

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

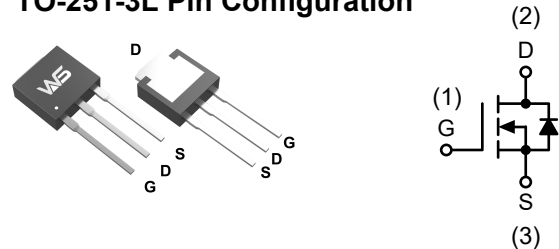
Product Summary

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
E _{AS}	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 ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=30A$	---	4.1	6.5	m Ω
		$V_{GS}=4.5V, I_D=24A$	---	6.5	8.0	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 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	$V_{DD}=10V, I_D=30A$ $V_{GS}=10V, R_{GEN}=2.7\Omega$	---	15	---	ns
T_r	Rise Time		---	20	---	
$T_{d(off)}$	Turn-Off Delay Time		---	10	---	
T_f	Fall Time		---	60	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	---	2330	---	pF
C_{oss}	Output Capacitance		---	460	---	
C_{rss}	Reverse Transfer Capacitance		---	230	---	

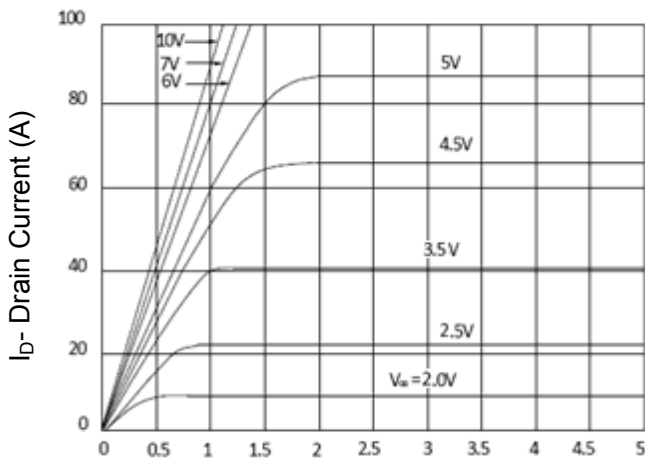
Drain-Source Diode Characteristics

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	$I_F=30A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	32	50	nS
Q_{rr}	Reverse Recovery Charge		---	12	20	nC

Notes:

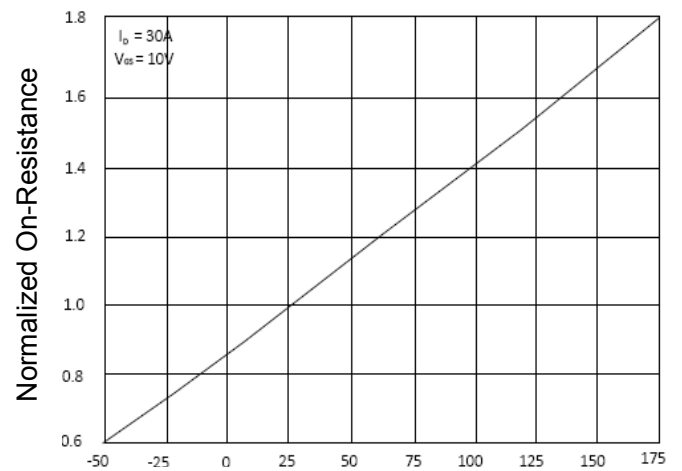
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V,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

Typical Electrical and Thermal Characteristics (Curves)



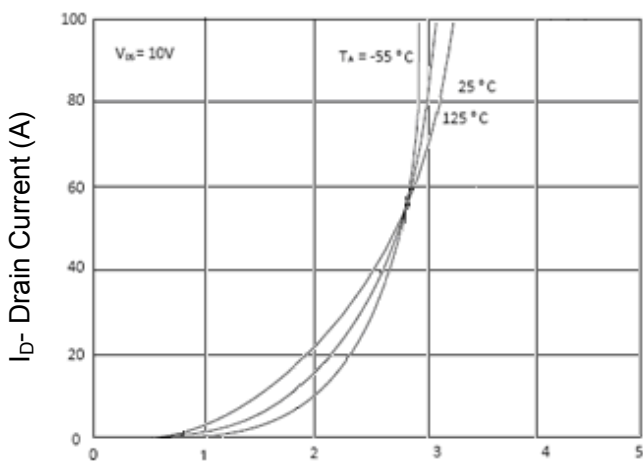
V_{DS} Drain-Source Voltage (V)

Figure 1 Output Characteristics



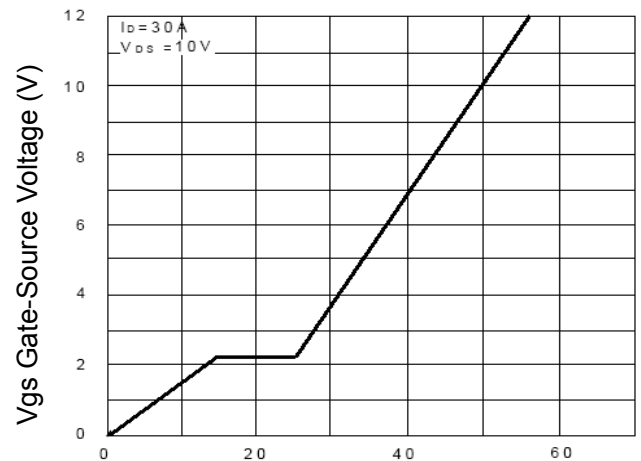
T_J-Junction Temperature(°C)

Figure 4 Rdson-Junction Temperature



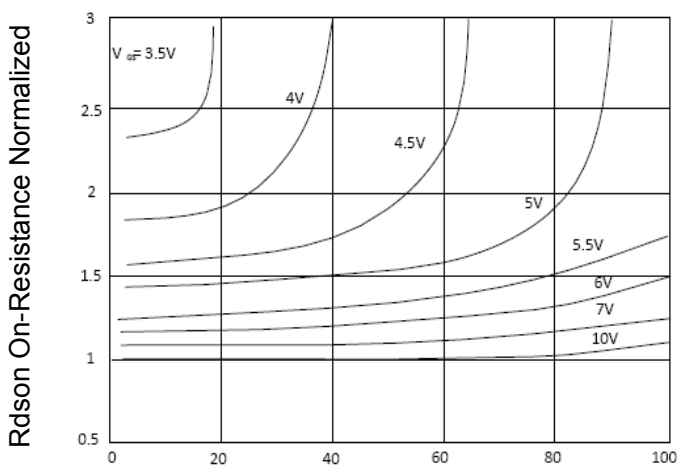
V_{GS} Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



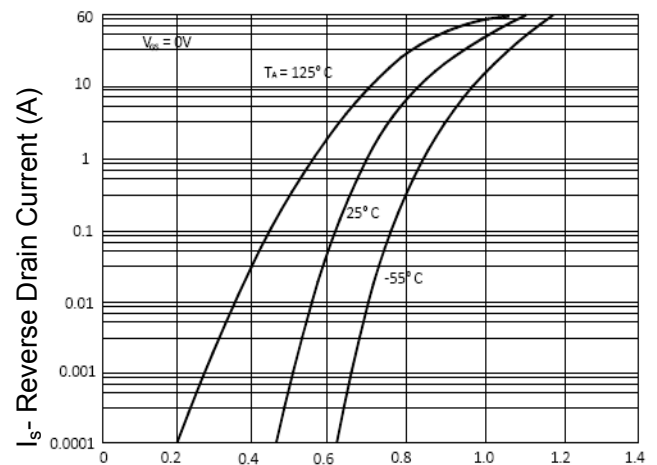
Q_g Gate Charge (nC)

Figure 5 Gate Charge



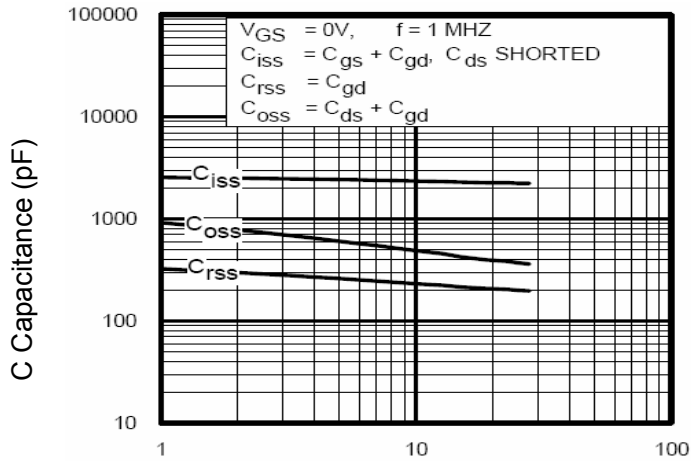
I_D- Drain Current (A)

Figure 3 Rdson- Drain Current

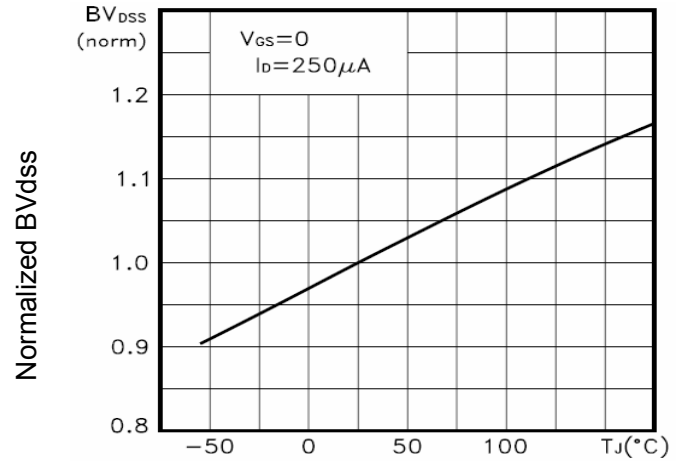


V_{SD} Source-Drain Voltage (V)

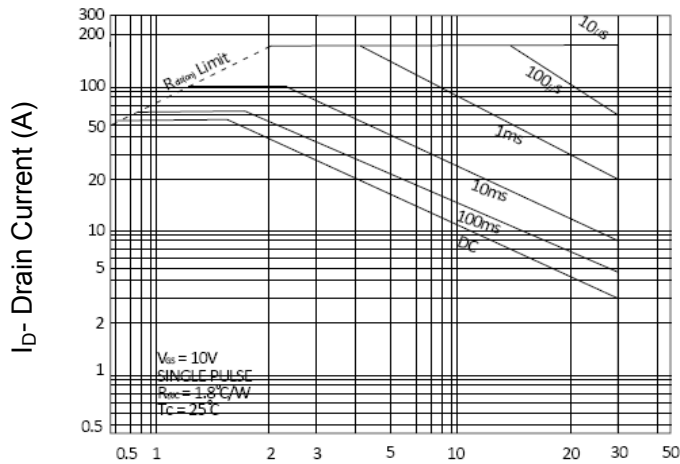
Figure 6 Source- Drain Diode Forward



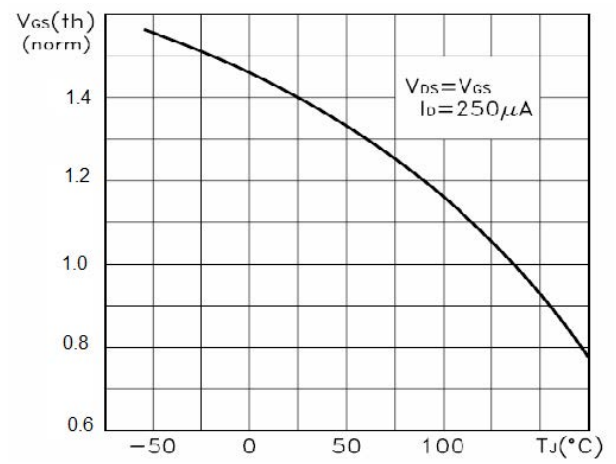
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



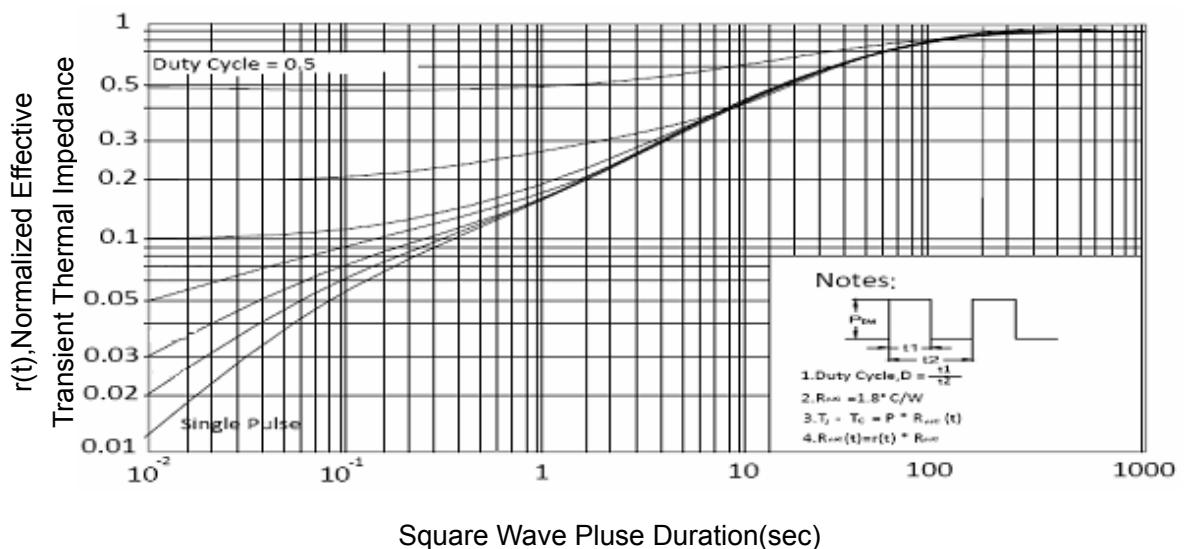
T_J -Junction Temperature($^{\circ}C$)
Figure 9 BV_{DSS} vs Junction Temperature



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area

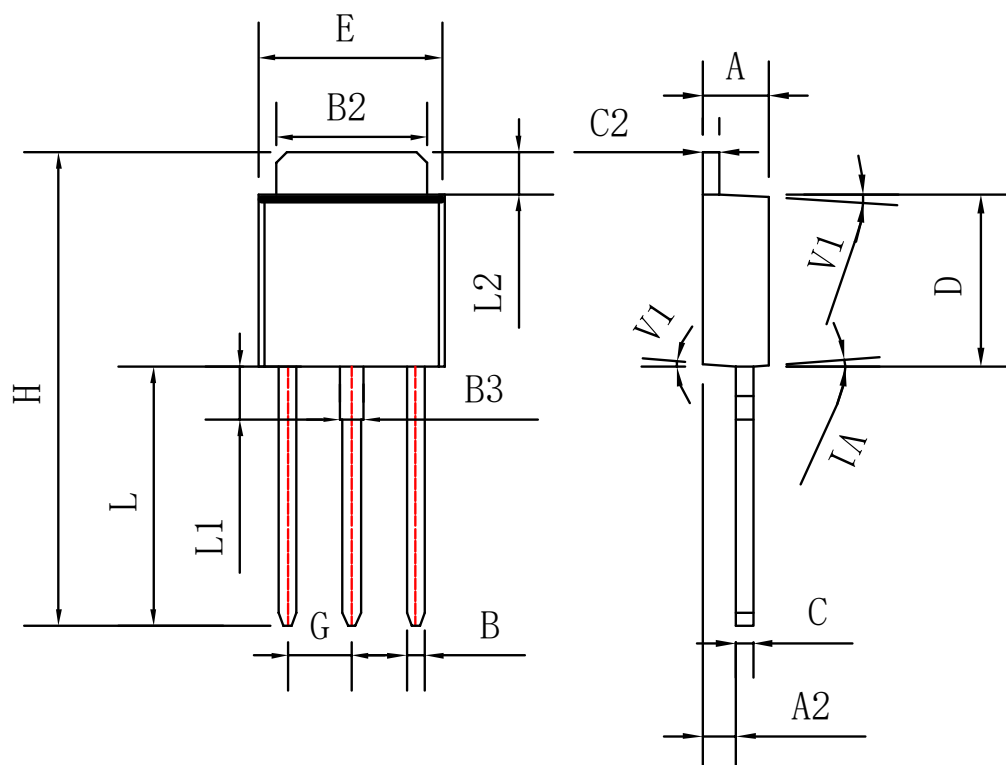


T_J -Junction Temperature($^{\circ}C$)
Figure 10 $V_{GS(th)}$ vs Junction Temperature



Square Wave Pulse Duration(sec)
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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