

General Description

The WSF15N10D 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 WSF15N10D 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)

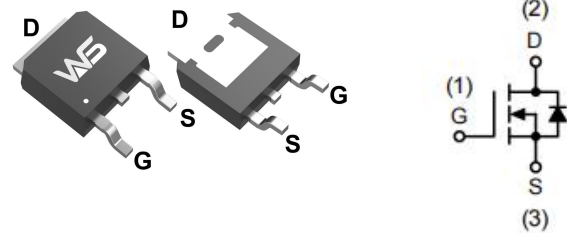
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	65m Ω	20A

Applications

- Load Switch
- PWM Application

TO-252-2L Pin Configuration



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

Symbol	Parameter	Rating	Units	
V_{DS}	Drain-Source Voltage	150	V	
V_{GS}	Gate-Source Voltage	± 20		
I_D^7	Continuous Drain Current	$T_C=25^\circ\text{C}$	20	A
		$T_C=100^\circ\text{C}$	15	
I_{DM}^3	Pulse Drain Current	60		
P_D^2	Power Dissipation	$T_C=25^\circ\text{C}$	23	W
		$T_C=100^\circ\text{C}$	2.5	
I_{AS}^3	Single pulse Avalanche Current	30	A	
E_{AS}^3	Single pulse Avalanche Energy	L=0.5mH	1.3	mJ
T_{STG}	Storage Temperature Range	-55 to 150	°C	
T_J	Operating Junction Temperature Range	-55 to 150		
$R_{\theta JA}^{1,4}$	Thermal Resistance-Junction to Ambient	t \leq 10s	31	°C/W
		Steady State	62.5	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	5.1		

Electrical Characteristics (T_J=25°C, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =10A	---	65	85	mΩ
		V _{GS} =4.5V, I _D =10A	---	75	100	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1.2	1.8	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =100V, V _{GS} =0V T _J =55°C	---	---	1.0	μA
			---	---	5.0	
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0V, V _{GS} =±20V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	---	10	---	S
R _G	Gate Resistance	f=1.0MHz	1.0	2.0	3.1	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =50V, V _{GS} =10V, I _D =15A	---	12	---	nC
Q _{gs}	Gate-Source Charge		---	2	---	
Q _{gd}	Gate-Drain Charge		---	2	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =50V, V _{GS} =10V, R _L =1Ω, R _{GEN} =3Ω	---	4.5	---	ns
T _r	Rise Time		---	26	---	
T _{d(off)}	Turn-Off Delay Time		---	16	---	
T _f	Fall Time		---	8	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1.0MHz	---	1200	---	pF
C _{oss}	Output Capacitance		---	50	---	
C _{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I _S ⁷	Continuous Source Current		---	---	20	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A	---	---	1.4	V
t _{rr}	Reverse Recovery Time	I _F =20A, di/dt=500A/μs	---	75	---	ns
Q _{rr}	Reverse Recovery Charge		---	85	---	nC

Note:

- The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The Power dissipation P_{DSM} is based on R_{θJA} ≤ 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°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°C.
- The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.
- The static characteristics in Figures 1 to 6 are obtained using <300μs 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°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°C.
- The maximum current rating is silicon limited

Typical Characteristics

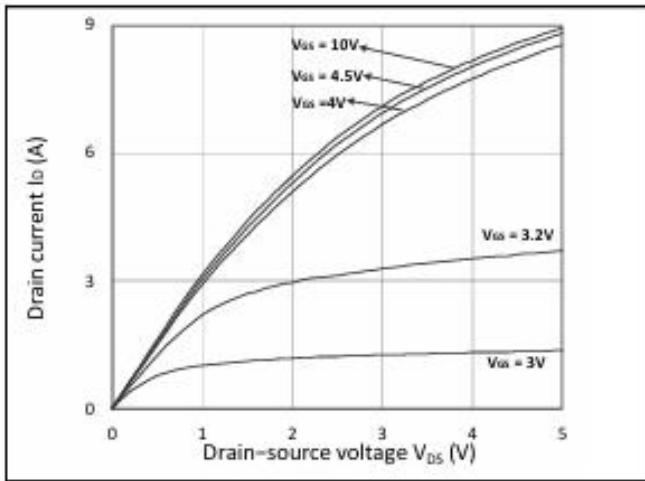


Figure 1. Output Characteristics

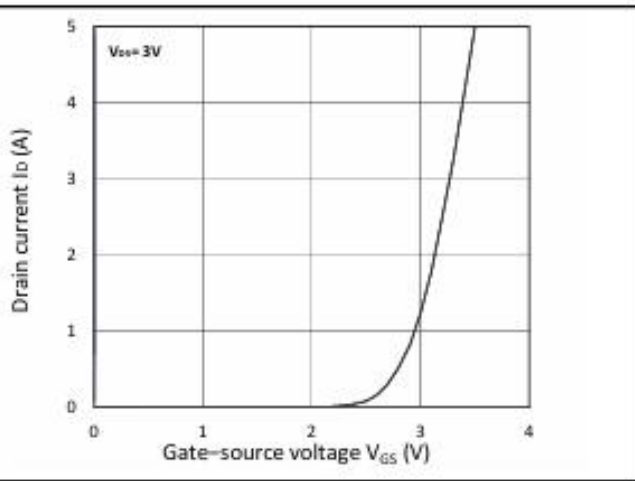


Figure 2. Transfer Characteristics

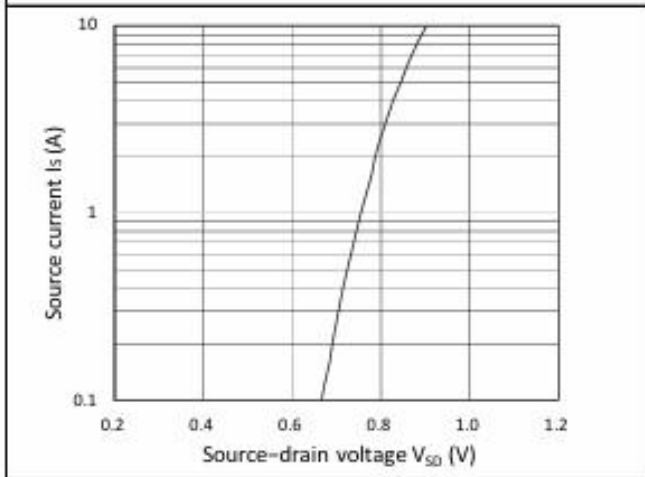


Figure 3. Forward Characteristics of Reverse

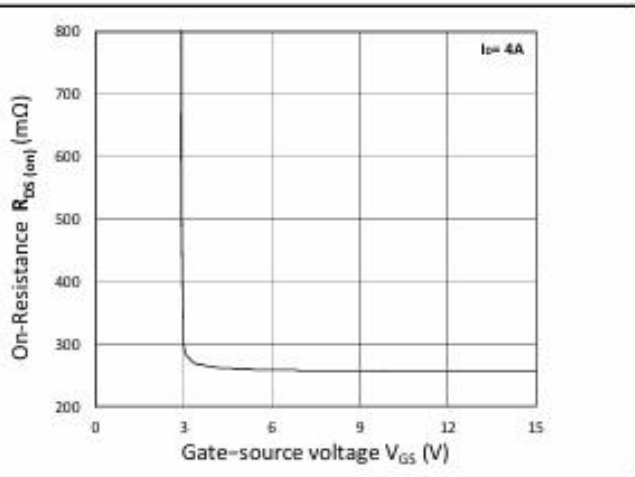


Figure 4. $R_{DS(on)}$ vs. V_{GS}

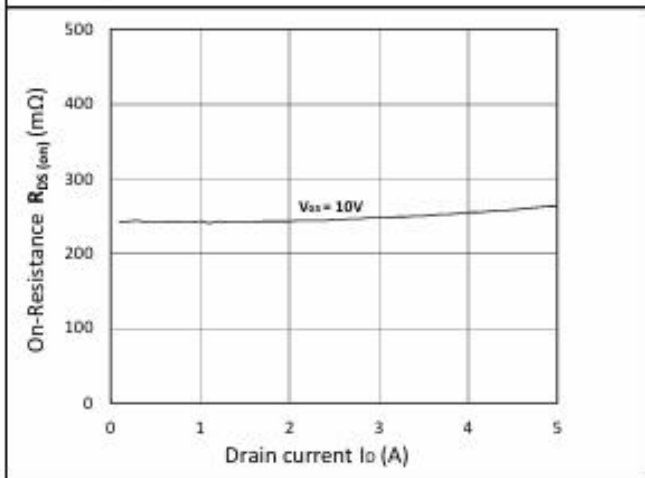


Figure 5. $R_{DS(on)}$ vs. I_D

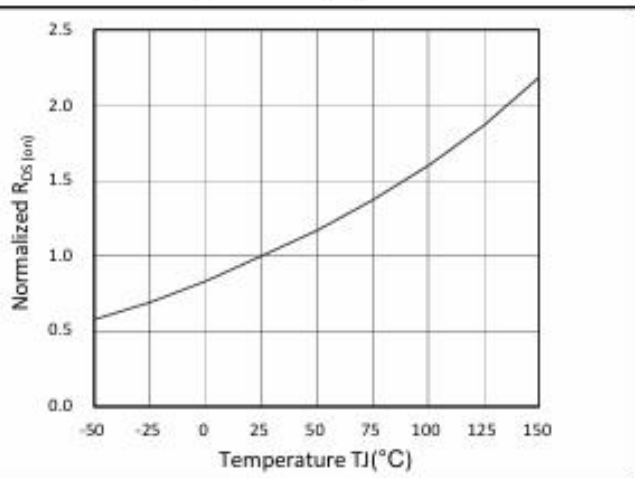


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

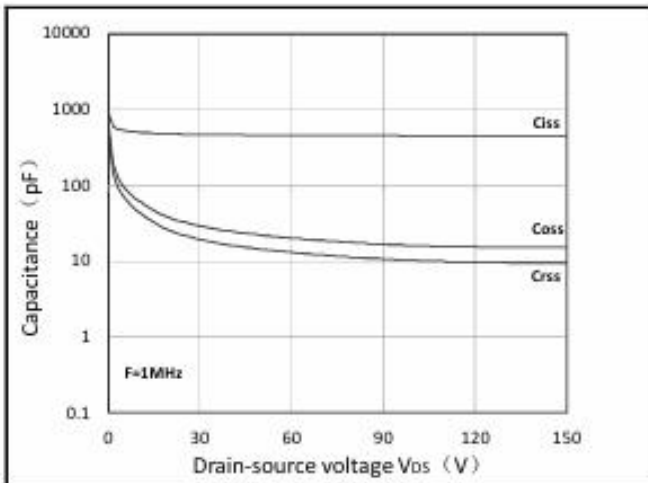


Figure 7. Capacitance Characteristics

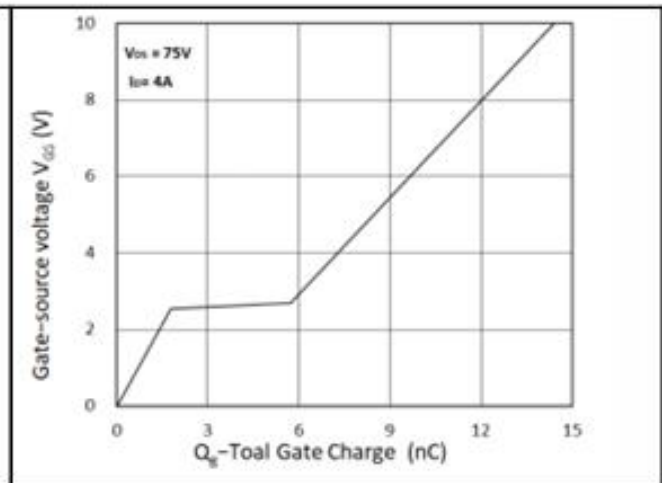


Figure 8. Gate Charge Characteristics

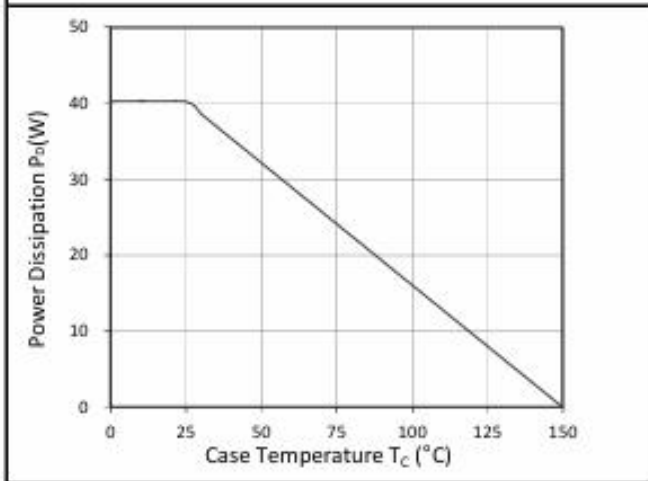


Figure 9. Power Dissipation

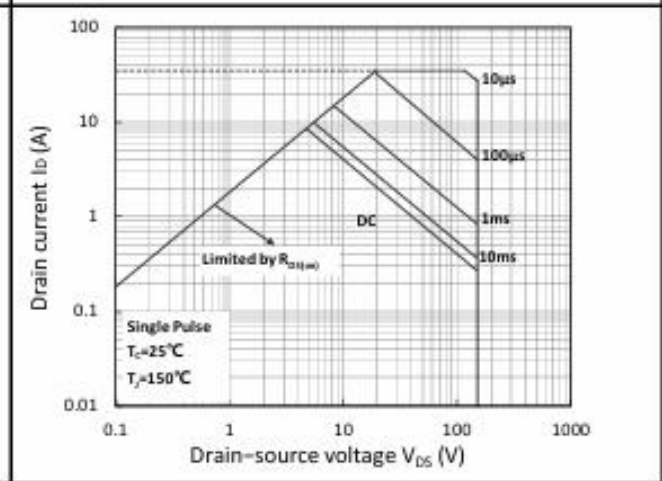


Figure 10. Safe Operating Area

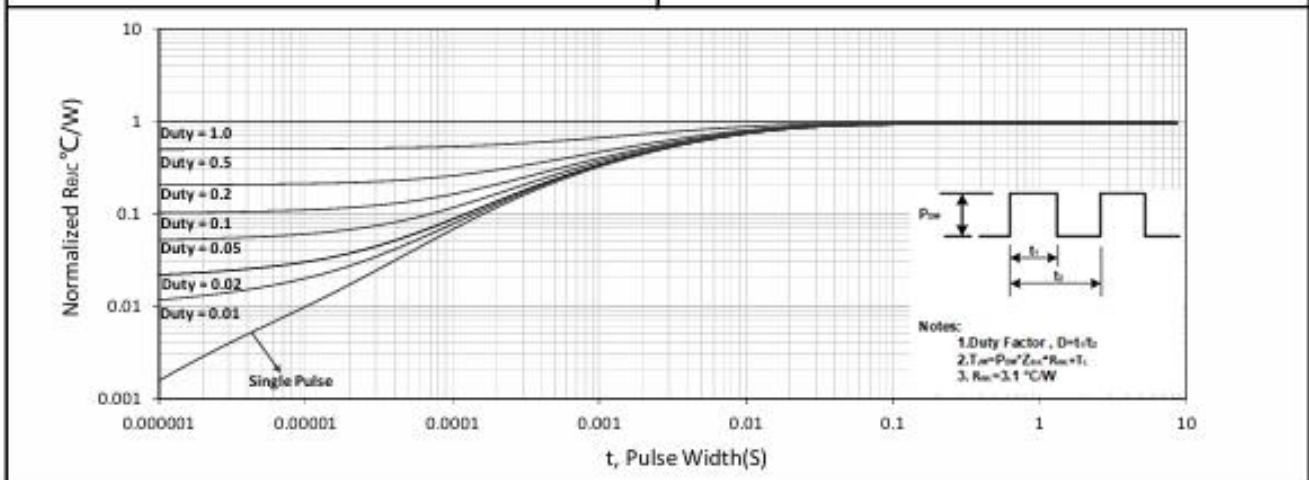
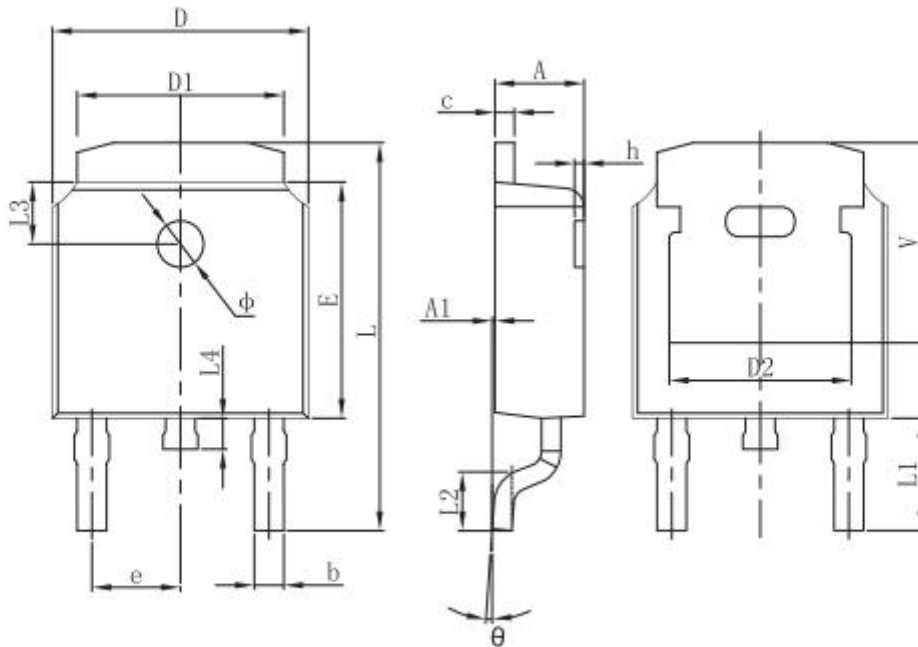


Figure 11. Normalized Maximum Transient Thermal Impedance

Packaging information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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