WSD45P10DN56

P-Channel MOSFET

General Description

The WSF45P10DN56 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

Product Summery

BV_{DSS}	$R_{DS(ON)}$	I_D
-100V	62mΩ	-27.5A

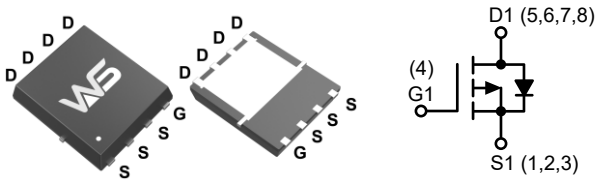
Features

- Super high dense cell design
- Advanced trench process technology
- Reliable and rugged
- High density cell design for ultra low $R_{DS(ON)}$

Applications

- Portable equipment and battery powered systems.

DFN5X6-8L Pin Configuration



Absolute Maximum Ratings (T_A=25°C, Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		-100	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Drain Current (Continuous) [3]	T_C=25°C	-27.5	A
		T_C=100°C	-17.4	
I_{DM}	Drain Current (Pulse) [2]		-110	
P_D	Power Dissipation	T_C=25°C	104	W
T_{STG}	Storage Temperature Range		-55 to 150	°C
T_J	Operating Junction Temperature Range		-55 to 150	

Thermal Resistance Ratings

Symbol	Parameter		Typ.	Max.	Units
$R_{\theta JC}$	Maximum Junction-to-Case (Drain) [1]	Steady State	---	1.2	°C/W

Electrical Characteristics (T_A=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=-20A	---	62	81	mΩ
		V_{GS}=-6V , I_D=-15A	---	65	84.5	
		V_{GS}=-4.5V , I_D=-15A	---	70	91	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=-250μA	-1.0	---	-2.5	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-80V , V_{GS}=0V	---	---	1.0	μA
I_{GSS}	Gate Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge	V_{DS}=-80V , V_{GS}=-10V , I_D=-18A	---	75	---	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	18	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=-50V , V_{GS}=-10V , I_D=-18A , R_G=3.3Ω	---	17	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	75	---	
T_f	Fall Time		---	10	---	
C_{iss}	Input Capacitance	V_{DS}=-50V , V_{GS}=0V , f=1.0MHz	---	2590	---	pF
C_{oss}	Output Capacitance		---	320	---	
C_{rss}	Reverse Transfer Capacitance		---	45	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Diode Forward Current [3]	T_C=25°C	---	---	-27.5	A
V_{SD}	Diode Forward Voltage	I_{SD}=-1A , V_{GS}=0V	---	---	-1.2	V

Note:

1. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.
2. Repetitive rating, pulse width limited by junction temperature.
3. The current rating is based on the t≤10s junction to ambient thermal resistance rating.
4. Pulse Test: Pulse Wide≤300μs, Duty Cycle≤2%.

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

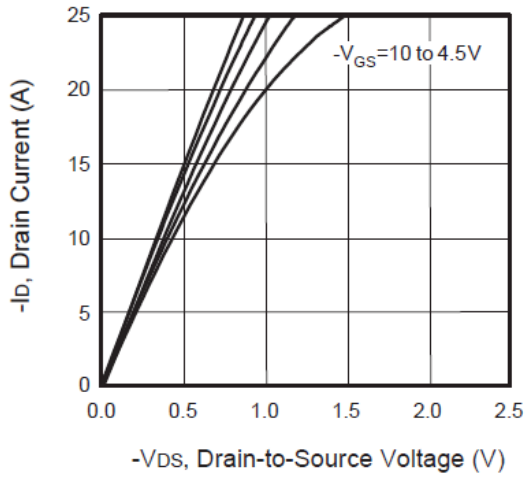


Figure 1. Output Characteristics

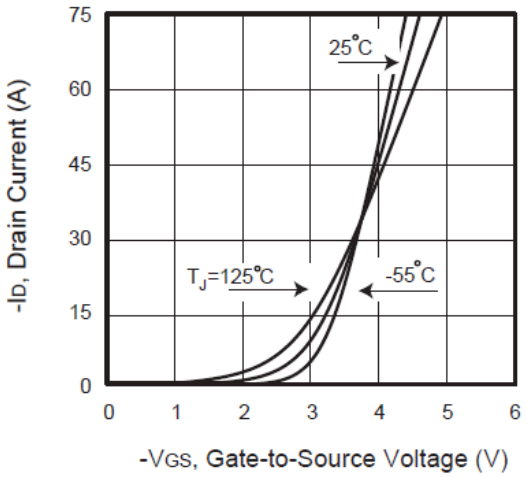


Figure 2. Transfer Characteristics

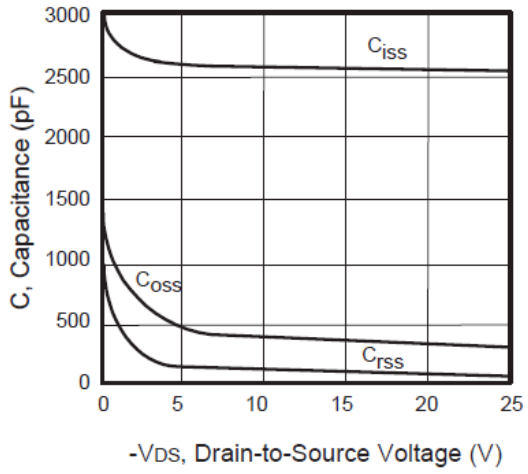


Figure 3. Capacitance

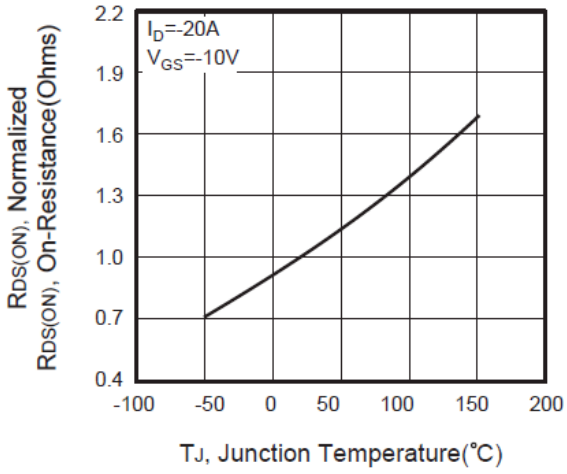


Figure 4. On-Resistance Variation with Temperature

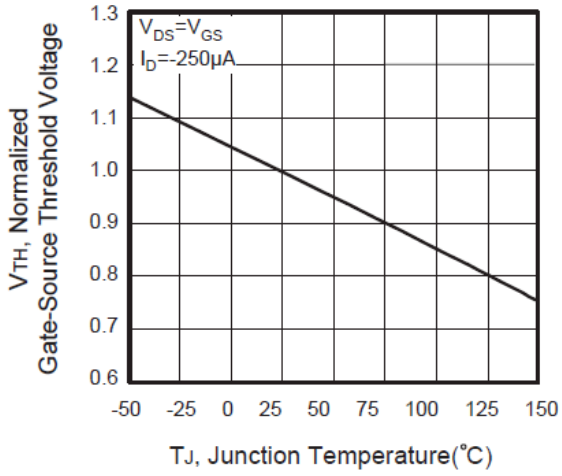


Figure 5. Gate Threshold Variation with Temperature

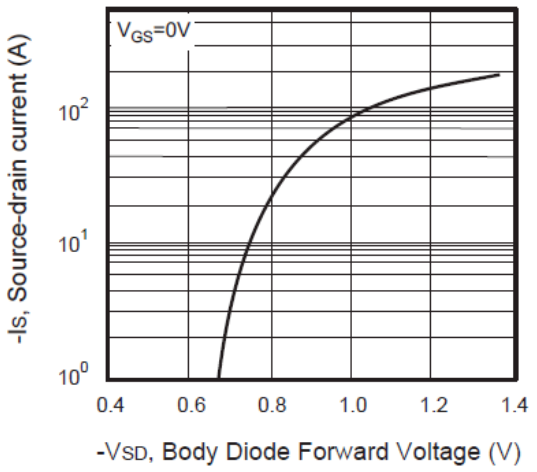


Figure 6. Body Diode Forward Voltage Variation with Source Current

Typical Characteristics (Cont.)

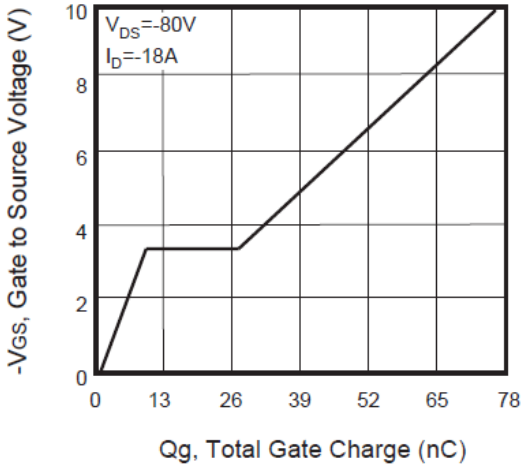


Figure 7. Gate Charge

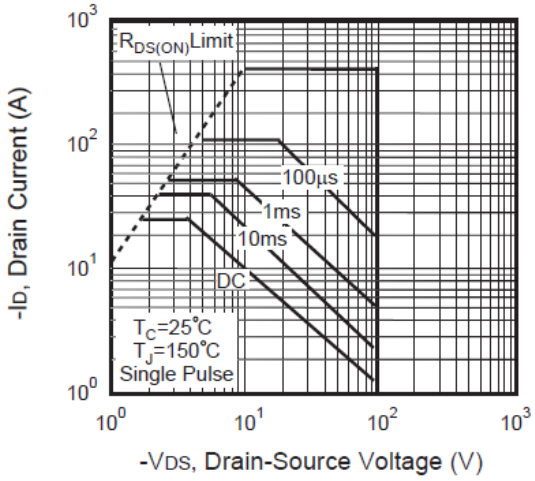


Figure 8. Maximum Safe Operating Area

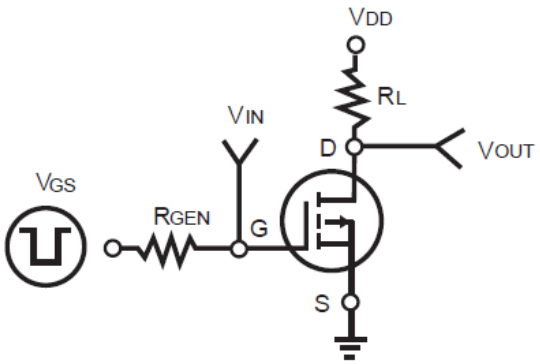


Figure 9. Switching Test Circuit

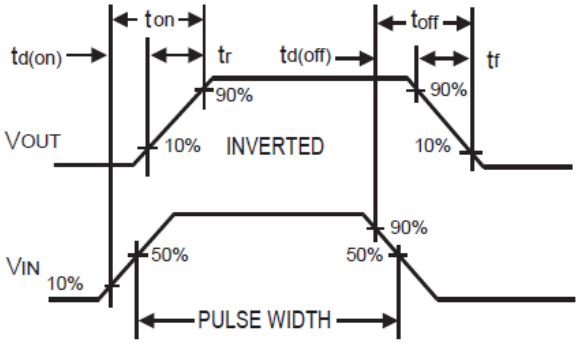


Figure 10. Switching Waveforms

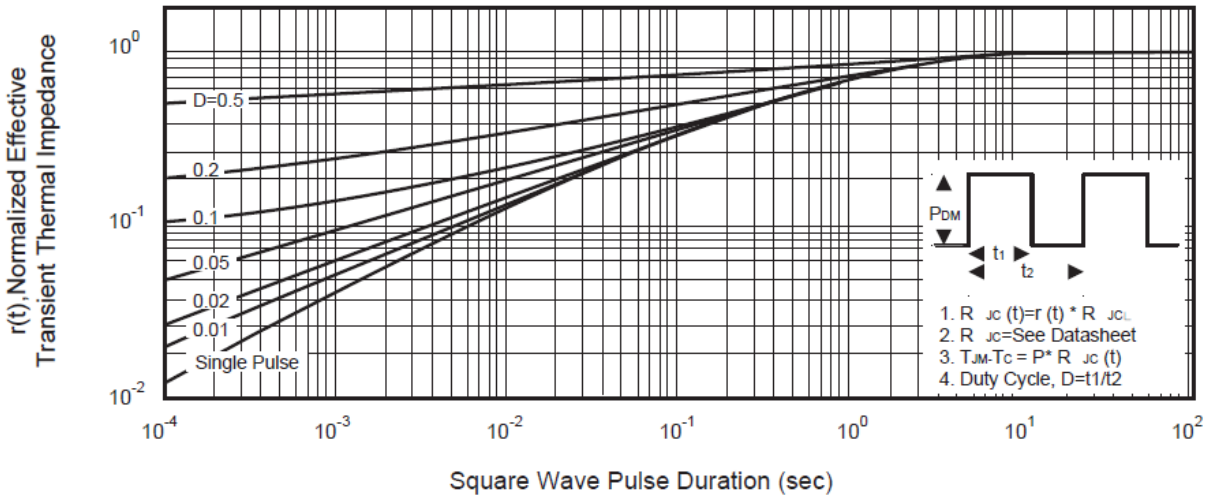
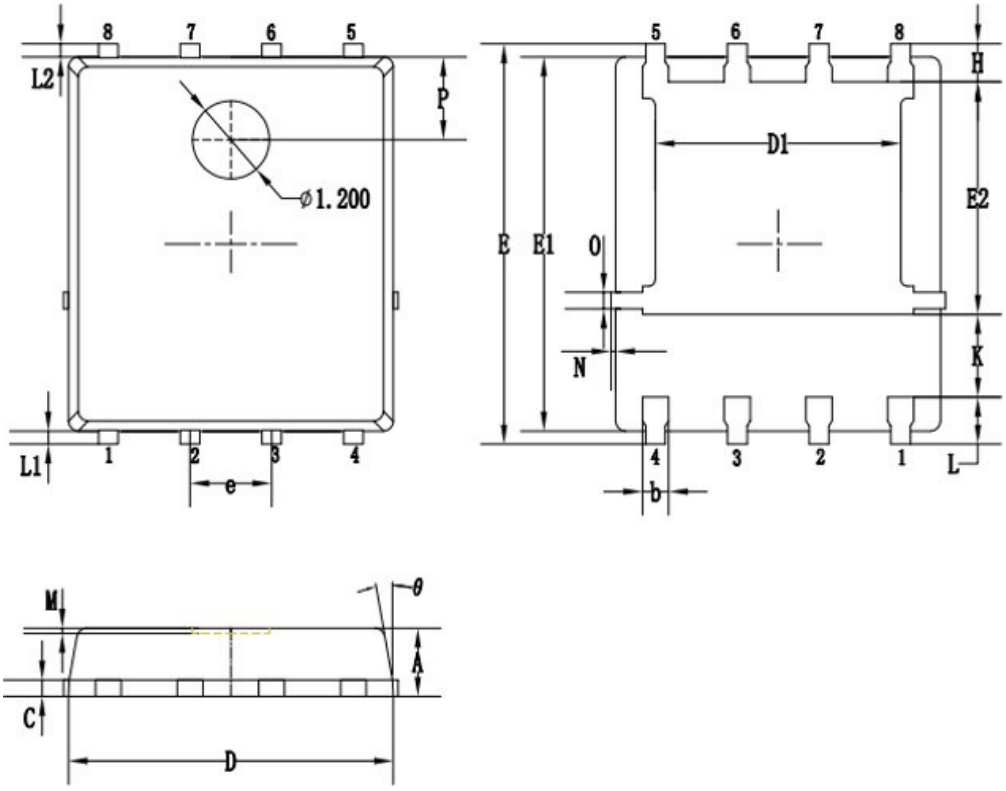


Figure 11. Normalized Thermal Transient Impedance Curve

Packaging information



SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	3.92
E	6.00	6.15	6.30
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.74	0.84
L1/L2	0.20 REF.		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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