

**General Description**

The WSD3056DN is the highest performance trench Dual N-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 WSD3056DN meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

**Features**

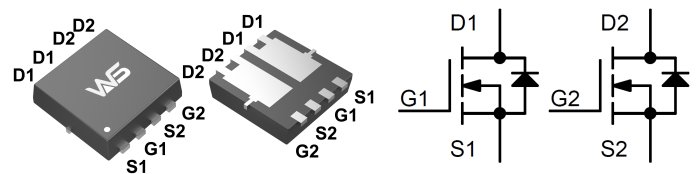
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent  $CdV/dt$  effect decline
- 100% EAS Guaranteed
- Green Device Available

**Product Summary**

$B_{VDS}$	$R_{DS(ON)}$	$I_D$
30V	13m $\Omega$	35A

**Applications**

- POL Applications
- MB / VGA / Vcore
- Load Switch
- SMPS 2nd SR

**DFN3X3 Dual Pin Configuration**

**Absolute Maximum Ratings @TA=25°C unless otherwise noted**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current (Continuous) *AC	$T_c=25^\circ\text{C}$	35
		$T_c=100^\circ\text{C}$	22
$I_{DM}$	Drain Current (Pulse) *B	140	A
$P_D$	Power Dissipation	$T_c=25^\circ\text{C}$	27
EAS	Single Pulse Avalanche Energy	13	mJ
$R_{\theta JA}$	Thermal Resistance Junction to ambient	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	4.6	$^\circ\text{C}/\text{W}$
$T_I/T_{STG}$	Operating Temperature/ Storage Temperature	-55~150	$^\circ\text{C}$

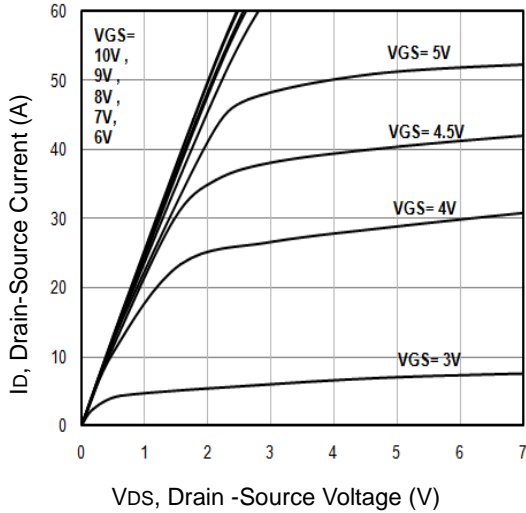
**Electrical Characteristics @ $T_A=25^{\circ}\text{C}$  unless otherwise noted**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu A$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			100	nA
<b>On Characteristics</b>						
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_{DS} = 250\mu A$	1.2	1.8	2.5	V
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 10A$		10	13	$m\Omega$
		$V_{GS} = 4.5V, I_D = 8A$		14	18	$m\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 5A$		6		S
<b>Switching</b>						
$Q_g$	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V, I_D=5A$		7.2		nC
$Q_{gs}$	Gate-Source Charge			2.3		nC
$Q_{gd}$	Gate-Drain Charge			3		nC
$t_d(on)$	Turn-on Delay Time	$V_{GS}=10V, V_{DD}=15V, I_D=1A, R_G=6\Omega$		3.8		ns
$t_r$	Turn-on Rise Time			10		ns
$t_d(off)$	Turn-off Delay Time			22		ns
$t_f$	Turn-off Fall Time			6.6		ns
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		2.8		$\Omega$
<b>Dynamic</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=15V, f=1MHz$		620		pF
$C_{oss}$	Output Capacitance			85		pF
$C_{rSS}$	Reverse Transfer Capacitance			30		pF
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{ Force Current}$			35	A
$I_{SM}$	Pulsed Source Current <sup>3</sup>				70	A
$V_{SD}$	Diode Forward Voltage	$I_{SD} = 1A, V_{GS}=0V$			1.2	V

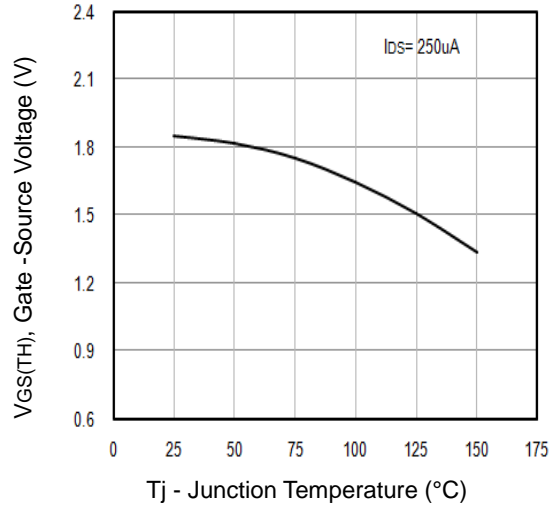
Note :

- 1, Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2,  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, R_G=25$  , Starting  $T_J=25^{\circ}\text{C}$ .
- 3, The data tested by pulsed , pulse width  $\cong 300\mu s$  , duty cycle  $\cong 2\%$ .
- 4, Essentially independent of operating temperature.

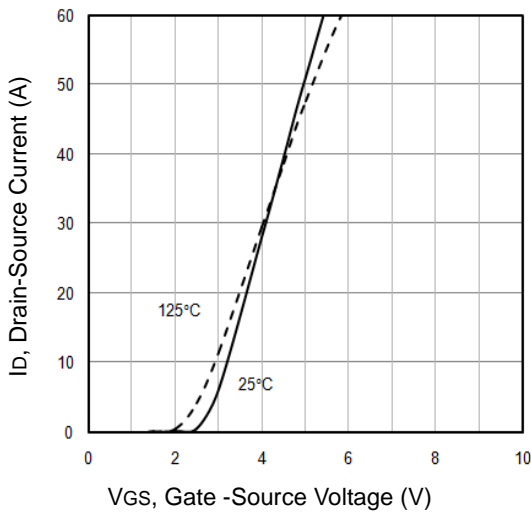
**Typical Characteristics**



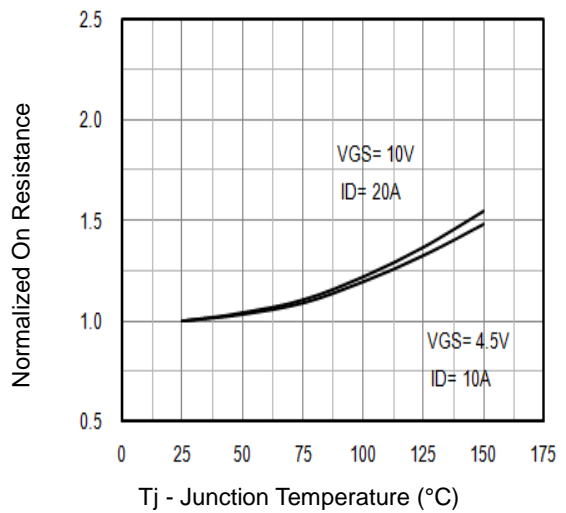
**Fig1.** Typical Output Characteristics



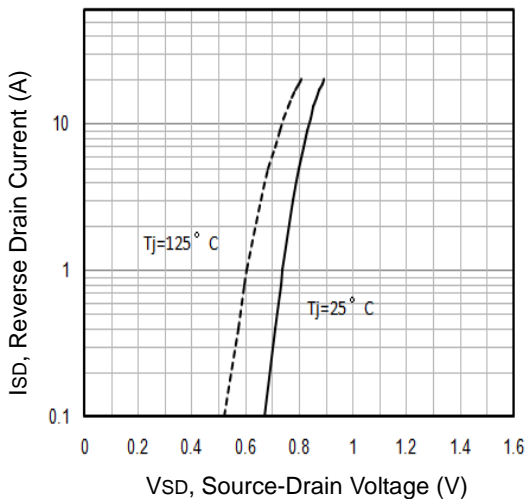
**Fig2.** Threshold Voltage Vs. Temperature



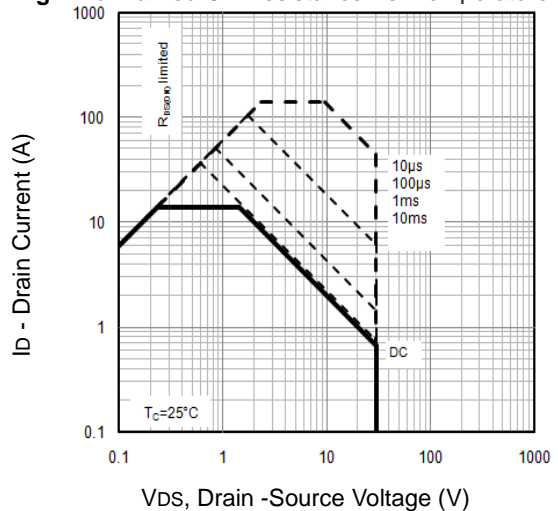
**Fig3.** Typical Transfer Characteristics



**Fig4.** Normalized On-Resistance Vs. Temperature

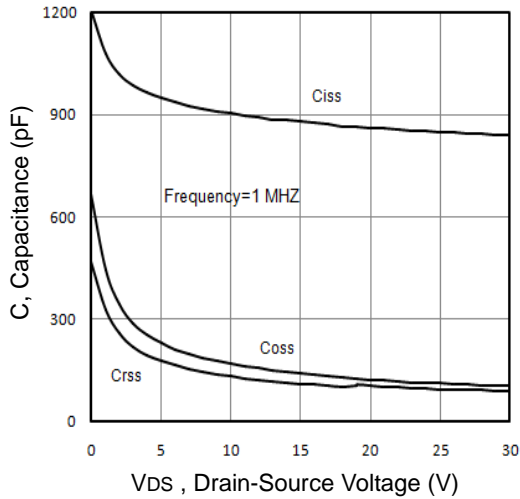


**Fig5.** Typical Source-Drain Diode Forward Voltage

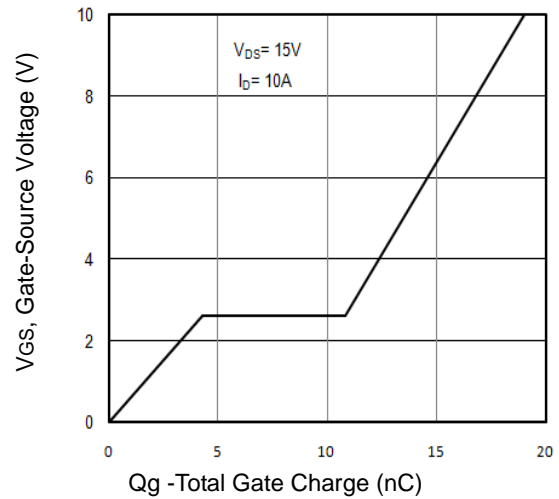


**Fig6.** Maximum Safe Operating Area

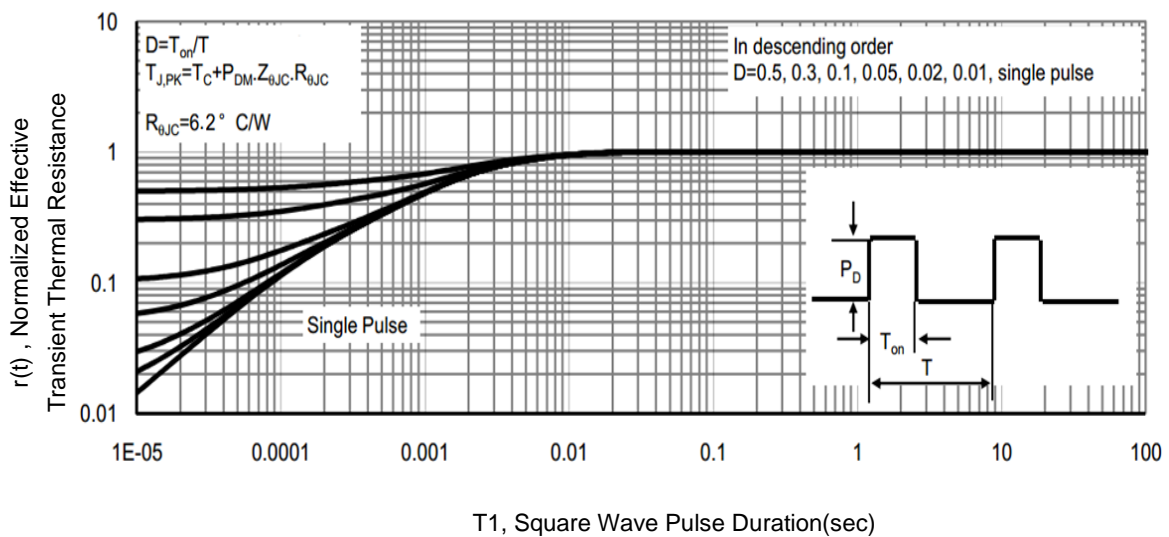
**Typical Characteristics**



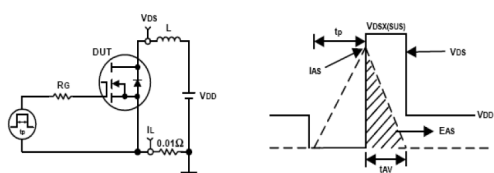
**Fig7.** Typical Capacitance Vs. Drain-Source Voltage



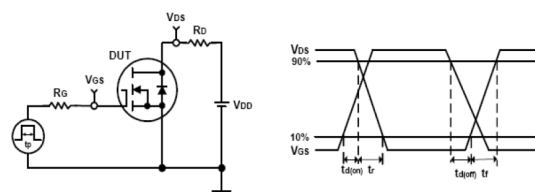
**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



**Fig9.** T1, Transient Thermal Response Curve



**Fig10.** Unclamped Inductive Test Circuit and waveforms



**Fig11.** Switching Time Test Circuit and waveforms



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