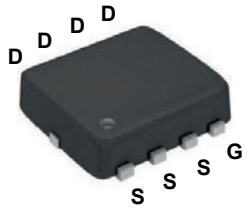
GOOD-ARK SEMICONDUCTOR

GSGN4R303

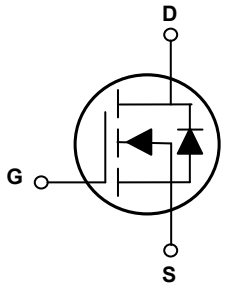
30V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	3.5mΩ (Typ.)
I_D	70A



PPAK3x3



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The GSGN4R303 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)[1]	I_D	70	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		44	A
Pulsed Drain Current[2]	I_{DM}	280	A
Power Dissipation (T_C=25°C)	P_D	35	W
Linear Derating Factor (T_C=25°C)		1.4	W/°C
Single Pulse Avalanche Energy[3]	E_{AS}	36	mJ
Junction-to-Case	$R_{\theta JC}$	3.57	°C/W
Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	59.0	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	30	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		T_J=125°C	-	0.5	-	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V	-	-	100	nA
		V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A	-	3.5	4.3	mΩ
		V_{GS}=4.5V, I_D=10A	-	5.3	6.8	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	-	2.8	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz	-	1073	-	pF
Output Capacitance	C_{oss}		-	651	-	
Reverse Transfer Capacitance	C_{rss}		-	57	-	
Total Gate Charge	Q_g	I_D=25A, V_{DD}=15V, V_{GS}=4.5V	-	9.6	-	nC
Gate-to-Source Charge	Q_{gs}		-	4.6	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	3.0	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=4.5V, V_{DD}=20V, I_D=25A, R_{GEN}=5Ω	-	10	-	nS
Rise Time	t_r		-	44	-	
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	
Fall Time	t_f		-	13	-	
Gate Resistance	R_g	f=1MHz	-	1.1	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	70	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	280	A
Diode Forward Voltage	V_{SD}	I_S=10A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time	T_{rr}	I_S=25A, V_{GS}=0V, V_R=30V di/dt=100A/μs	-	28	-	nS
Reverse Recovery Charge	Q_{rr}		-	18	-	nC

Notes:

1. Pulse test: Pulse width ≤300us, duty cycle ≤2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. L=0.5mH, R_G=10Ω, V_{DD}=50V, T_J=25°C.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

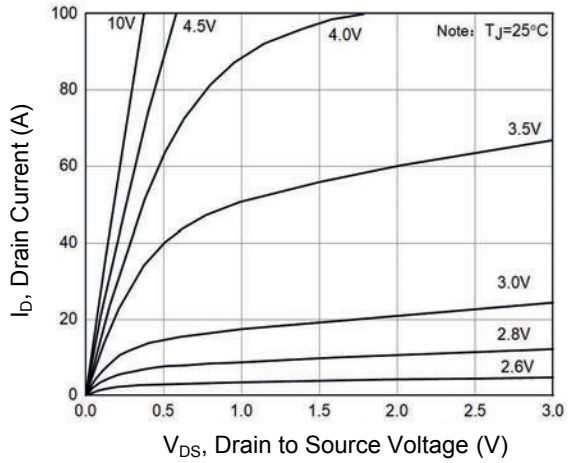


Figure 1. Output Characteristics

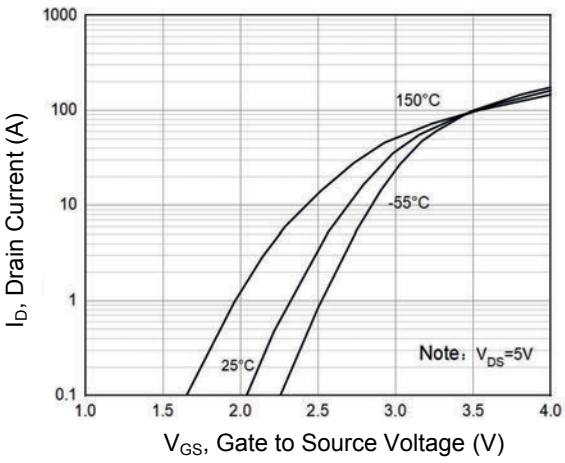


Figure 2. Transfer Characteristics

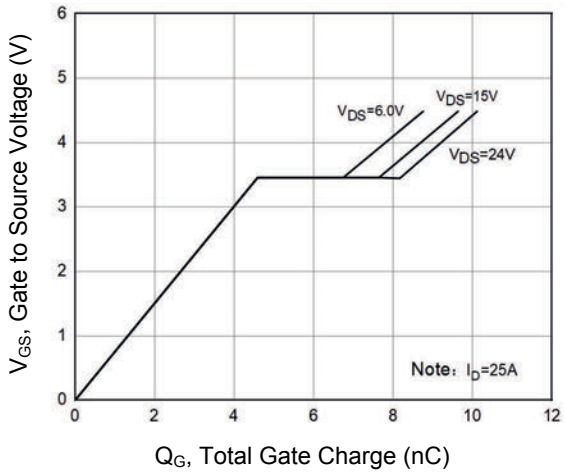


Figure 3. Gate Charge

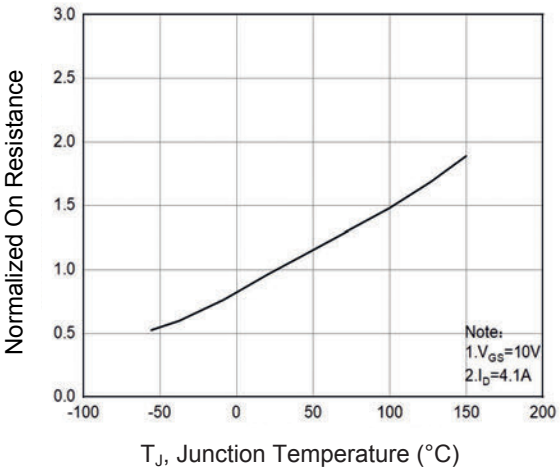


Figure 4. Normalized $R_{DS(ON)}$ Vs. T_J

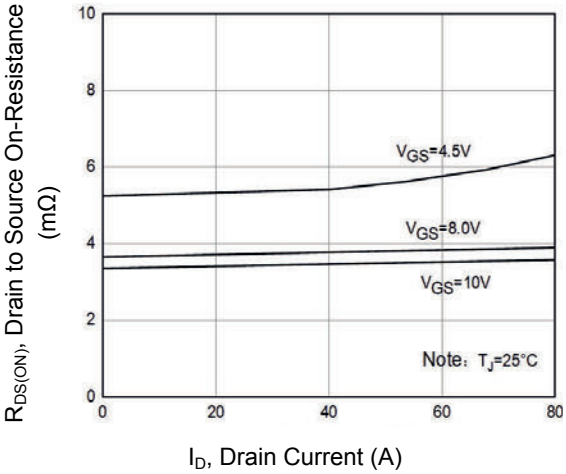


Figure 5. $R_{DS(ON)}$ Vs. Drain Current

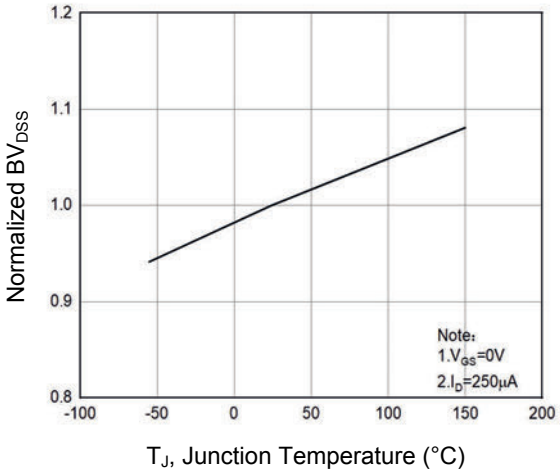


Figure 6. Normalized BV_{DSS} Vs. T_J

Typical Electrical and Thermal Characteristic Curves

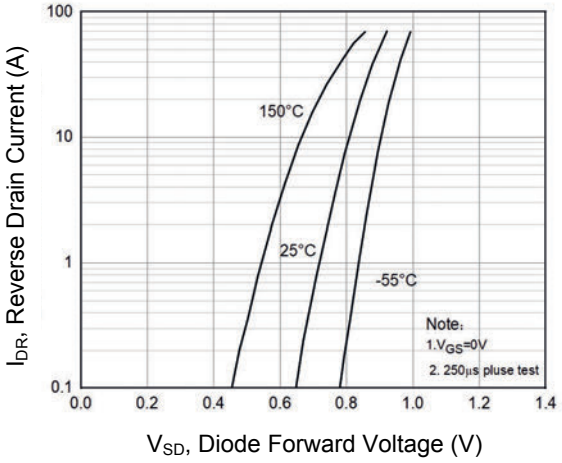


Figure 7. Body Diode Characteristics

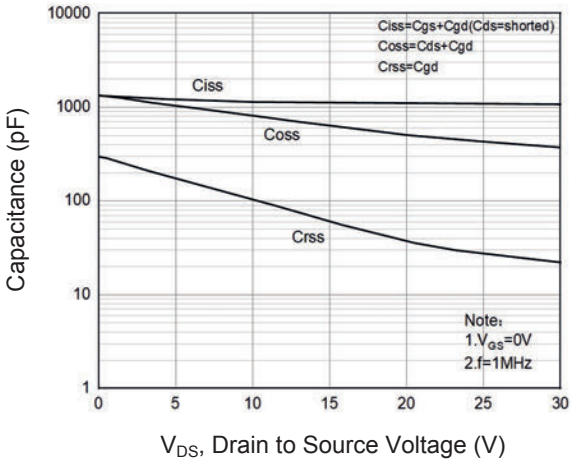


Figure 8. Capacitance Characteristics

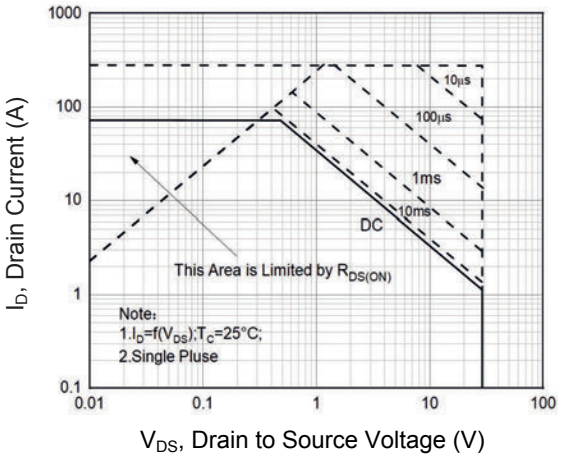


Figure 9. Safe Operation Area

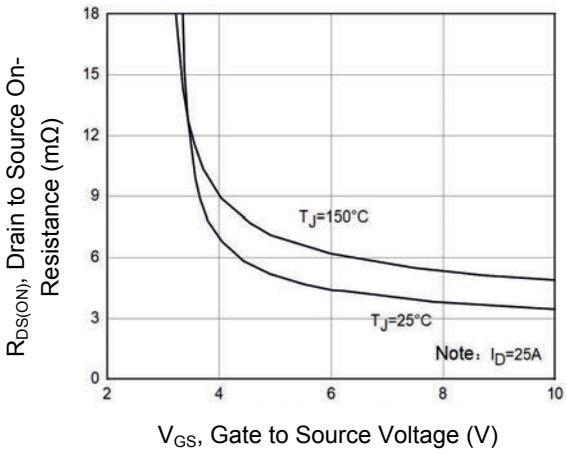


Figure 10. $R_{DS(on)}$ vs. Gate to Source Voltage

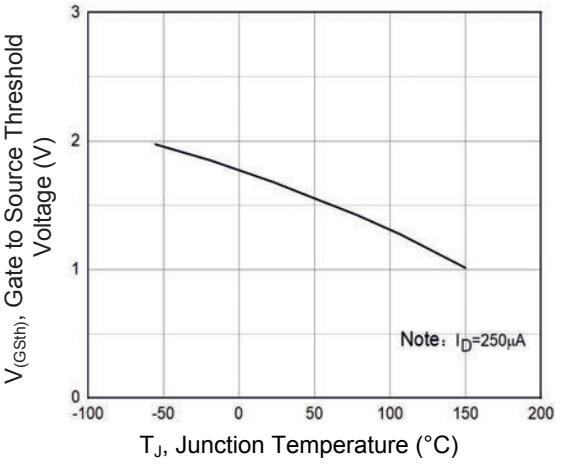


Figure 11. $V_{GS(th)}$ vs. Junction Temperature

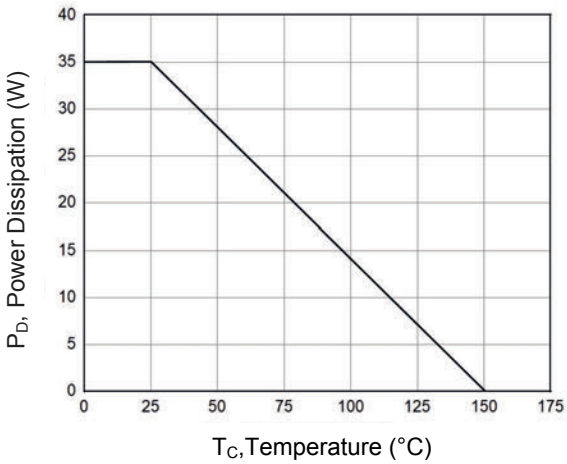
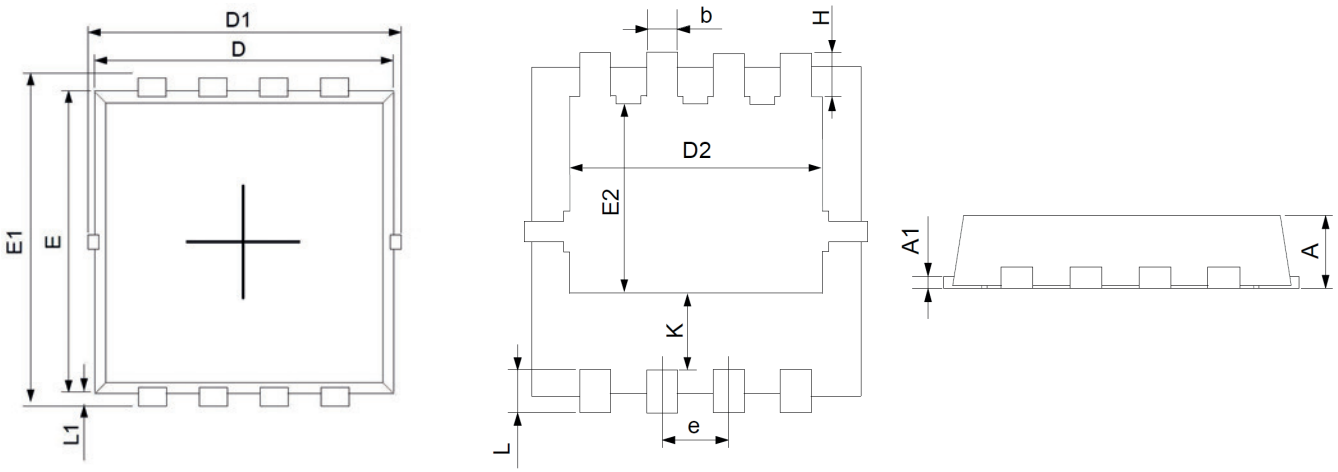


Figure 12. P_D vs. Junction Temperature

Package Outline Dimensions (PPAK3x3)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.70	0.90	0.028	0.035
A1	0.14	0.20	0.006	0.008
D	3.05	3.25	0.120	0.128
E	2.90	3.10	0.114	0.122
D1	3.10	3.50	0.122	0.138
D2	2.35	2.50	0.093	0.098
E1	3.10	3.50	0.122	0.138
E2	1.64	1.84	0.065	0.072
b	0.25	0.35	0.010	0.014
K	0.59	0.79	0.023	0.031
e	0.55	0.75	0.022	0.030
L	0.25	0.55	0.010	0.022
L1	0.10	0.20	0.004	0.008
H	0.32	0.52	0.013	0.020

Order Information

Device	Package	Marking	Carrier	Quantity
GSGN4R303	PPAK3x3	N4R303	Tape & Reel	5,000pcs / Reel