

General Description

The WSR58P06 is the highest performance trench P-Ch MOSFET with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The WSR58P06 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

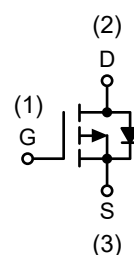
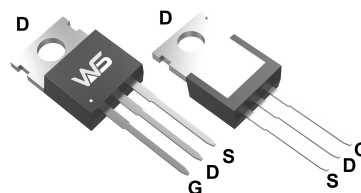
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
-60V	30m Ω	-45A

Applications

- Power Management in Desktop Computer or DC/DC Converters

TO-220-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 25	V
I_D	Continuous Drain Current, $V_{GS} @ -10V; T_C=25^\circ C$	-45	A
	Continuous Drain Current, $V_{GS} @ -10V; T_C=100^\circ C$	-25	A
I_S	Diode Continuous Forward Current	-45	A
I_{AS}	Avalanche Energy, Single pulse ; $L=1mH$	-18	A
E_{AS}	Avalanche Energy, Single pulse;; $L=1mH$	81	mJ
I_{DP}	Pulse Drain Current Tested ; $T_C=25^\circ C$	-80	A
P_D	Maximum Power Dissipation; $T_C=25^\circ C$	54	W
	Maximum Power Dissipation; $T_C=100^\circ C$	21	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62.5	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.3	$^\circ C/W$

Note : *Current limited by bond wire.

Note a : UIS tested and pulse width limited by maximum junction temperature 150 $^\circ C$ (initial temperature $T_J=25^\circ C$).

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.018	---	V/ $^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-10A$	---	30	47	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	---	42	58	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.4	-2.2	-3.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	5.04	---	mV/ $^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V, I_D=-2A$	---	18	---	S
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-25V, V_{GS}=-4.5V, I_D=-10A$	---	24	---	nC
Q_{gs}	Gate-Source Charge		---	5.3	---	
Q_{gd}	Gate-Drain Charge		---	6.4	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-25V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	6	---	ns
T_r	Rise Time		---	9	---	
$T_{d(off)}$	Turn-Off Delay Time		---	27	---	
T_f	Fall Time		---	48	---	
C_{iss}	Input Capacitance	$V_{DS}=-25V, V_{GS}=0V, f=1\text{MHz}$	---	1350	---	pF
C_{oss}	Output Capacitance		---	180	---	
C_{rss}	Reverse Transfer Capacitance		---	85	---	

Diode Characteristics

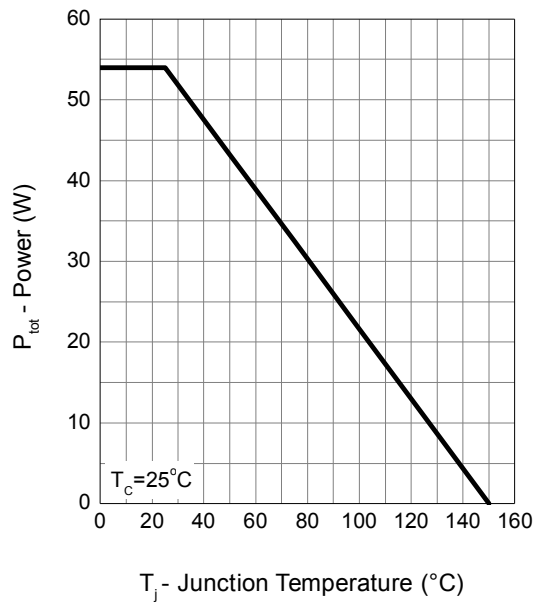
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	-45	A
I_{SM}	Pulsed Source Current ^{2,6}		---	---	-80	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-12A, dI/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	31	---	nS
Q_{rr}	Reverse Recovery Charge		---	35	---	nC

Note :

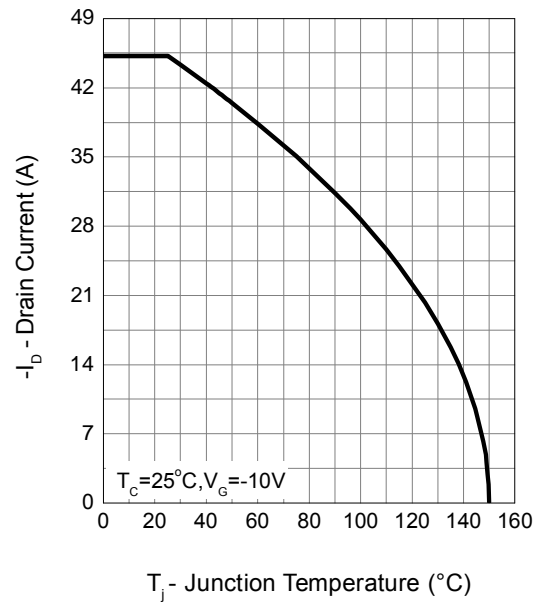
- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, $t<10\text{sec}$.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.5\text{mH}, I_{AS}=-18A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The Min. value is 100% EAS tested guarantee.
- 6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Operating Characteristics

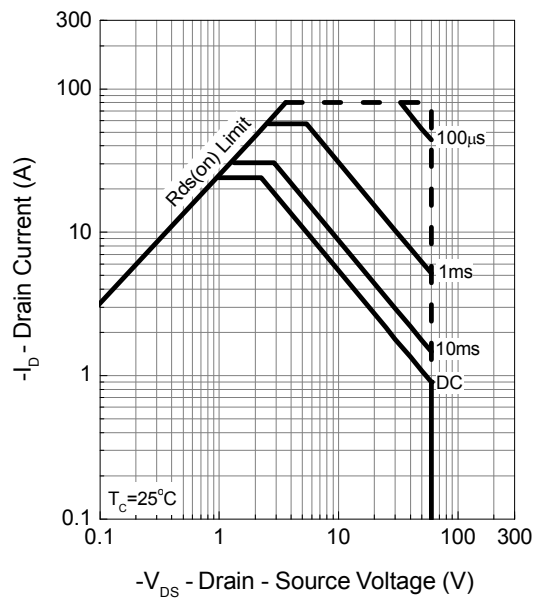
Power Dissipation



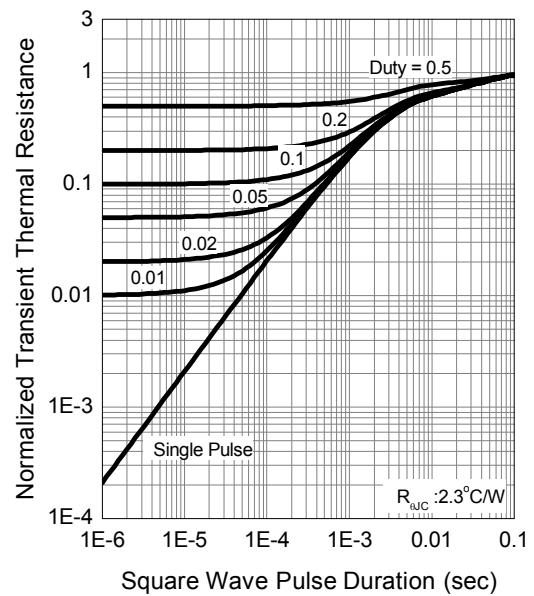
Drain Current



Safe Operation Area

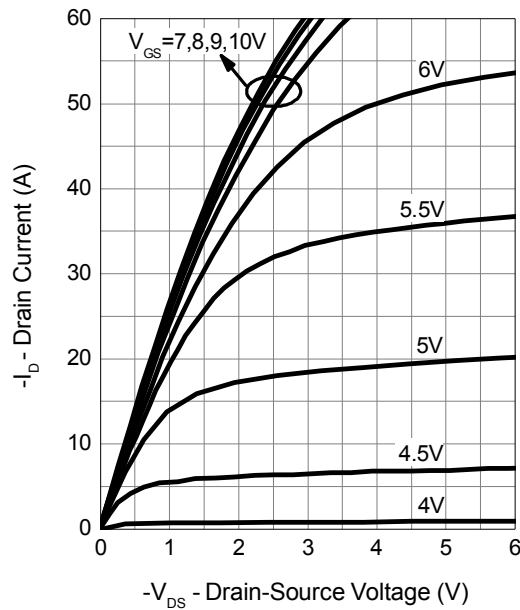


Thermal Transient Impedance

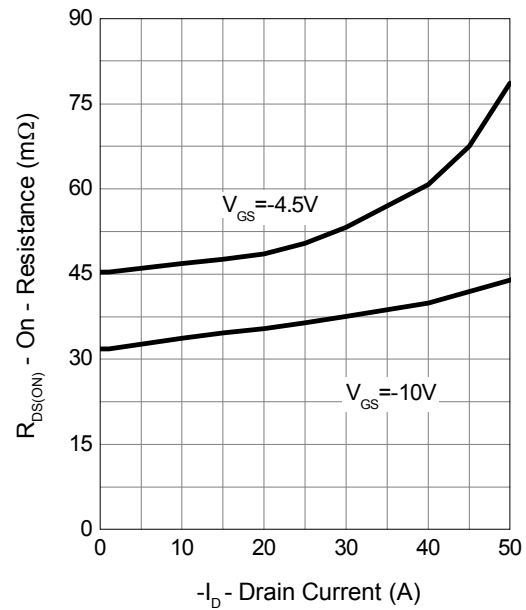


Typical Operating Characteristics

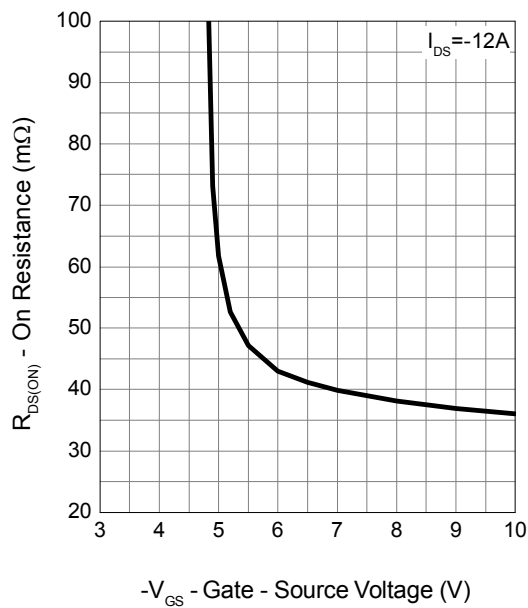
Output Characteristics



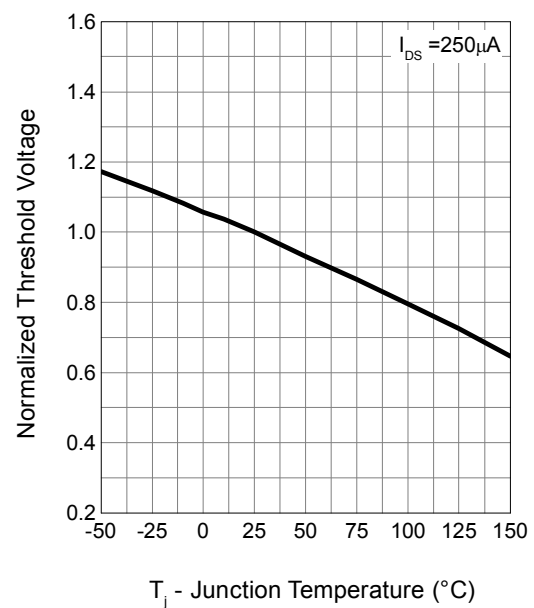
Drain-Source On Resistance



Gate-Source On Resistance

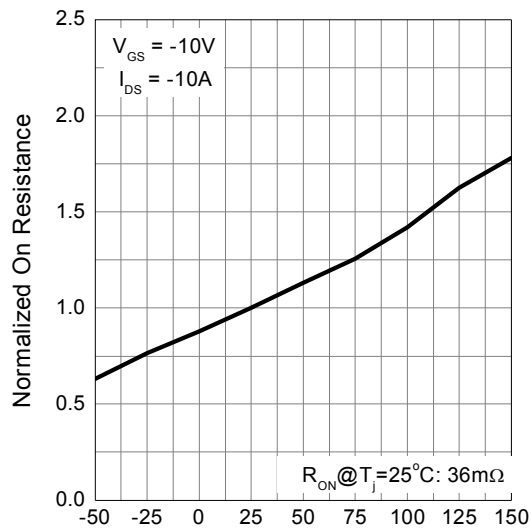


Gate Threshold Voltage



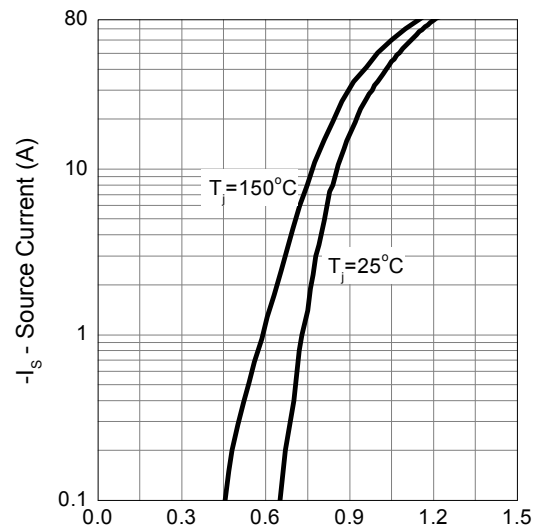
Typical Operating Characteristics

Drain-Source On Resistance



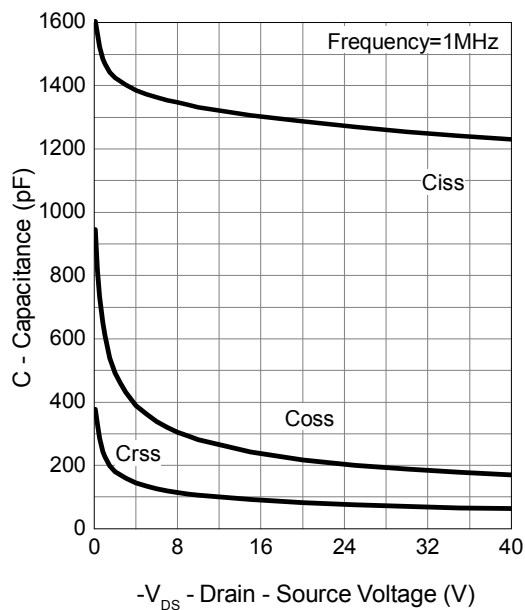
T_J - Junction Temperature (°C)

Source-Drain Diode Forward



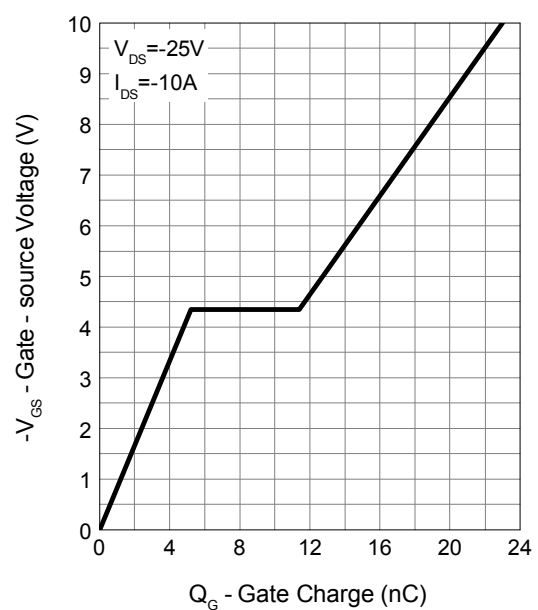
$-V_{SD}$ - Source - Drain Voltage (V)

Capacitance



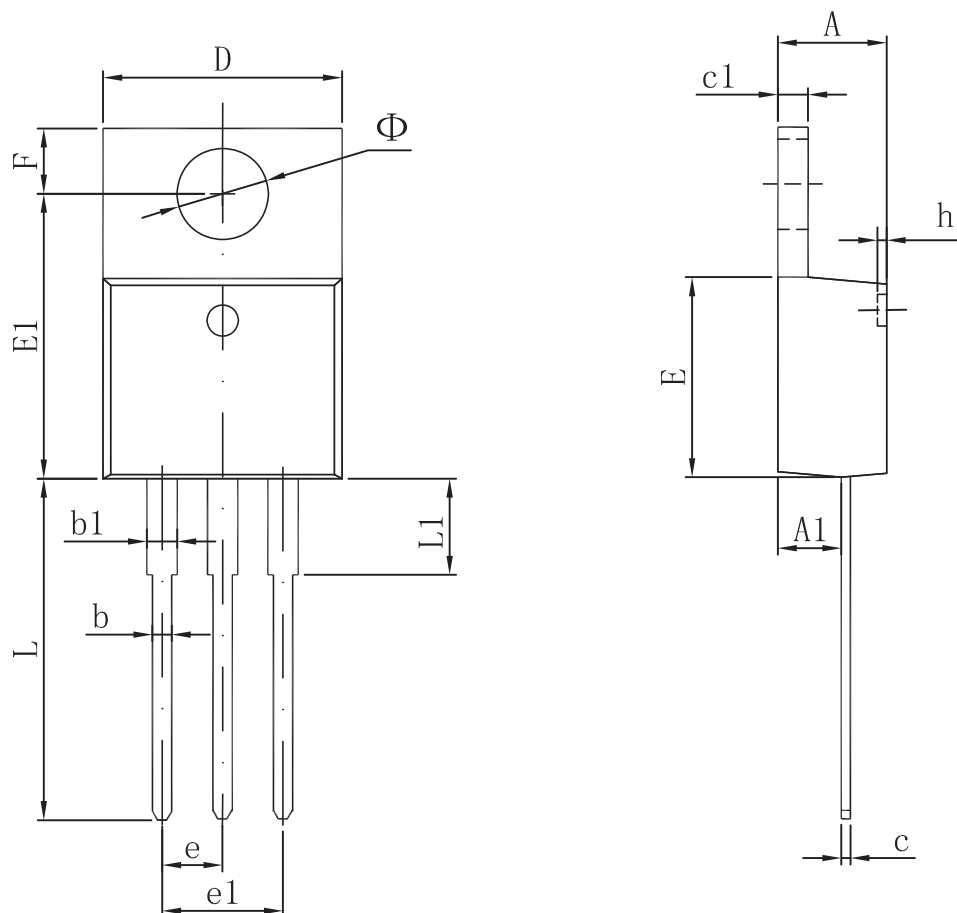
$-V_{DS}$ - Drain - Source Voltage (V)

Gate Charge



Q_G - Gate Charge (nC)

Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155

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