

General Description

The WSF80P04 is the highest performance trench P-Channel MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSF80P04 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

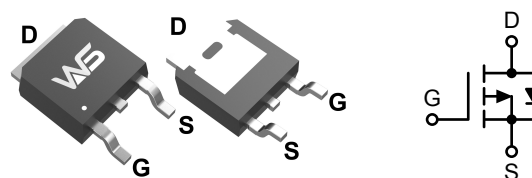
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
-40V	7mΩ	-80A

Applications

- Motor Drivers.
- Primary Switch for 12V Systems.
- Load Switch.

TO-252 Pin Configuration



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Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-80	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-38	A
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-13	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-10	A
I_{DM}	Pulsed Drain Current ² , $T_C = 25^\circ C$	-210	A
EAS	Avalanche Energy, Single pulse, $L = 0.1mH$	1008	mJ
I_{AS}	Avalanche Current, Single pulse, $L = 0.1mH$	-142	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	78	W
$P_D @ T_C = 100^\circ C$	Total Power Dissipation ⁴	37	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	---	50	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.8	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_{DS}=-27$	---	7	10	$m\Omega$
		$V_{GS}=-4.5V, I_{DS}=-17A$	---	9	14	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.3	-1.8	-2.3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-32V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	-1	μA
		$V_{DS}=-32V, V_{GS}=0V, T_J=85^{\circ}\text{C}$	---	---	-30	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2.5	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-27A$	---	51	71	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	11	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-20V, R_L=20\Omega, I_{DS}=-1A, V_{GEN}=-10V, R_G=6\Omega$	---	11	20	ns
T_r	Rise Time		---	14	25	
$T_{d(off)}$	Turn-Off Delay Time		---	41	74	
T_f	Fall Time		---	77	139	
C_{iss}	Input Capacitance	$V_{DS}=-20V, V_{GS}=0V, f=1\text{MHz}$	---	5500	5857	pF
C_{oss}	Output Capacitance		---	560	---	
C_{rss}	Reverse Transfer Capacitance		---	500	---	

Diode Characteristics

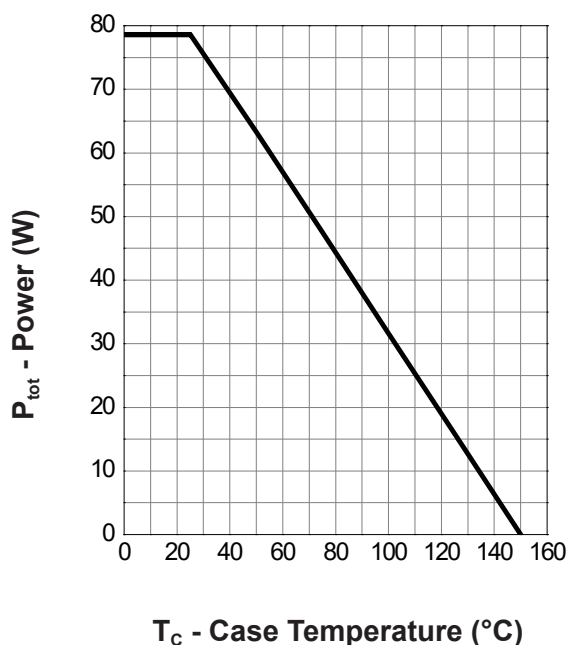
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	-80	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-13A, T_J=25^{\circ}\text{C}$	---	-0.8	-1.1	V
t_{rr}	Reverse Recovery Time	$I_F=20A, dI/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	28	---	nS
Q_{rr}	Reverse Recovery Charge		---	20	---	nC

Note :

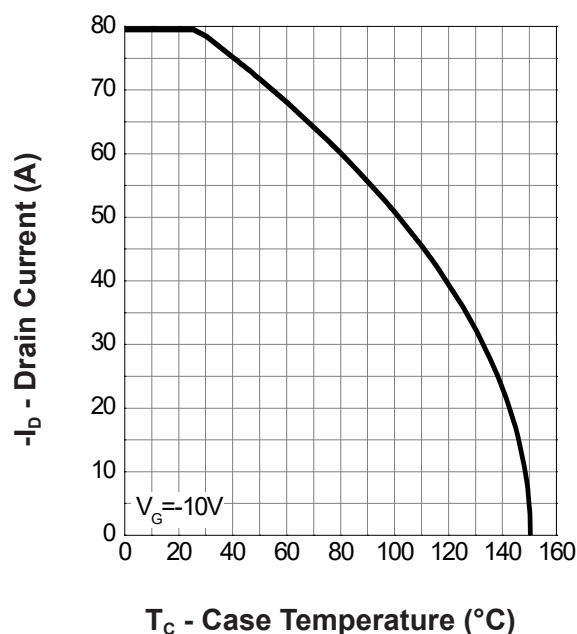
1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, $t < 10\text{sec}$.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DS}=-20V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-142A$
4. The 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 Characteristics

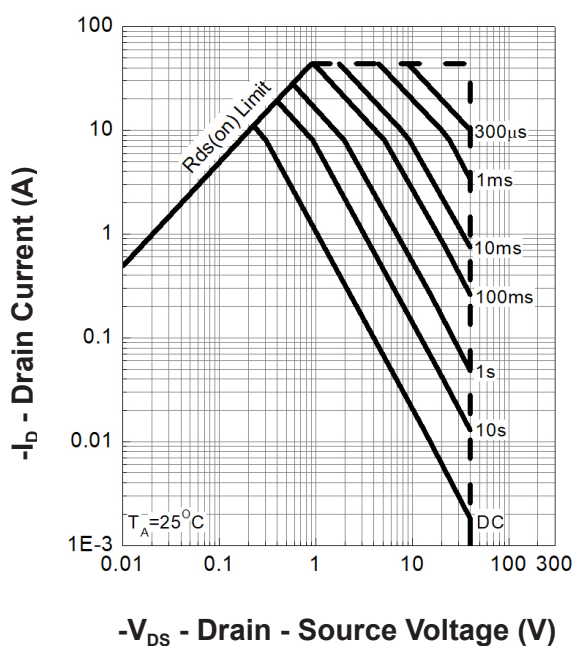
Power Dissipation



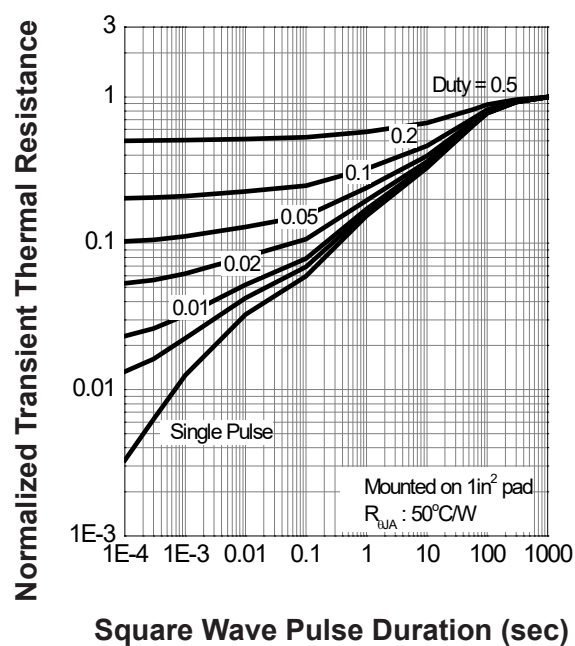
Drain Current



Safe Operation Area

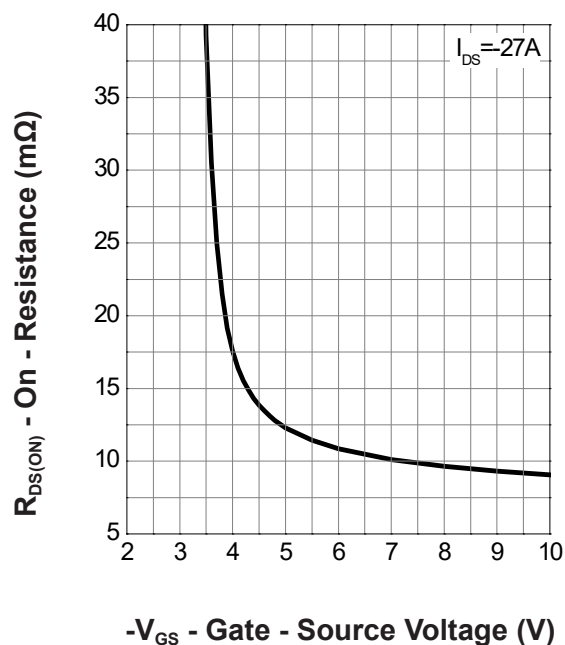


Thermal Transient Impedance

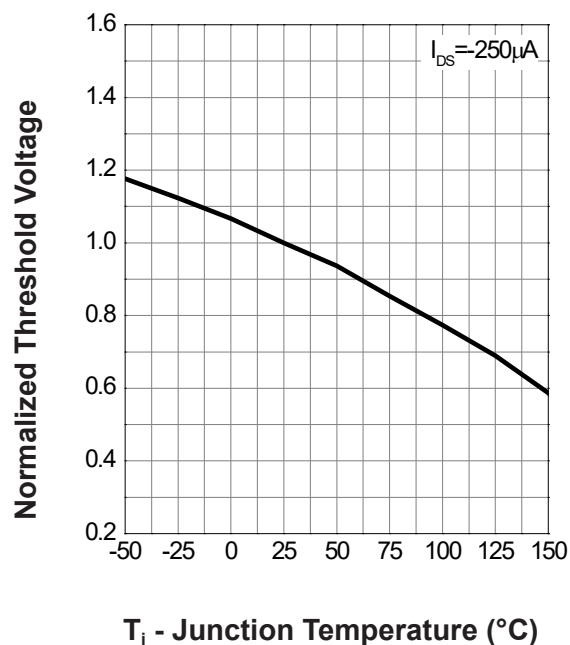


Typical Characteristics (Cont.)

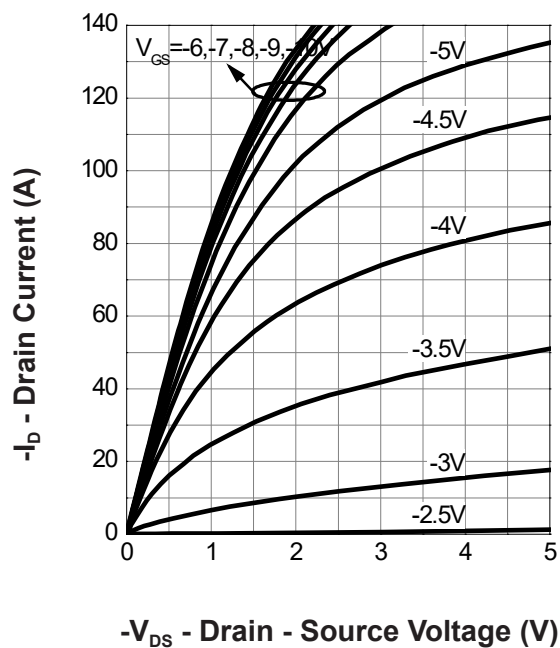
Gate-Source On Resistance



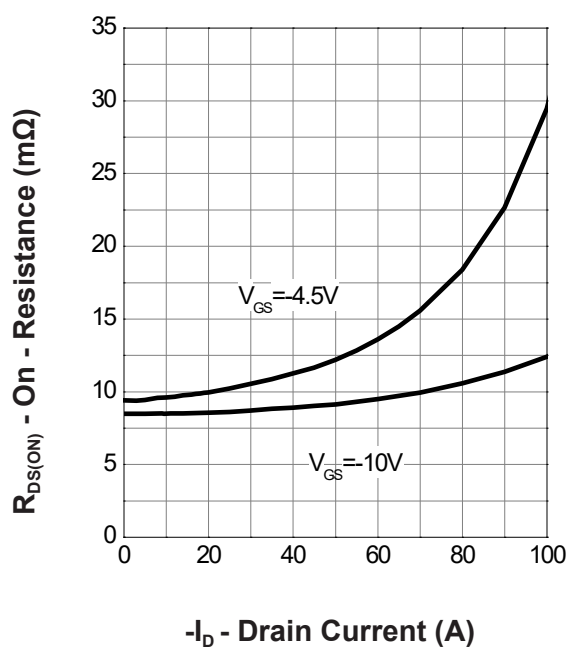
Gate Threshold Voltage

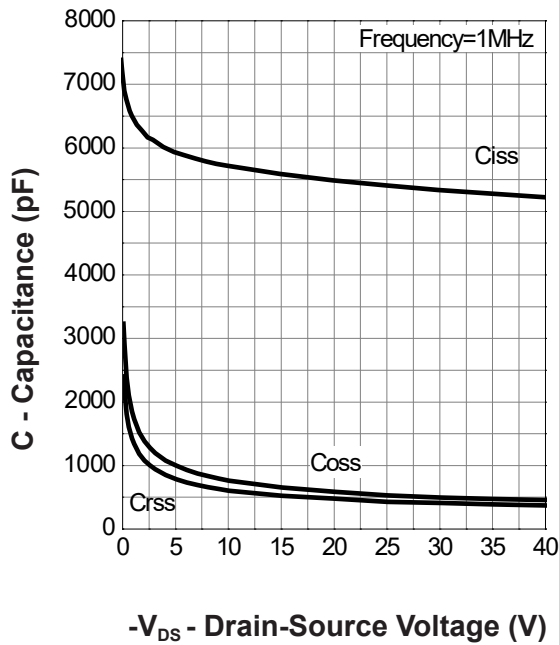
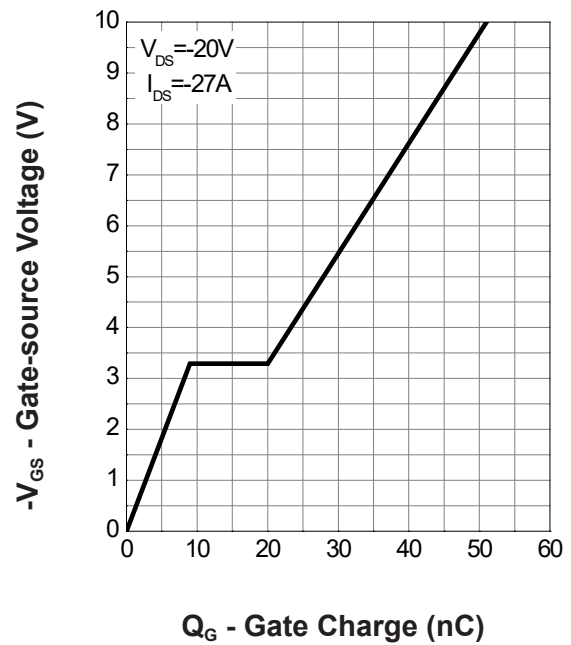
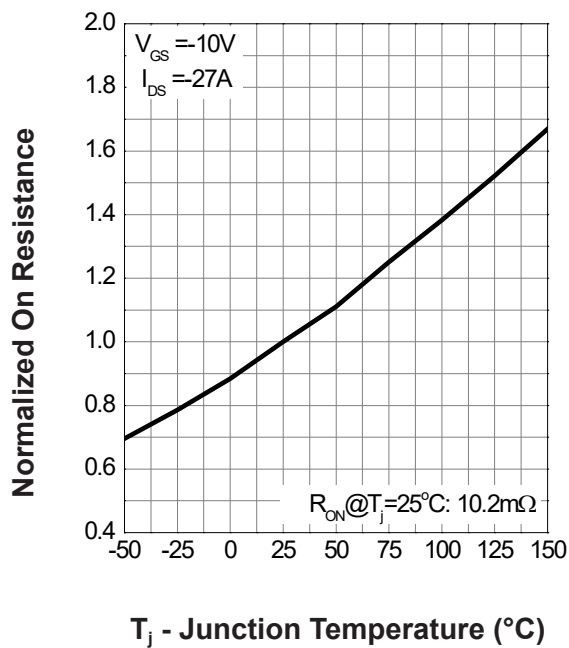
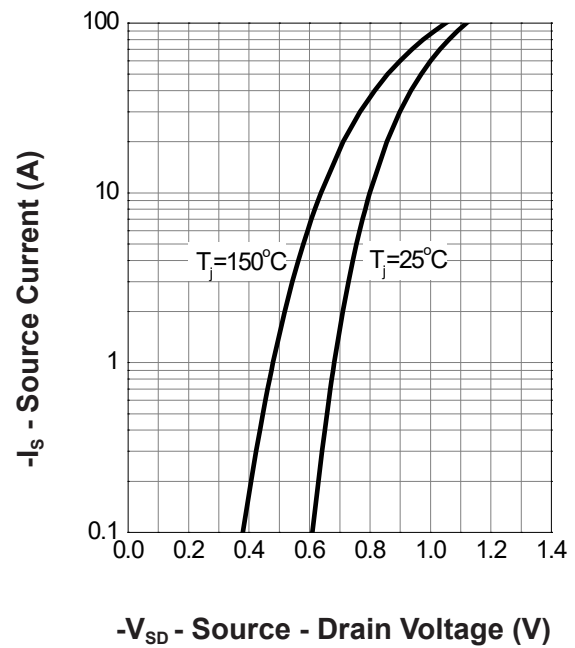


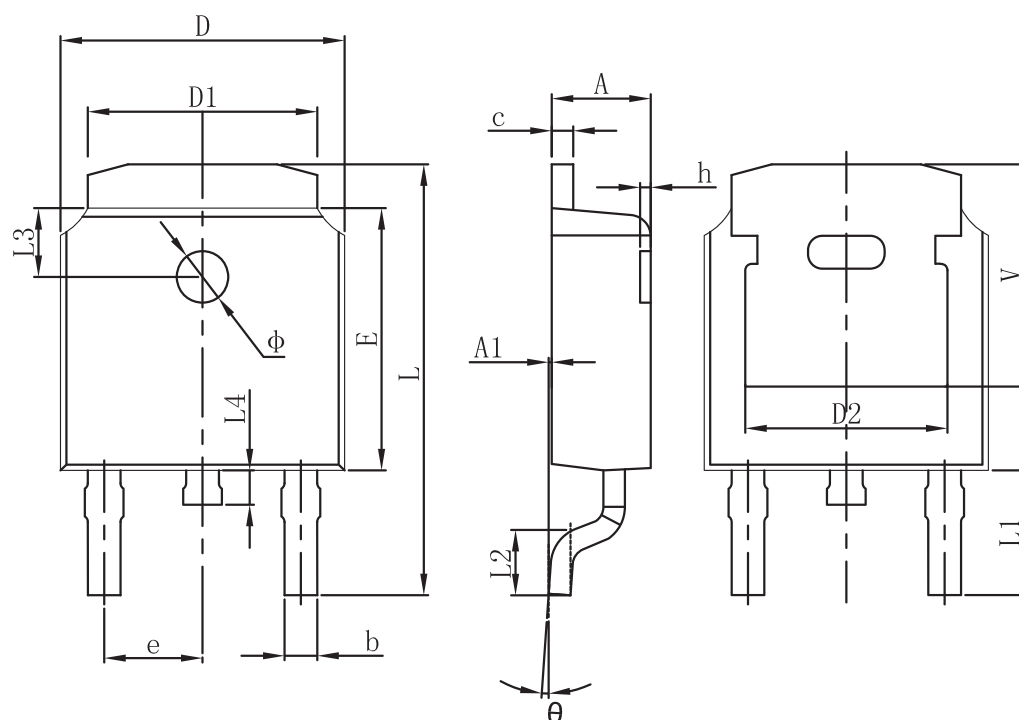
Output Characteristics



Drain-Source On Resistance



Typical Characteristics (Cont.)
Capacitance

Gate Charge

Drain-Source On Resistance

Source-Drain Diode Forward


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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