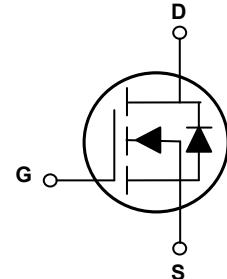


## Main Product Characteristics

$V_{(BR)DSS}$	100V
$R_{DS(ON)}$	13mΩ (max.)
$I_D$	50A



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 GSFN13010 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ ) <sup>1</sup>	$I_D$	50	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )		35	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	200	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	45	W
Linear Derating Factor ( $T_C=25^\circ\text{C}$ )		0.36	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	31	mJ
Junction-to-Case	$R_{\theta JC}$	2.78	$^\circ\text{C}/\text{W}$
Junction-to-Ambient (PCB Mounted, Steady-State) <sup>4</sup>	$R_{\theta JA}$	62.0	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	100	-	-	V
Drain-to-Source Leakage Current	$I_{\text{DSS}}$	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
		$T_J=125^\circ\text{C}$	-	-	20	
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{GS}=20\text{V}$	-	-	100	$\text{nA}$
		$V_{GS}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(\text{on})}$	$V_{GS}=10\text{V}, I_D=20\text{A}$	-	11	13	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=10\text{A}$	-	15	20	
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.1	-	2.6	V
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0\text{V}, V_{DS}=50\text{V}$ $F=1\text{MHz}$	-	1716	-	$\text{pF}$
Output Capacitance	$C_{oss}$		-	171	-	
Reverse Transfer Capacitance	$C_{rss}$		-	4	-	
Total Gate Charge	$Q_g$	$I_D=20\text{A}, V_{DS}=50\text{V}, V_{GS}=10\text{V}$	-	29	-	$\text{nC}$
Gate-to-Source Charge	$Q_{gs}$		-	7.1	-	
Gate-to-Drain ("Miller") Charge	$Q_{gd}$		-	7.0	-	
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, I_D=20\text{A}, R_{\text{GEN}}=3\Omega$	-	7.6	-	$\text{nS}$
Rise Time	$t_r$		-	28	-	
Turn-Off Delay Time	$t_{d(\text{off})}$		-	32	-	
Fall Time	$t_f$		-	11	-	
Gate Resistance	$R_g$	$F=1\text{MHz}$	-	2.4	-	$\Omega$
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse-p-n junction diode.	-	-	50	A
Pulsed Source Current (Body Diode)	$I_{SM}$		-	-	200	A
Diode Forward Voltage	$V_{SD}$	$I_S=20\text{A}, V_{GS}=0\text{V}$	-	1.0	1.3	V
Reverse Recovery Time	$T_{rr}$	$T_J=25^\circ\text{C}, I_F=20\text{A}, \frac{dI}{dt}=100\text{A}/\mu\text{s}$	-	42	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	50	-	nC

Notes:

1. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $L=0.1\text{mH}, V_{DD}=80\text{V}, I_{AS}=25\text{A}, R_G=25\Omega, T_J=25^\circ\text{C}$ .
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

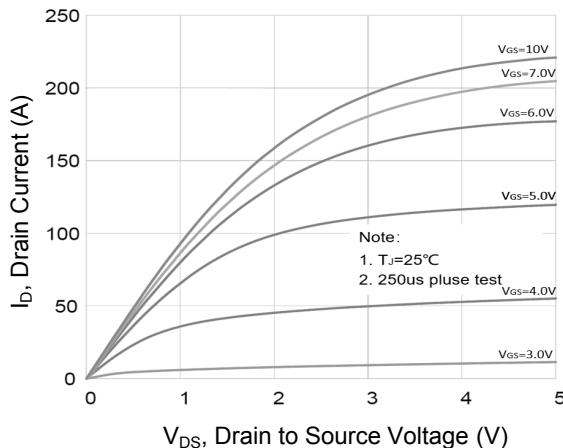


Figure 1. Output Characteristics

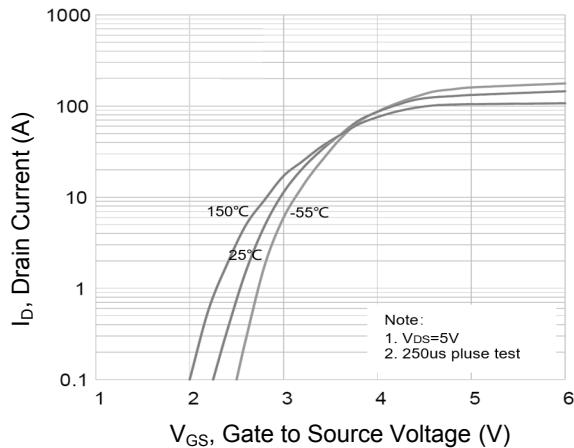


Figure 2. Transfer Characteristics

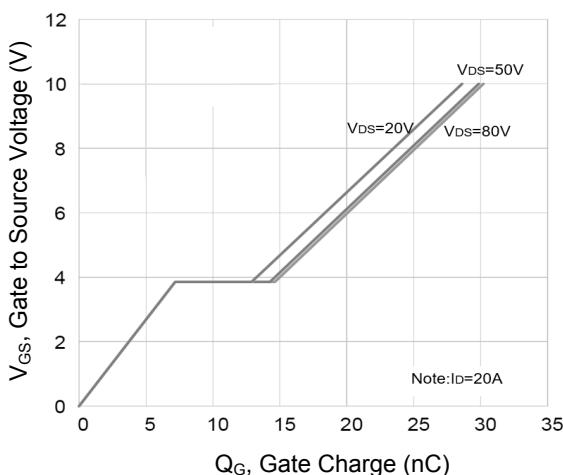


Figure 3. Gate Charge

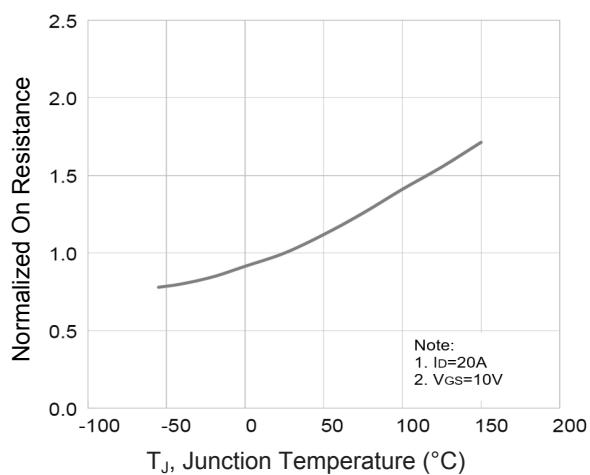


Figure 4. Normalized  $R_{DS(ON)}$  Vs.  $T_J$

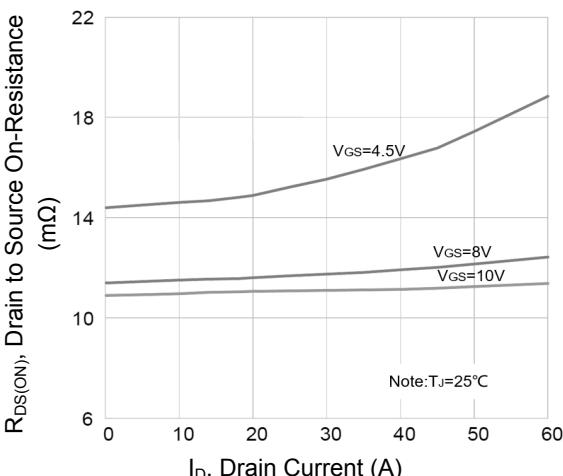


Figure 5.  $R_{DS(ON)}$  Vs. Drain Current

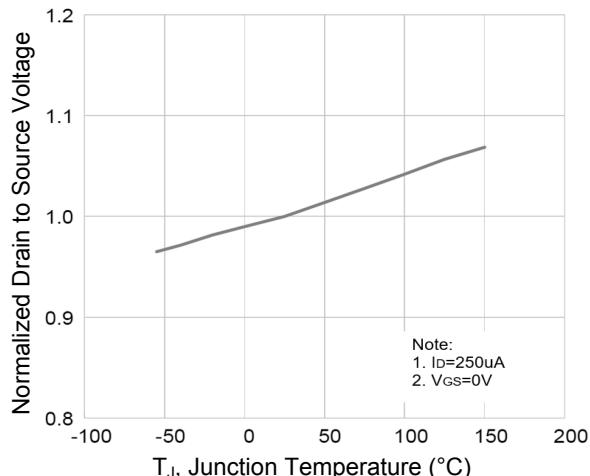
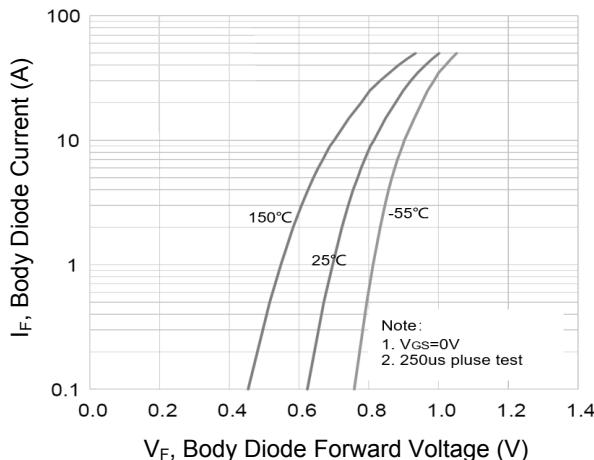
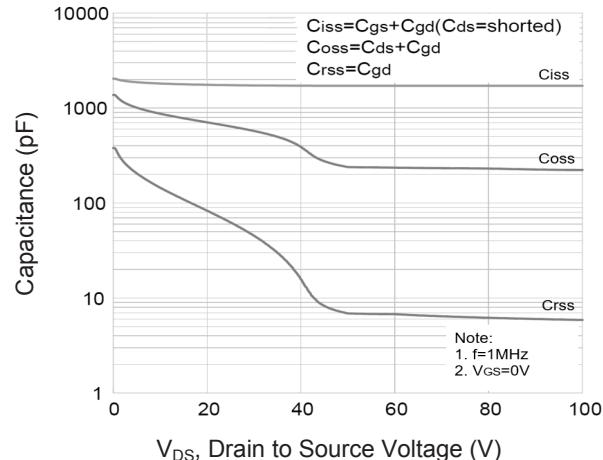


Figure 6. Normalized  $BV_{DSS}$  Vs.  $T_J$

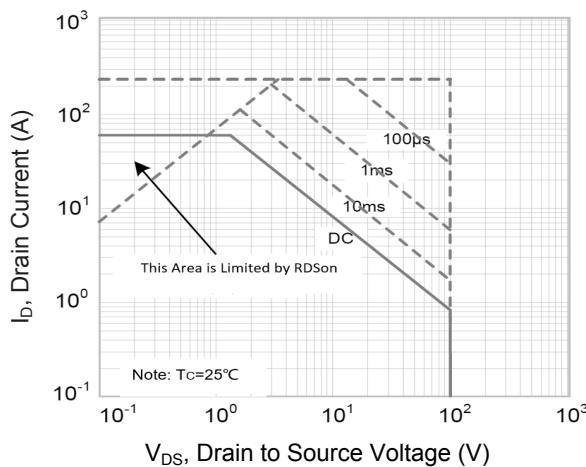
### Typical Electrical and Thermal Characteristic Curves



**Figure 7. Body Diode Characteristics**

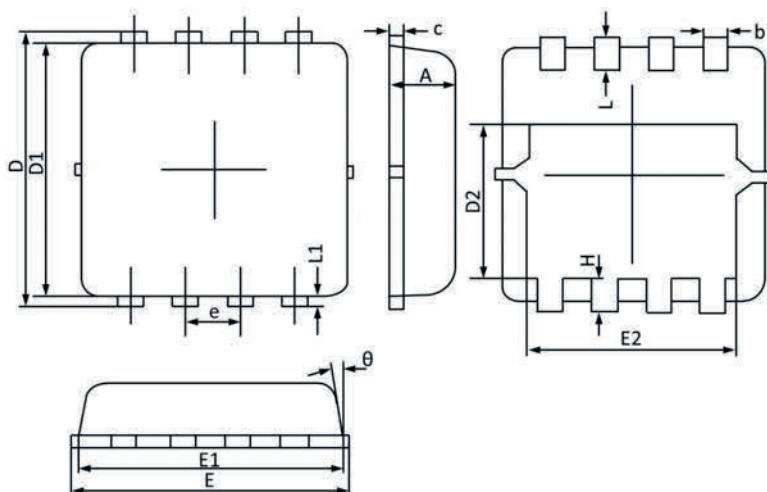


**Figure 8. Capacitance Characteristics**



**Figure 9. Safe Operation Area**

### Package Outline Dimensions (PPAK3x3)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.70	0.90	0.028	0.035
b	0.25	0.35	0.010	0.014
c	0.10	0.25	0.004	0.010
D	3.05	3.50	0.120	0.138
D1	2.90	3.20	0.114	0.126
D2	1.35	1.95	0.053	0.077
E	3.00	3.40	0.118	0.134
E1	2.90	3.30	0.114	0.130
E2	2.35	2.60	0.093	0.102
e	0.65 BSC		0.026 BSC	
H	0.30	0.75	0.012	0.030
L	0.30	0.60	0.012	0.024
L1	0.06	0.20	0.002	0.008
θ	6°	14°	6°	14°

### Order Information

Device	Package	Marking	Carrier	Quantity
GSFN13010	PPAK3x3	N13010	Tape & Reel	5,000pcs / Reel