

### General Description

The WSD100N06GDN56 is the SGT MOSFET with extreme high cell density, which provide excellent  $R_{DS(on)}$  and gate charge for most of the synchronous buck converter applications.

The WSD100N06GDN56 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

### Features

- Lead Free and Green Devices Available

(RoHS Compliant)

- 100% UIS + Rg Tested
- Reliable and Rugged
- Moisture Sensitivity Level MSL1

(per JED EC J-STD-020D)

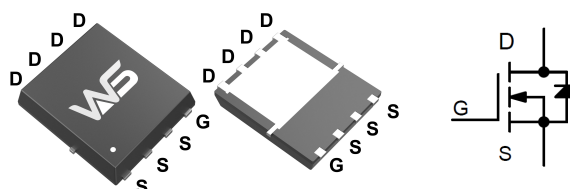
### Product Summary

$B_{VDSS}$	$R_{DS(on)}$	$I_D$
60V	3.0m $\Omega$	100A

### Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control
- Load Switching

### DFN5x6A-8\_EP Pin Configuration



### Absolute Maximum Ratings @ $T_A=25^{\circ}C$ unless otherwise noted

Symbol	Parameter		Rating	Units
$V_{DS}$	Drain-Source Voltage		60	V
$V_{GS}$	Gate-Source Voltage		$\pm 20$	V
$I_{D1,6}$	Continuous Drain Current	$T_C=25^{\circ}C$	100	A
		$T_C=100^{\circ}C$	65	
$I_{DM}^2$	Pulsed Drain Current	$T_C=25^{\circ}C$	240	A
$P_D$	Maximum Power Dissipation	$T_C=25^{\circ}C$	83	W
		$T_C=100^{\circ}C$	50	
$I_{AS}$	Avalanche Current, Single pulse		45	A
$E_{AS}^3$	Single Pulse Avalanche Energy		101	mJ
$T_J$	Maximum Junction Temperature		150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range		-55 to 150	$^{\circ}C$
$R_{\theta JA}^1$	Thermal Resistance Junction to ambient	Steady State	55	$^{\circ}C/W$
$R_{\theta JC}^1$	Thermal Resistance-Junction to Case	Steady State	1.5	$^{\circ}C/W$

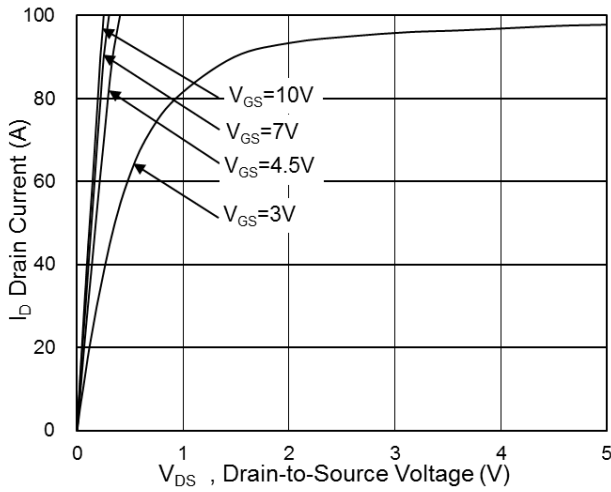
**Electrical Characteristics @ $T_A=25^{\circ}\text{C}$  unless otherwise noted**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 48V, V_{GS} = 0V$			1	$\mu A$
		$T_J = 85^{\circ}\text{C}$			30	
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	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
$R_{DS(on)}^2$	Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 20A$		3.0	3.6	$m\Omega$
		$V_{GS} = 4.5V, I_D = 15A$		4.4	5.4	$m\Omega$
<b>Switching</b>						
$Q_g$	Total Gate Charge	$V_{DS}=30V$ $V_{GS}=10V$ $I_D=20A$		58		nC
$Q_{gs}$	Gate-Source Charge			16		nC
$Q_{gd}$	Gate-Drain Charge			4.0		nC
$t_d(on)$	Turn-on Delay Time	$V_{GEN}=10V$ $V_{DD}=30V$ $I_D=20A$ $R_G=\Omega$		18		ns
$t_r$	Turn-on Rise Time			8		ns
$t_d(off)$	Turn-off Delay Time			50		ns
$t_f$	Turn-off Fall Time			11		ns
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$		0.7		$\Omega$
<b>Dynamic</b>						
$C_{iss}$	In Capacitance	$V_{GS}=0V$ $V_{DS}=30V$ $f=1\text{MHz}$		3458		pF
$C_{oss}$	Out Capacitance			1522		pF
$C_{rss}$	Reverse Transfer Capacitance			22		pF
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_{S1.5}$	Continuous Source Current	$V_G=V_D=0V$ , Force Current			55	A
$I_{SM}$	Pulsed Source Current <sup>3</sup>				240	A
$V_{SD}^2$	Diode Forward Voltage	$I_{SD} = 1A, V_{GS}=0V$		0.8	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=20A, dI_{SD}/dt=100A/\mu s$		27		ns
$Q_{rr}$	Reverse Recovery Charge				33	

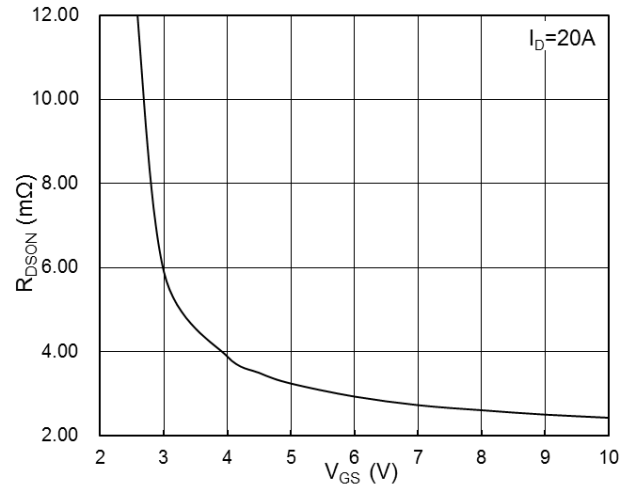
**Note :**

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating . The test condition is  $V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=40A$
- The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.
- The maximum current rating is package limited.

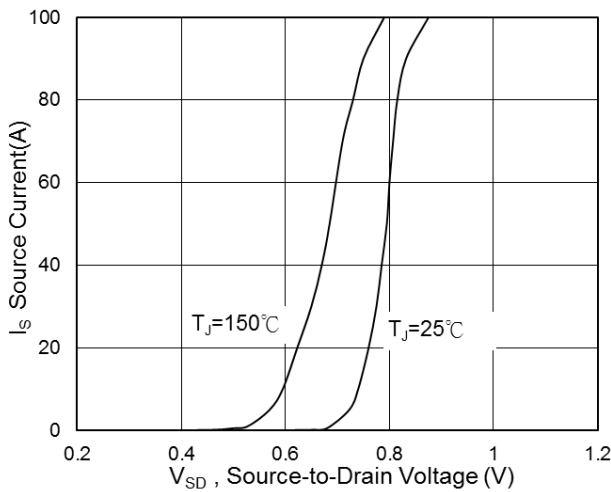
## Typical Operating Characteristics



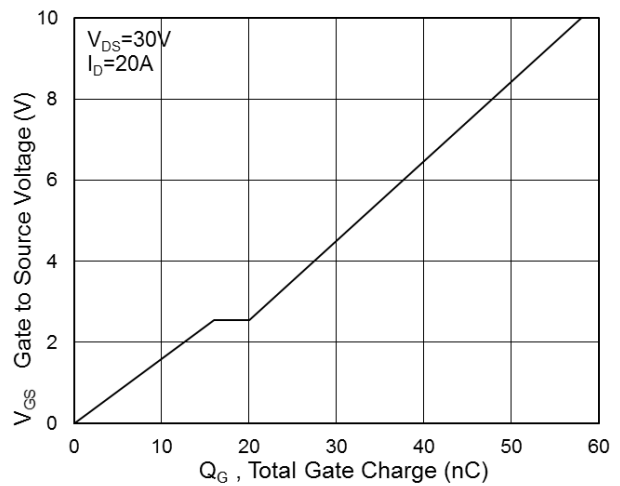
**Fig.1 Typical Output Characteristics**



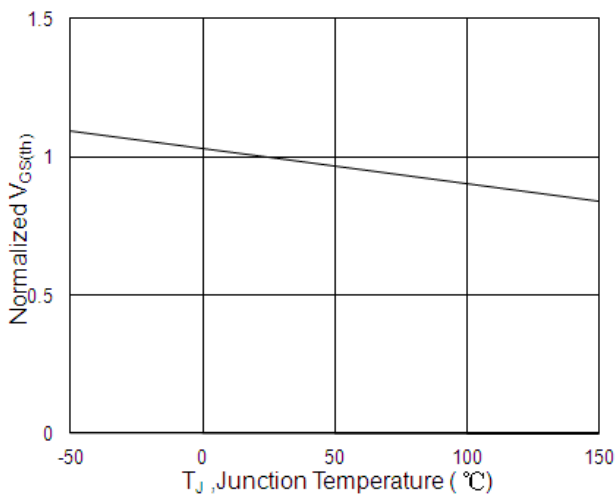
**Fig.2 On-Resistance vs G-S Voltage**



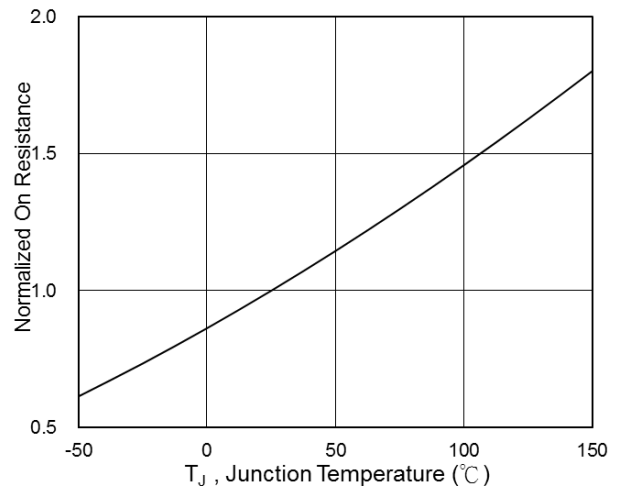
**Fig.3 Diode Forward Voltage vs. Current**



**Fig.4 Gate-Charge Characteristics**

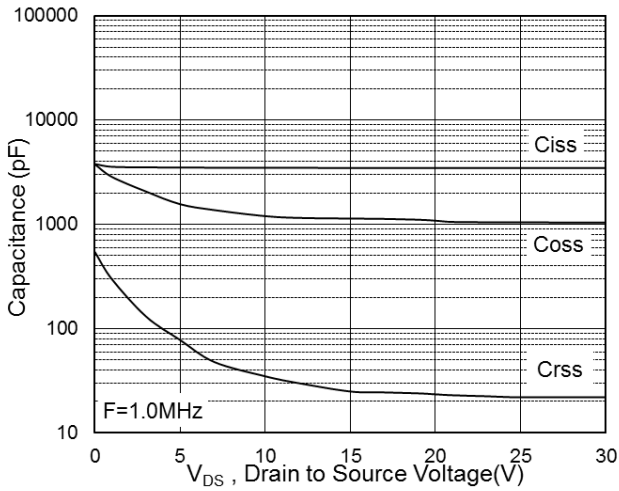


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

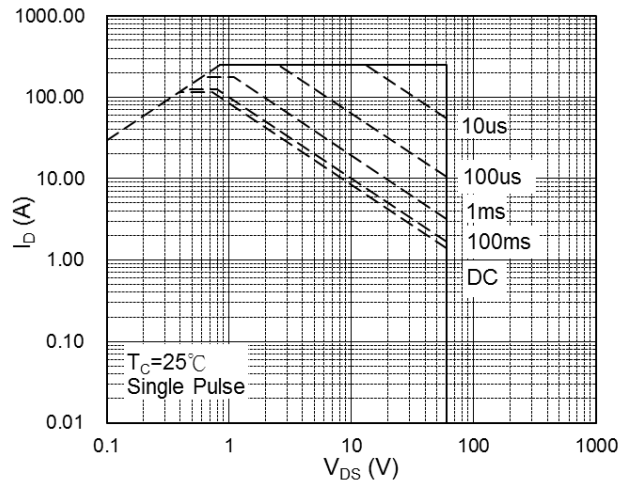


**Fig.6 Normalized  $R_{DSON}$  vs  $T_J$**

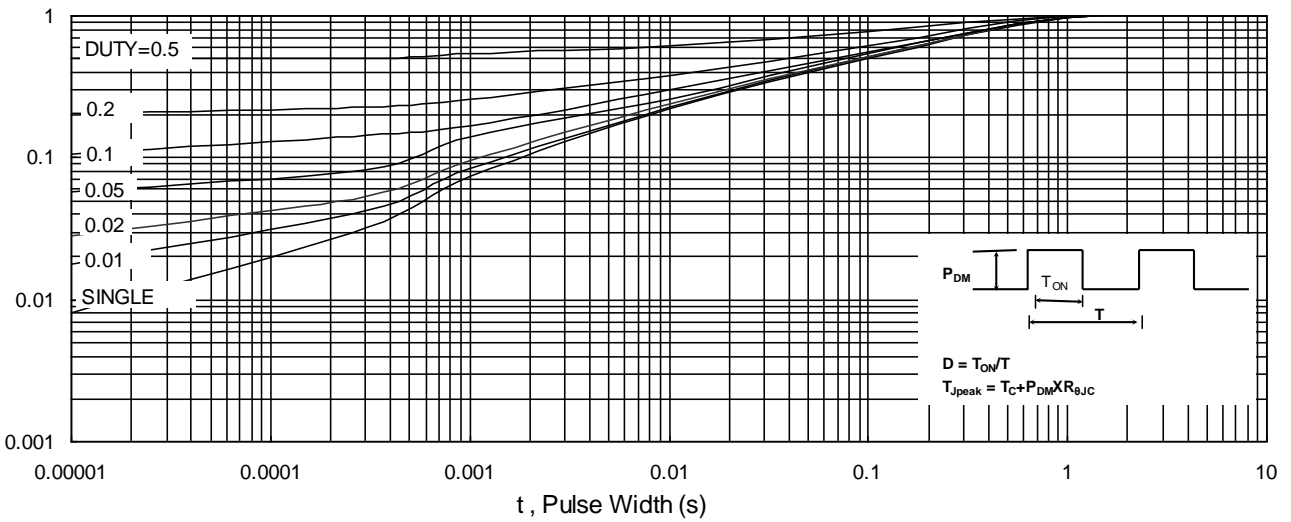
**Typical Operating Characteristics (Cont.)**



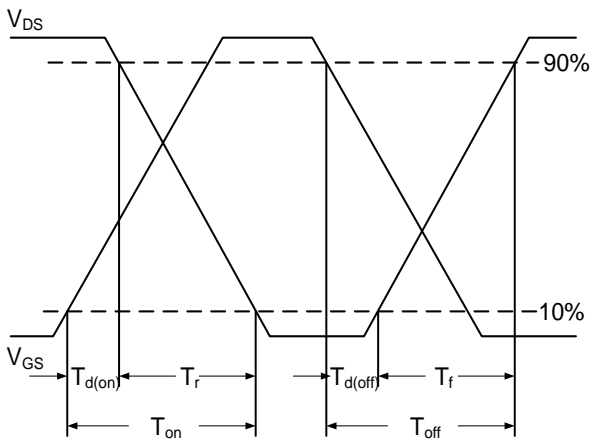
**Fig.7 Capacitance**



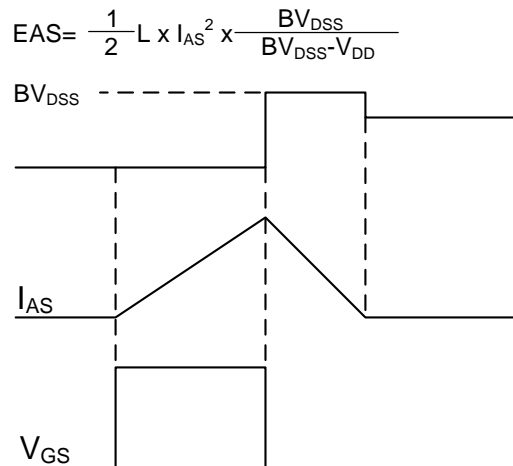
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**



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