

## General Description

The WSD60P06DN56 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications.

The WSD60P06DN56 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

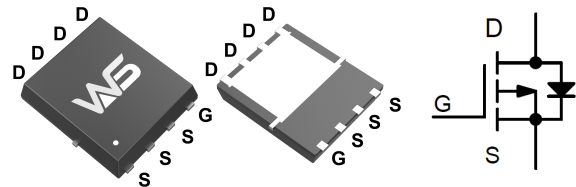
## Product Summary

BVDSS	R <sub>DS(on)</sub>	I <sub>D</sub>
-60V	20mΩ	-60A

## Applications

- Power Management
- Load Switch

## DFN5X6\_8L Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, -V <sub>GS</sub> @ -10V	-60	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, -V <sub>GS</sub> @ -10V	-31	A
I <sub>DM</sub>	Pulsed Drain Current	-140	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	56	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient	---	62.5	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case	---	2.2	°C/W

**P-Channel Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-60	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-18A	---	20	25	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-12A	---	23	30	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.0	-1.85	-2.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -17A	---	72	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	11	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	16	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = -30 V, R <sub>L</sub> = 30Ω I <sub>D</sub> = -1 A, V <sub>GEN</sub> = -10 V, R <sub>g</sub> = 6Ω	---	12	---	ns
T <sub>r</sub>	Rise Time		---	10	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	125	---	
T <sub>f</sub>	Fall Time		---	45	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, f=1.0MHz	---	3300	---	pF
C <sub>oss</sub>	Output Capacitance		---	265	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	125	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	T <sub>C</sub> =25°C	---	---	-20	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1.2	V

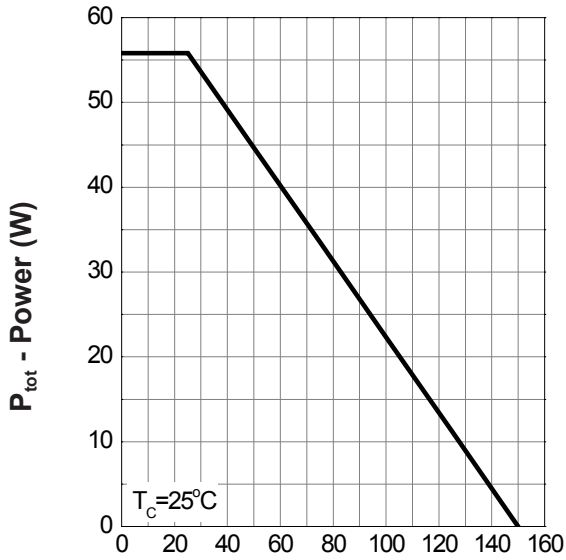
A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t<sub>s</sub> 10s junction to ambient thermal resistance rating.

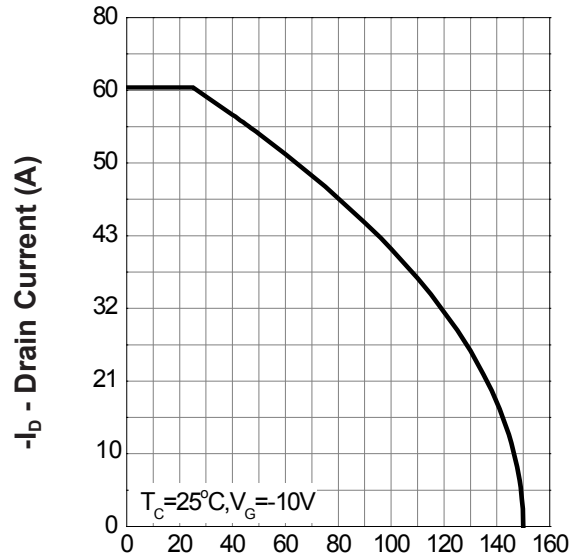
Typical Operating Characteristics

Power Dissipation



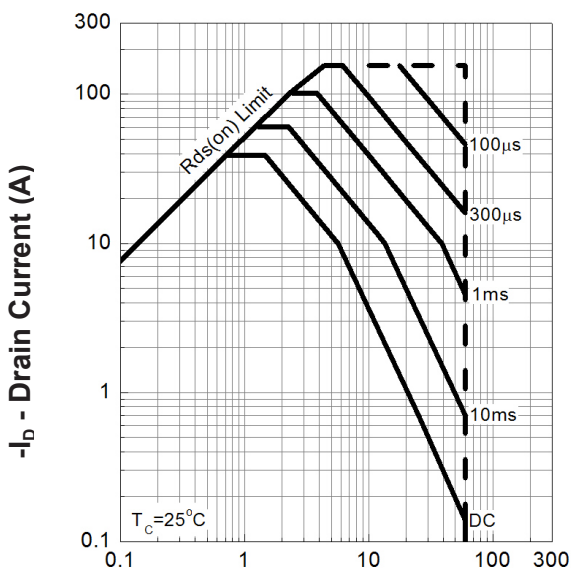
T<sub>j</sub> - Junction Temperature (°C)

Drain Current



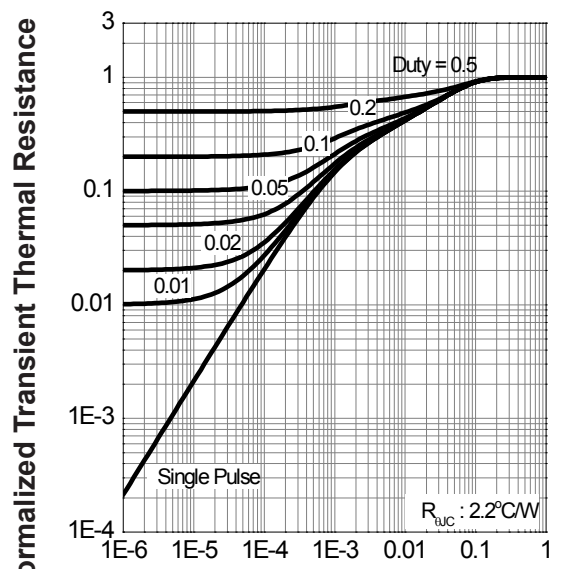
T<sub>j</sub> - Junction Temperature (°C)

Safe Operation Area



-V<sub>DS</sub> - Drain - Source Voltage (V)

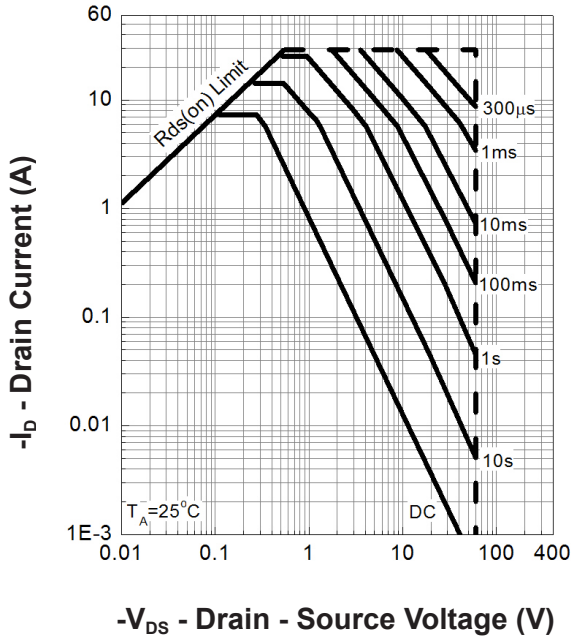
Thermal Transient Impedance



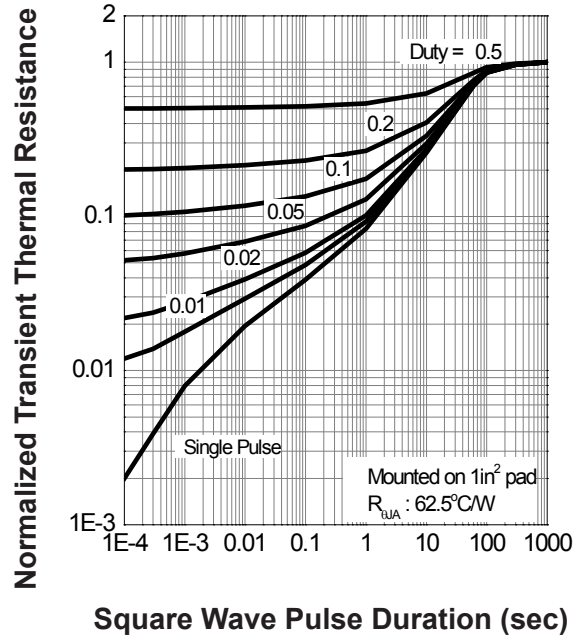
Square Wave Pulse Duration (sec)

Typical Operating Characteristics

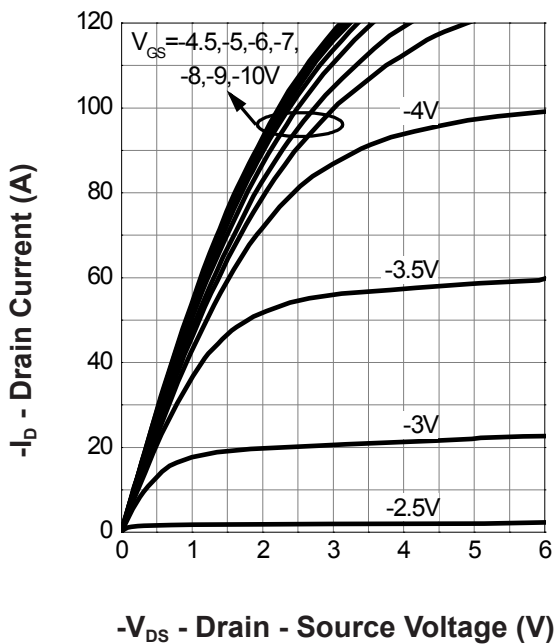
Safe Operation Area



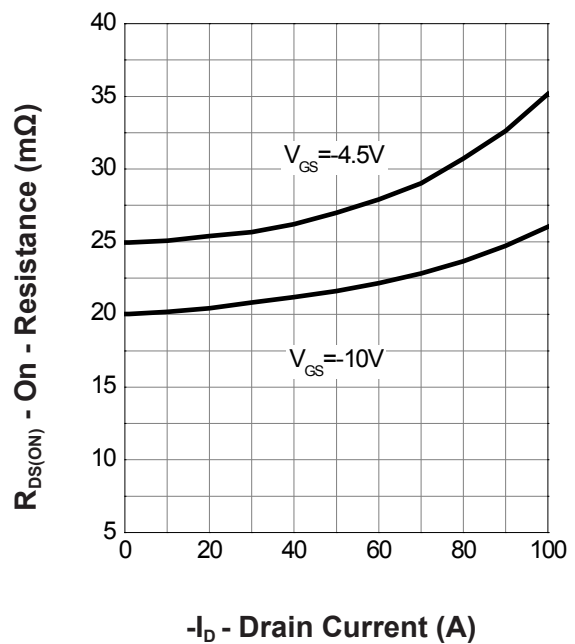
Thermal Transient Impedance



Output Characteristics

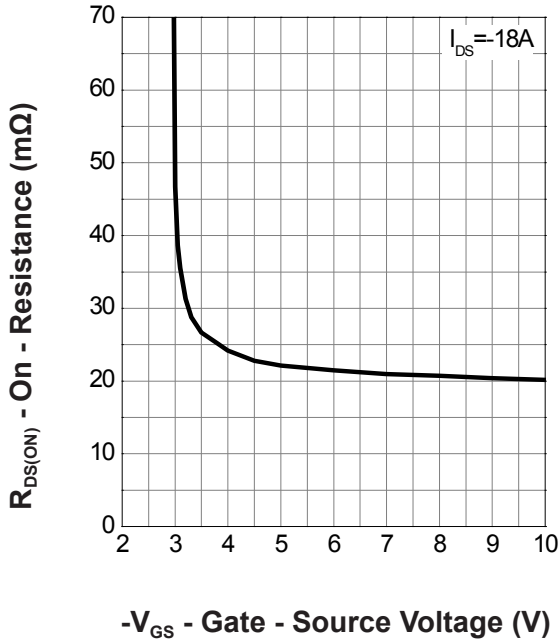


Drain-Source On Resistance

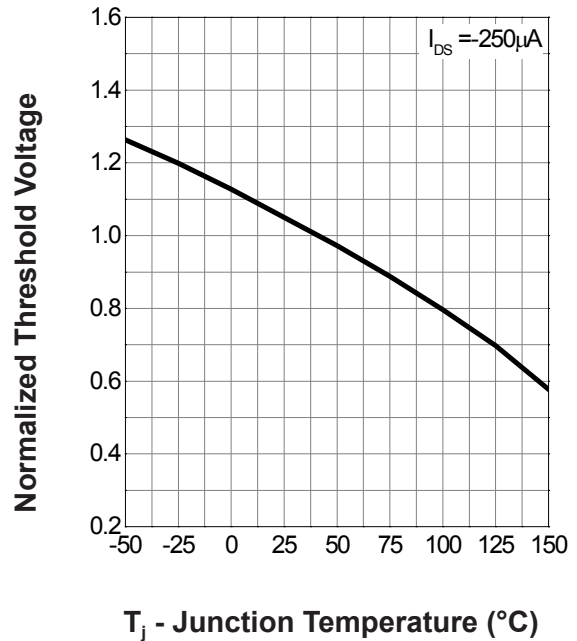


**Typical Operating Characteristics**

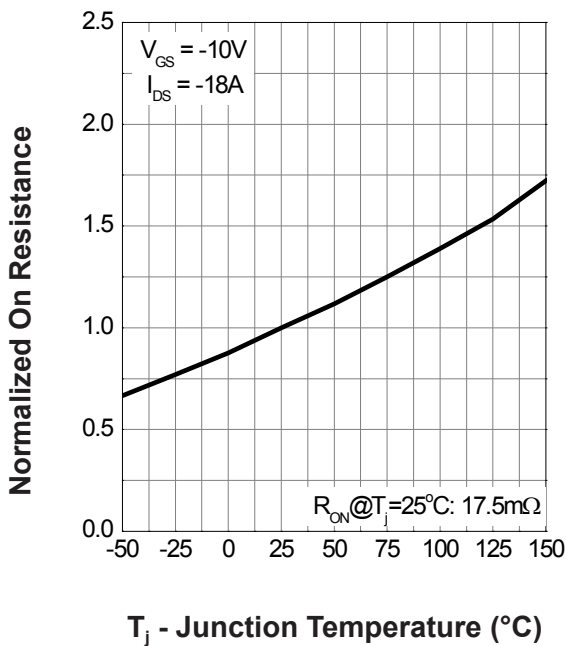
**Gate-Source On Resistance**



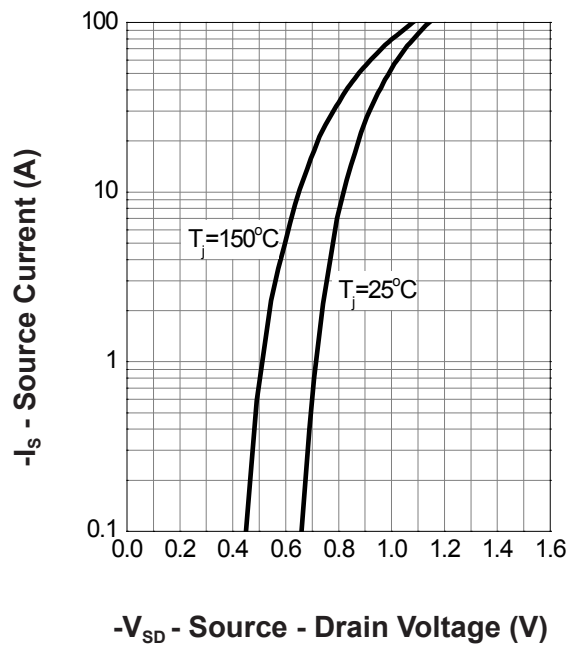
**Gate Threshold Voltage**



**Drain-Source On Resistance**

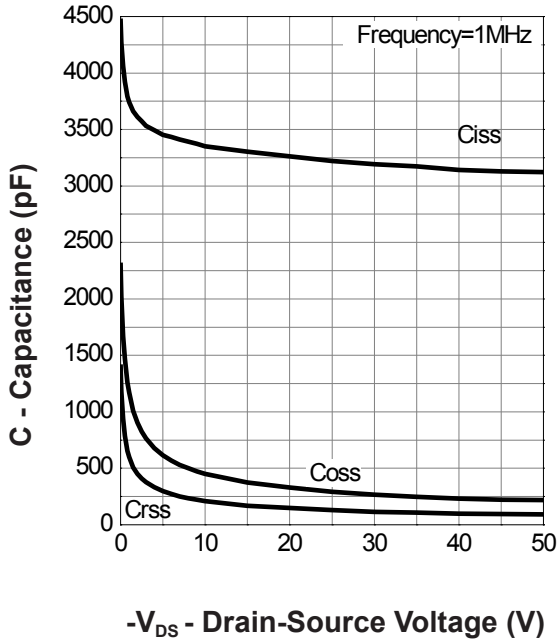


**Source-Drain Diode Forward**

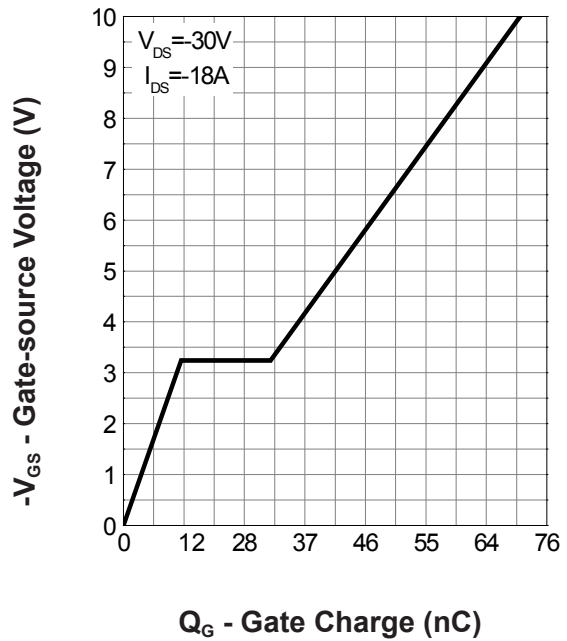


Typical Operating Characteristics

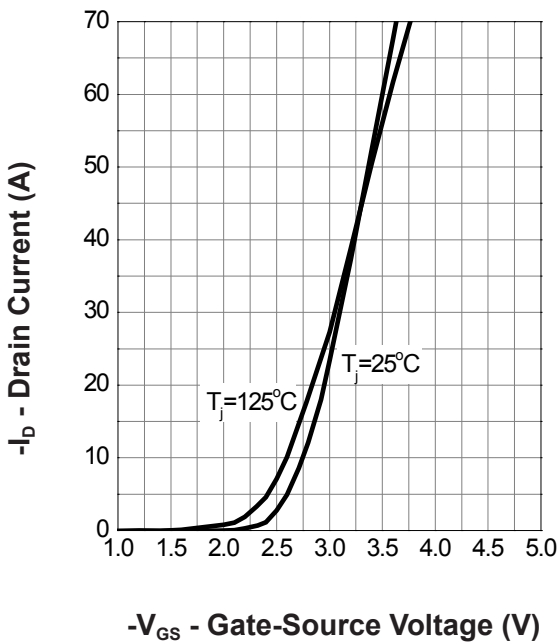
Capacitance



Gate Charge



Transfer Characteristics





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