

## General Description

The WSF55P06 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSF55P06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

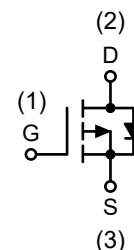
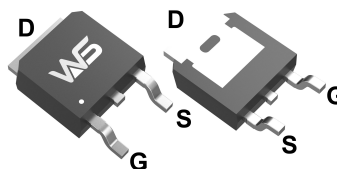
## Product Summary

BVDSS	RDSON	ID
-60V	23mΩ	-50A

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- CCFL Back-light Inverter

## TO-252-2L Pin Configuration



## Absolute Maximum Ratings (Tc=25 °C, unless otherwise noted)

Symbol	Parameter	Limit	Unit
V <sub>DS</sub>	Drain-Source Voltage	-60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current-Continuous	-50	A
I <sub>D</sub> (T <sub>C</sub> =100 °C)	Drain Current-Continuous(T <sub>C</sub> =100 °C)	-24.8	A
I <sub>DM</sub>	Pulsed Drain Current	-220	A
P <sub>D</sub>	Maximum Power Dissipation	110	W
	Derating factor	0.73	W/°C
E <sub>AS</sub>	Single pulse avalanche energy (Note 5)	273	mJ
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 To 175	°C
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case(Note 2)	1.36	°C/W

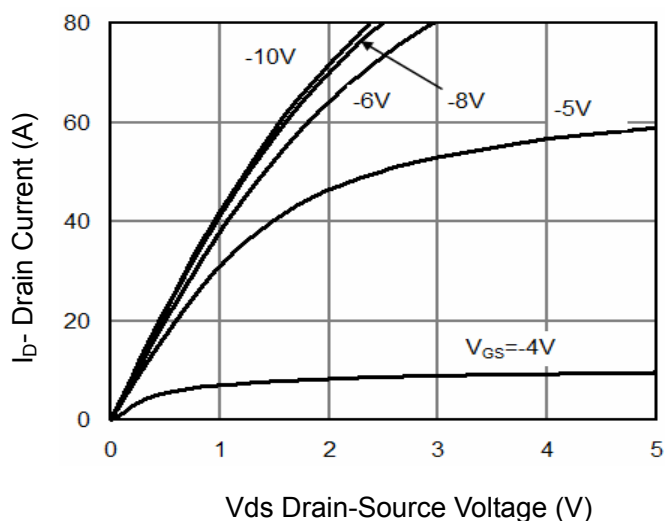
**Electrical Characteristics (T<sub>c</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-60	---	---	V
I <sub>D</sub> SS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V	---	---	-1	μA
I <sub>G</sub> SS	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
On Characteristics (Note 3)						
V <sub>GS</sub> (th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.8	-3.0	V
R <sub>DS</sub> (ON)	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	---	23	28	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A	---	25	---	S
Dynamic Characteristics (Note4)						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, f=1.0MHz	---	3017	---	PF
C <sub>OSS</sub>	Output Capacitance		---	180	---	PF
C <sub>rSS</sub>	Reverse Transfer Capacitance		---	126	---	PF
Switching Characteristics (Note 4)						
t <sub>d</sub> (on)	Turn-on Delay Time	V <sub>DD</sub> =-30V, R <sub>L</sub> =1.5Ω, V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω	---	12	---	nS
t <sub>r</sub>	Turn-on Rise Time		---	15	---	nS
t <sub>d</sub> (off)	Turn-Off Delay Time		---	15	---	nS
t <sub>f</sub>	Turn-Off Fall Time		---	38	---	nS
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-30, I <sub>D</sub> =-20A, V <sub>GS</sub> =-10V	---	49.8	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	10.6	---	nC
Q <sub>gd</sub>	Gate-Drain Charge		---	13.6	---	nC
Drain-Source Diode Characteristics						
V <sub>SD</sub>	Diode Forward Voltage (Note 3)	V <sub>GS</sub> =0V, I <sub>S</sub> =-20A	---	---	-1.2	V
I <sub>S</sub>	Diode Forward Current (Note 2)		---	---	-50	A
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> = 25°C, I <sub>F</sub> =- 20A di/dt = -100A/μS(Note3)	---	47	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	53	---	nC

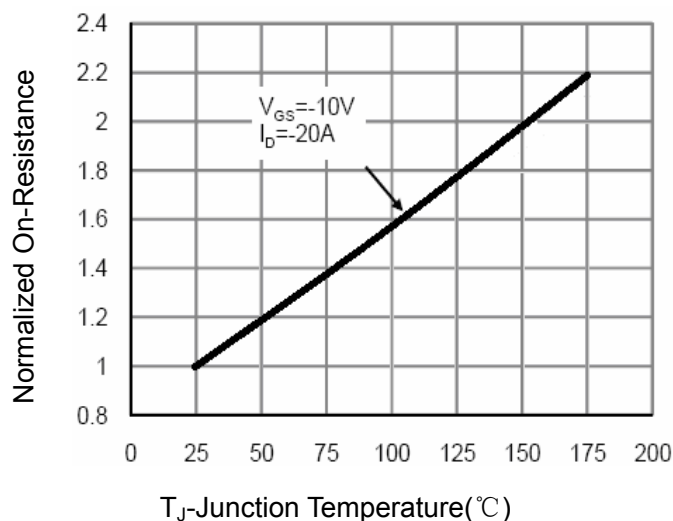
**Notes:**

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<sub>J</sub>=25°C, V<sub>DD</sub>=-20V, V<sub>G</sub>=-10V, L=0.5mH, R<sub>G</sub>=25Ω

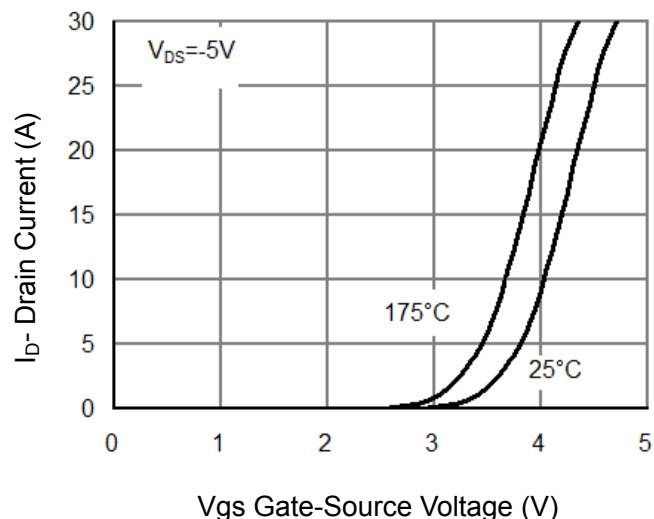
# Typical Electrical and Thermal Characteristics (Curves)



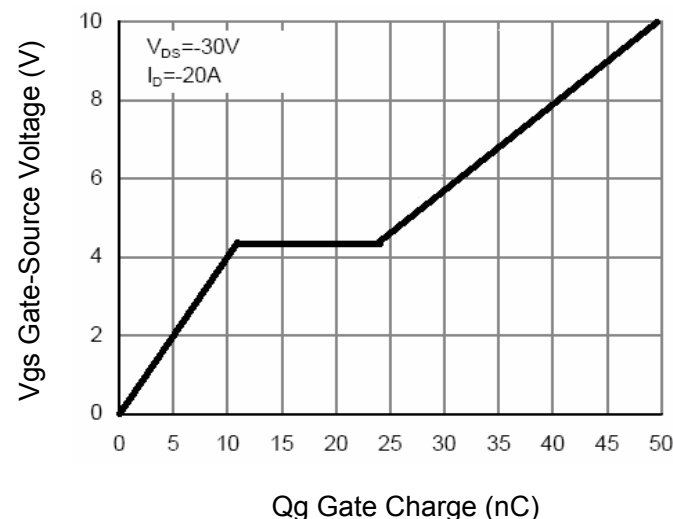
**Figure 1 Output Characteristics**



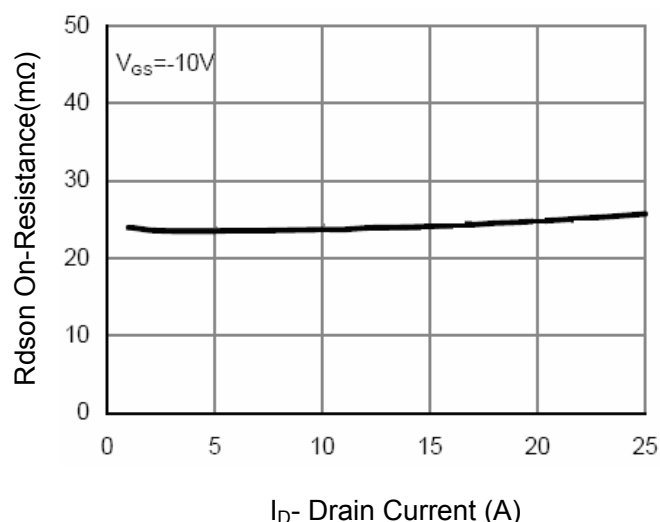
**Figure 4  $R_{DS(on)}$ -Junction Temperature**



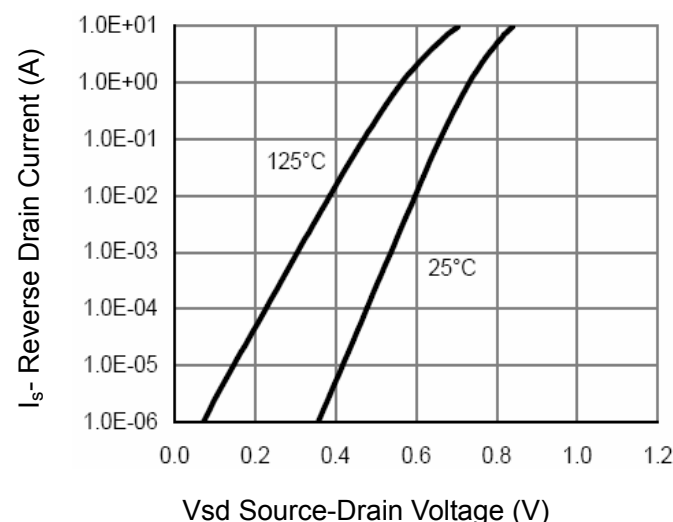
**Figure 2 Transfer Characteristics**



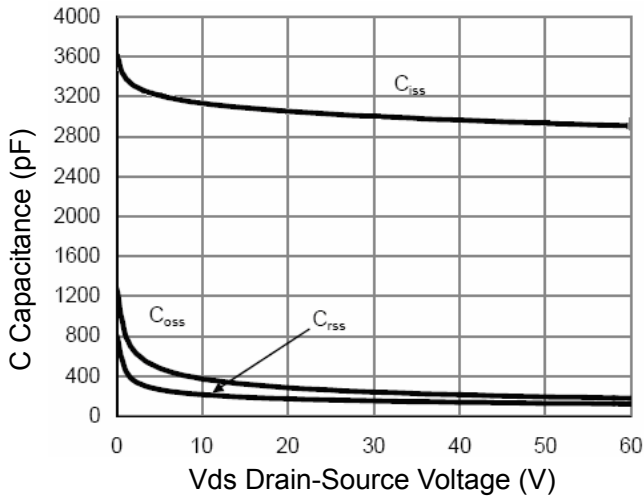
**Figure 5 Gate Charge**



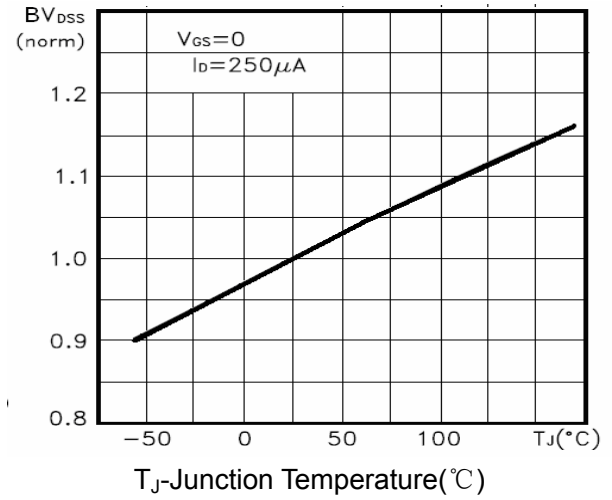
**Figure 3  $R_{DS(on)}$ - Drain Current**



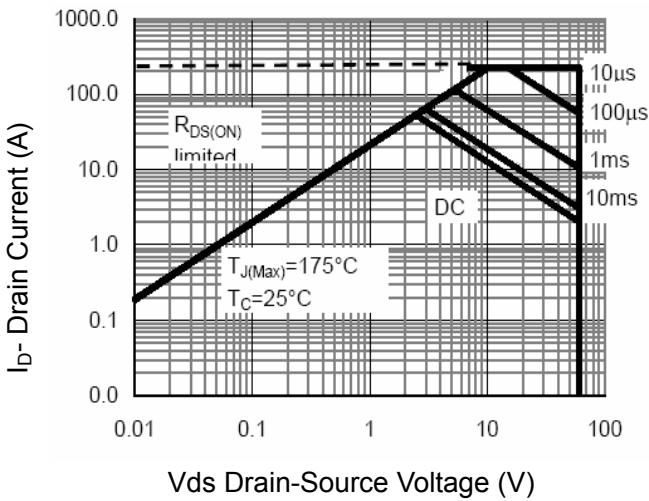
**Figure 6 Source- Drain Diode Forward**



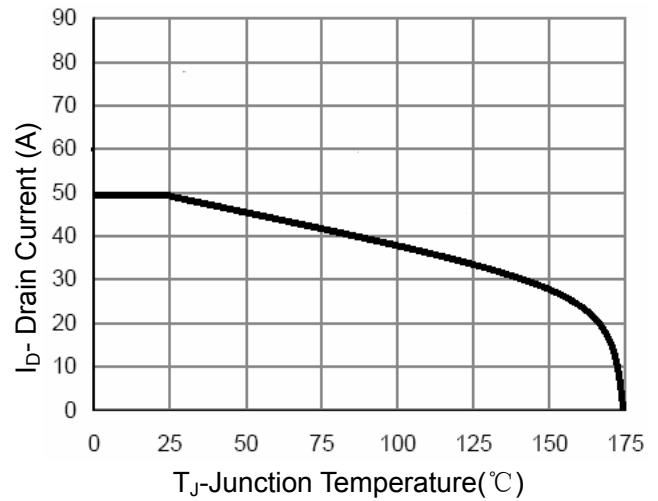
**Figure 7 Capacitance vs Vds**



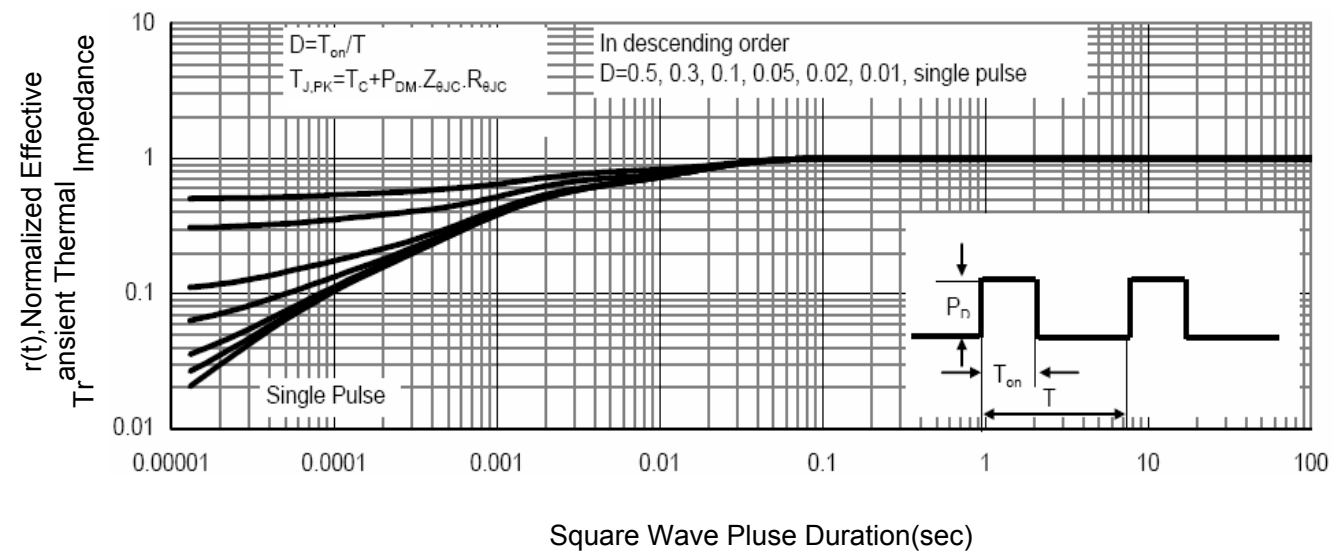
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**

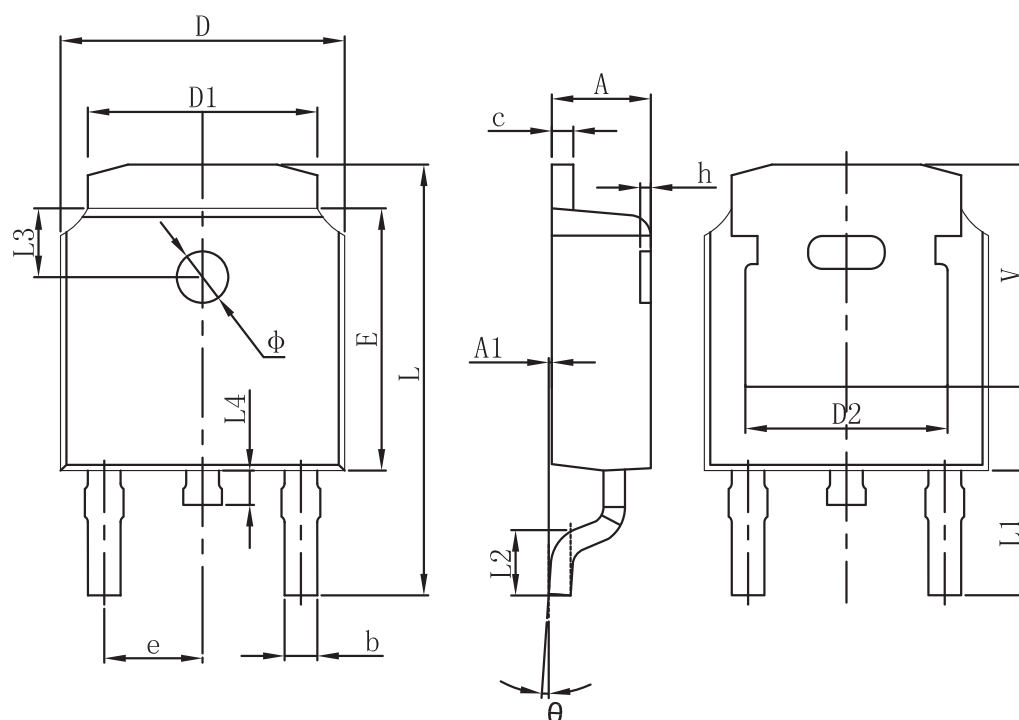


**Figure 10 ID Current De-rating**



**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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