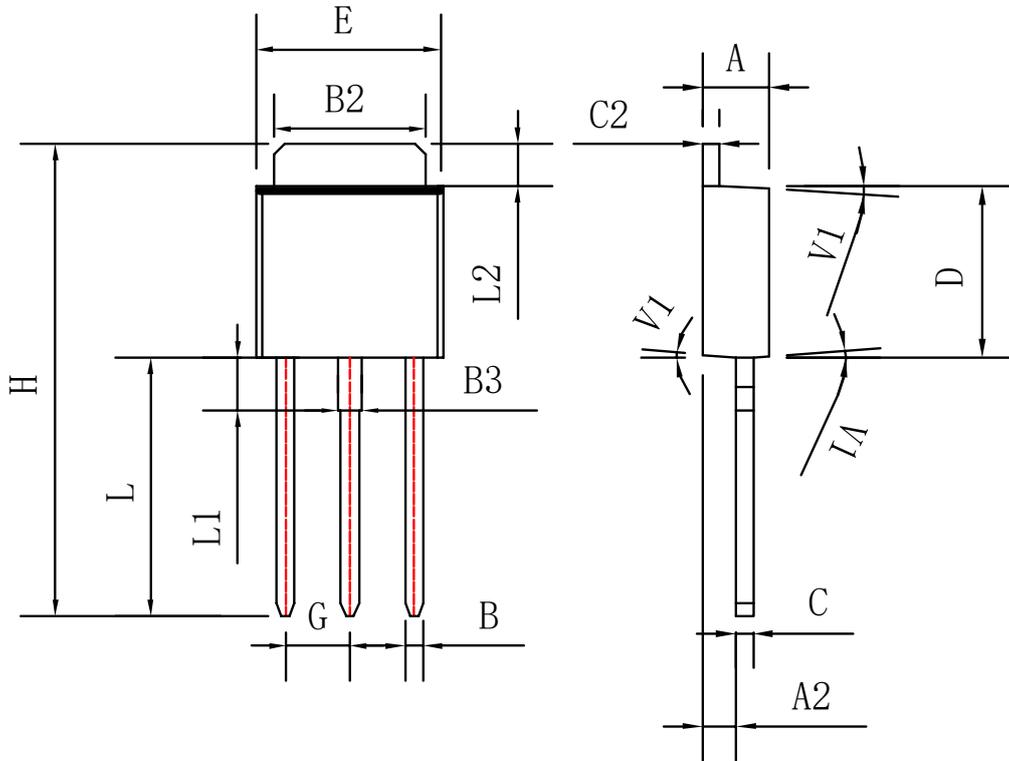


Figure 11 Normalized Maximum Transient Thermal Impedance

Packaging information


SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.20	2.40	0.086	0.095
A2	0.90	1.20	0.035	0.047
B	0.55	0.65	0.022	0.026
B2	5.10	5.40	0.200	0.213
B3	0.76	0.85	0.030	0.033
C	0.45	0.62	0.018	0.024
C2	0.48	0.62	0.019	0.024
D	6.00	6.20	0.236	0.244
E	6.40	6.70	0.252	0.264
G	2.30 TYP		0.091 TYP	
H	16.0	17.0	0.630	0.669
L	8.90	9.40	0.350	0.370
L1	1.80	1.90	0.071	0.075
L2	1.37	1.50	0.054	0.059
V1	4°		4°	



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