

General Description

The WSL65R028F is the highest performance Trench N-Channel MOSFET with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The WSL160N20 meet the RoHS and Green Product requirement, 100% E_{AS} guaranteed with full function reliability approved.

Features

- 100% UIS + R_g Tested.
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

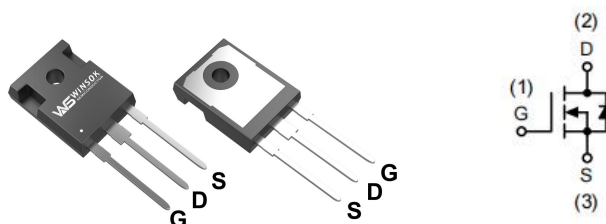
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
200V	9.5m Ω	160A

Applications

- Power Management for Industrial DC/DC Converters
- Uninterruptible Power Supply

TO-247-3L Pin Configuration



Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	
I_D ⁷	Continuous Drain Current	$T_C=25^{\circ}\text{C}$	A
		$T_C=100^{\circ}\text{C}$	
I_{DM} ³	Pulse Drain Current	531	
P_D ²	Power Dissipation	$T_C=25^{\circ}\text{C}$	W
		$T_C=100^{\circ}\text{C}$	
I_{AS} ³	Single pulse Avalanche Current	200	A
E_{AS} ³	Single pulse Avalanche Energy	L=10mH	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	
$R_{\theta JA}$ ^{1,4}	Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$	$^{\circ}\text{C/W}$
		Steady State	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.24	

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=30A$	---	9.5	11.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	3.5	4.5	5.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=200V$, $V_{GS}=0V$	---	---	1.0	μA
		$T_J=55^{\circ}\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{DS}=0V$, $V_{GS}=\pm 20V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=25V$, $I_D=40A$	---	70	---	S
R_G	Gate Resistance	$f=1.0\text{MHz}$	---	1.3	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=100V$, $V_{GS}=10V$, $I_D=80A$	---	85	---	nC
Q_g	Total Gate Charge (4.5V)		---	66	---	
Q_{gs}	Gate-Source Charge		---	15	---	
Q_{gd}	Gate-Drain Charge		---	25	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=100V$, $V_{GS}=10V$, $I_D=80A$ $R_L=1\Omega$, $R_{GEN}=6\Omega$	---	45	---	ns
T_r	Rise Time		---	70	---	
$T_{d(off)}$	Turn-Off Delay Time		---	110	---	
T_f	Fall Time		---	90	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1.0\text{MHz}$	---	12000	---	pF
C_{oss}	Output Capacitance		---	550	---	
C_{rss}	Reverse Transfer Capacitance		---	300	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S ⁷	Continuous Source Current		---	---	160	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=80A$	---	0.9	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=30A$, $di/dt=100A/\mu s$	---	110	---	ns
Q_{rr}	Reverse Recovery Charge		---	698	---	nC

Note:

- The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA} \leq 10s$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.
- The power dissipation P_D is based on $T_{J(MAX)}=150^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- Single pulse width limited by junction temperature $T_{J(MAX)}=150^{\circ}\text{C}$.
- The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
- The static characteristics in Figures 1 to 6 are obtained using $<300\mu s$ pulses, duty cycle 0.5% max.
- These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.
- The maximum current rating is package limited.
- These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.
- The maximum current rating is silicon limited

Typical Characteristics

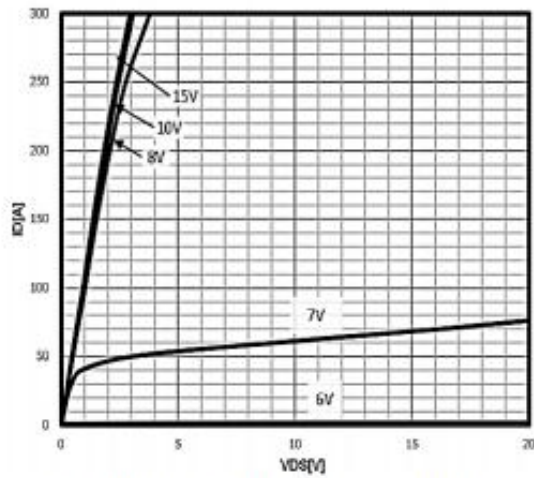


Figure1:Typ output characteristics

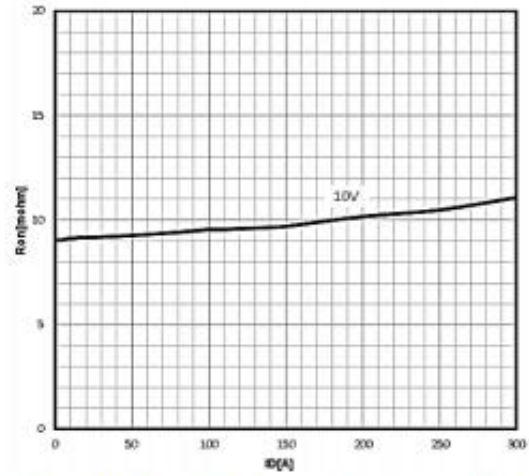


Figure2:Typ drain-source on resistance

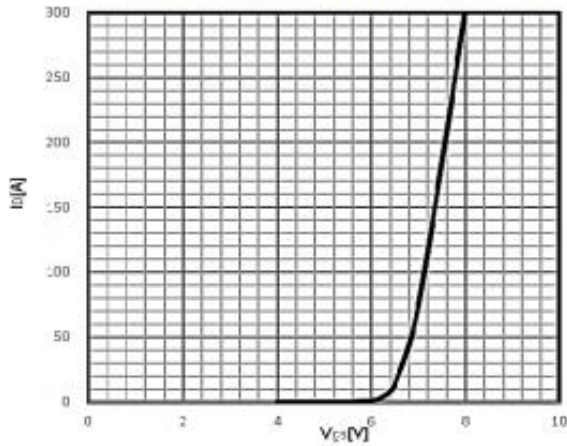


Figure3:Typ. transfer characteristics

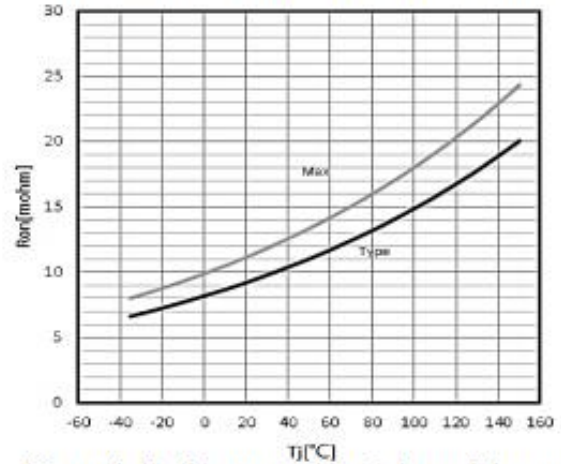


Figure4: Drain-source on-state resistance

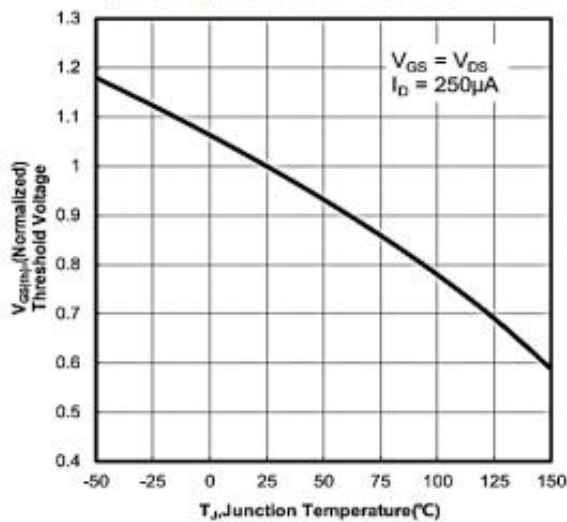


Figure5: Gate Threshold Voltage

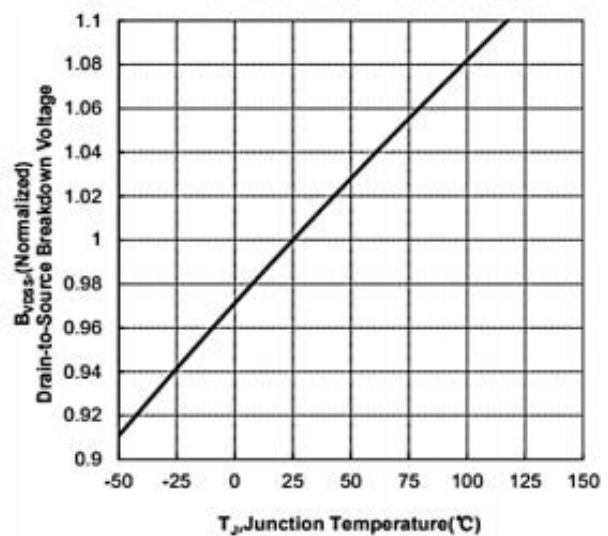


Figure6: Drain-source breakdown voltage

Typical Characteristics (Cont.)

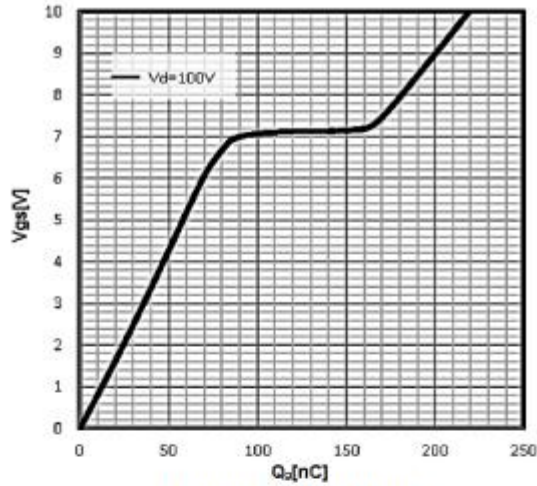


Figure7:gate charge

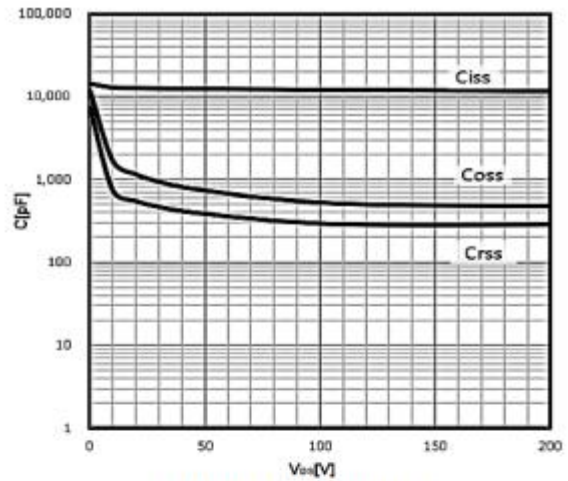


Figure8:capacitances

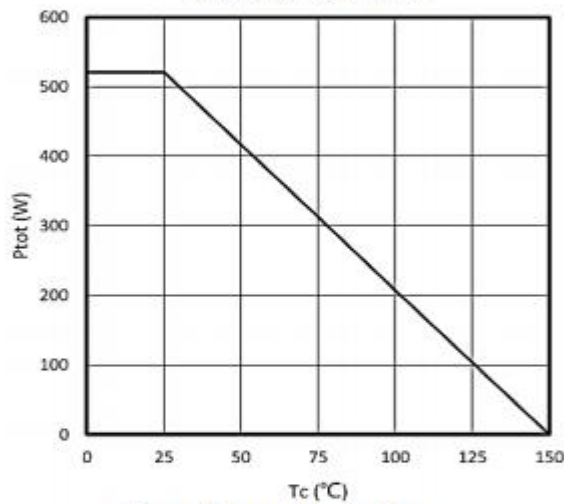


Figure9:Power Dissipation

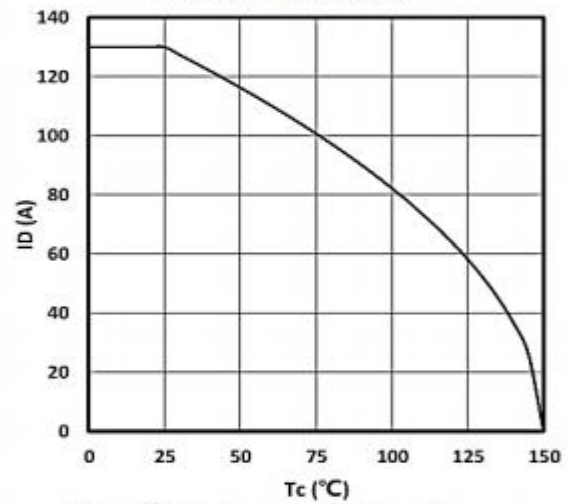


Figure10: Maximum Drain Current

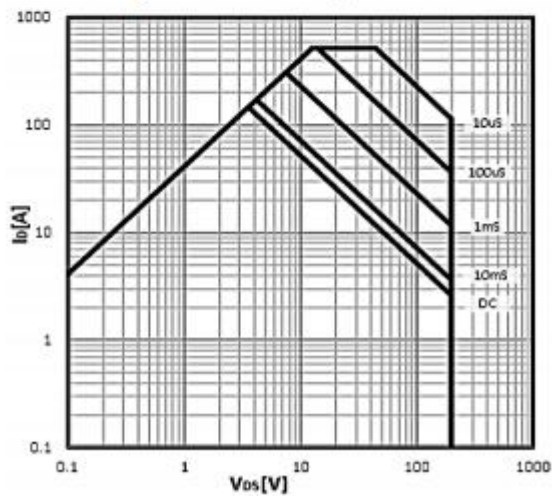


Figure11:Safe operating area

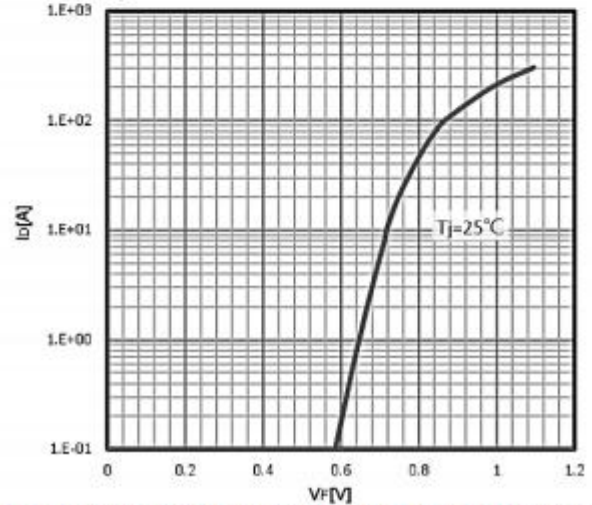


Figure12:Body Diode Forward Voltage Variation

Typical Characteristics (Cont.)

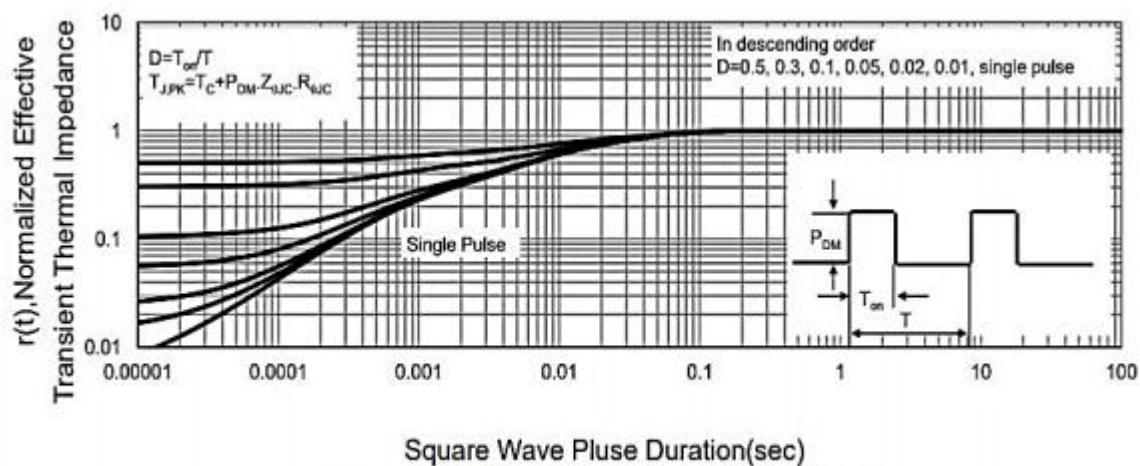
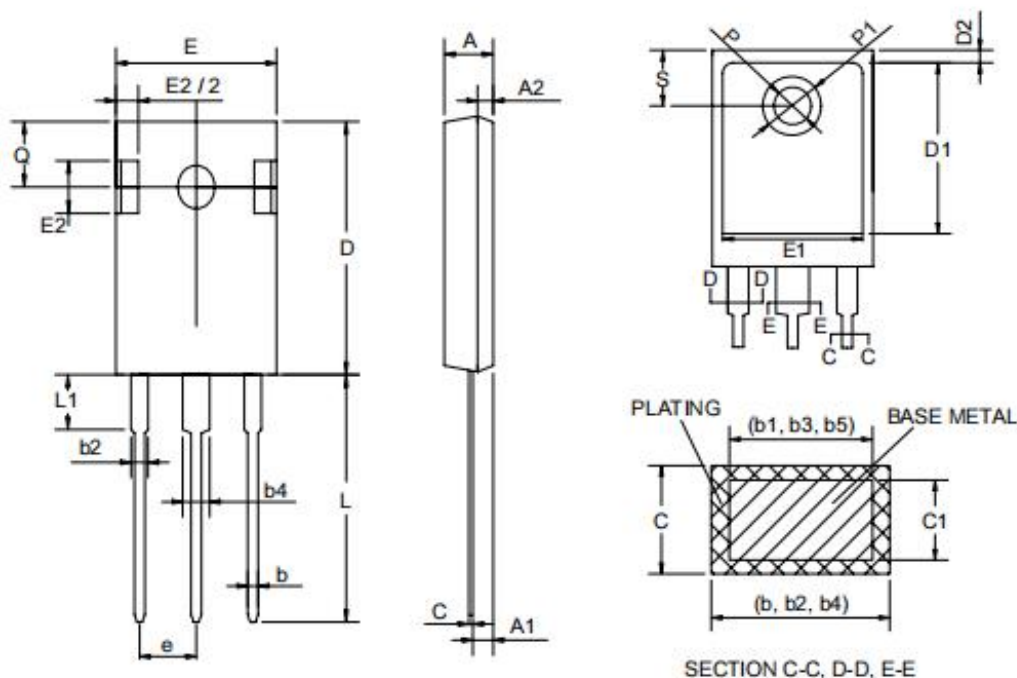


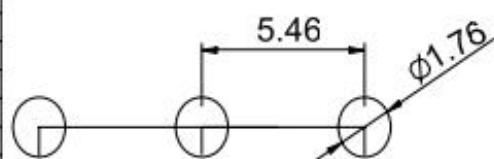
Figure13:Max. transient thermal impedance

Packaging information



SYMBOL	TO-247			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.7	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.5	2.49	0.059	0.098
D	20.8	21.46	0.819	0.845
E	15.49	16.26	0.610	0.640
E2	4.32	5.49	0.170	0.216
e	5.46 BSC		0.215 BSC	
L	19.81	20.32	0.780	0.800
L1	-	4.5	-	0.177
P	3.56	3.66	0.140	0.144
Q	5.38	6.2	0.212	0.244
S	6.15 BSC		0.242 BSC	
b	0.99	1.4	0.039	0.055
b1	0.99	1.35	0.039	0.053
b2	1.65	2.39	0.065	0.094
b3	1.65	2.34	0.065	0.092
b4	2.59	3.43	0.102	0.135
b5	2.59	3.38	0.102	0.133
c	0.38	0.89	0.015	0.035
c1	0.38	0.84	0.015	0.033
D1	13.08	-	0.515	-
D2	0.51	1.35	0.020	0.053
E1	13.46	-	0.530	-
P1	-	7.4	-	0.291

RECOMMENDED LAND PATTERN



UNIT: mm

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