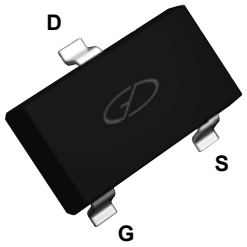
GOOD-ARK
SEMICONDUCTOR

GSFC3415

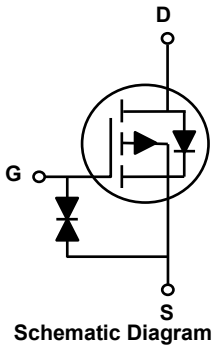
20V P-Channel MOSFET

Main Product Characteristics

BV_{DSS}	-20V
$R_{DS(ON)}$	36mΩ @ -4.5V(max.)
	49mΩ @ -2.5V(max.)
	55mΩ @ -1.8V(max.)
I_D	-4A



SOT-23



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 GSFC3415 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_A=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	-4	A
Drain Current-Pulsed[1]	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.4	W
Thermal Resistance, Junction-to-Ambient[2]	$R_{\theta JA}$	89	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V , V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±5V, V_{DS}=0V	-	-	±1	μA
		V_{GS}=±8V, V_{DS}=0V	-	-	±5	μA
		V_{GS}=±10V, V_{DS}=0V	-	-	±10	μA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.35	-0.65	-0.9	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-4A	-	29	36	mΩ
		V_{GS}=-2.5V, I_D=-4A	-	37	49	
		V_{GS}=-1.8V, I_D=-3A	-	45	55	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-4A	8	-	-	S
Dynamic Characteristics[4]						
Input Capacitance	C_{lss}	V_{DS}=-10V, V_{GS}=0V, F=1MHz	-	1181.1	-	pF
Output Capacitance	C_{oss}		-	121.3	-	
Reverse Transfer Capacitance	C_{rss}		-	114.8	-	
Switching Characteristics[4]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-10V, R_L=2.5Ω V_{GS}=-4.5V, R_{GEN}=3Ω	-	12	-	nS
Turn-On Rise Time	t_r		-	10	-	
Turn-Off Delay Time	$t_{d(off)}$		-	19	-	
Turn-Off Fall Time	t_f		-	25	-	
Total Gate Charge	Q_g	V_{DS}=-10V, I_D=-4A, V_{GS}=-4.5V	-	10.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.3	-	
Gate-Drain Charge	Q_{gd}		-	2.4	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=-4A	-	-	-1.2	V
Diode Forward Current[2]	I_S		-	-	-4	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristic Curves

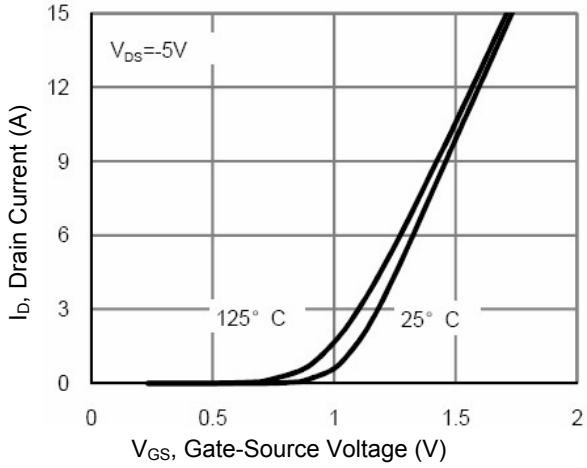


Figure 1. Transfer Characteristics

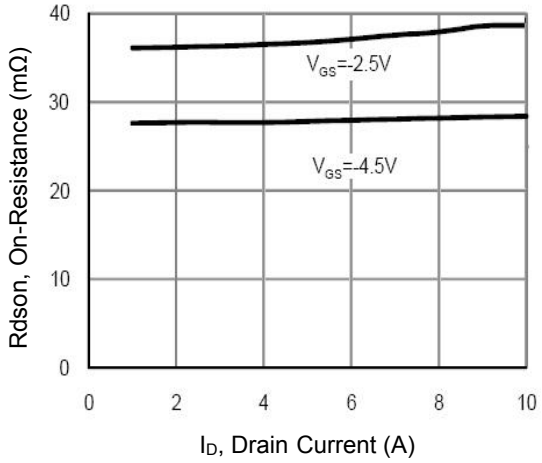


Figure 2. Drain-Source On-Resistance

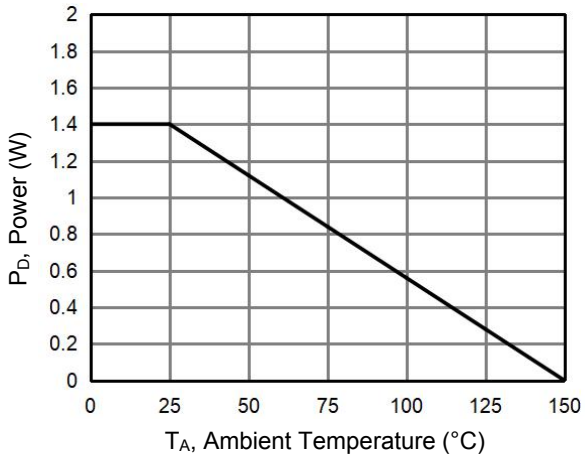


Figure 3. Power Dissipation

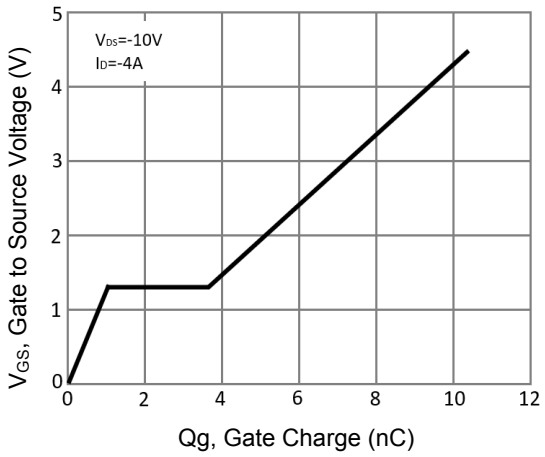


Figure 4. Gate Charge

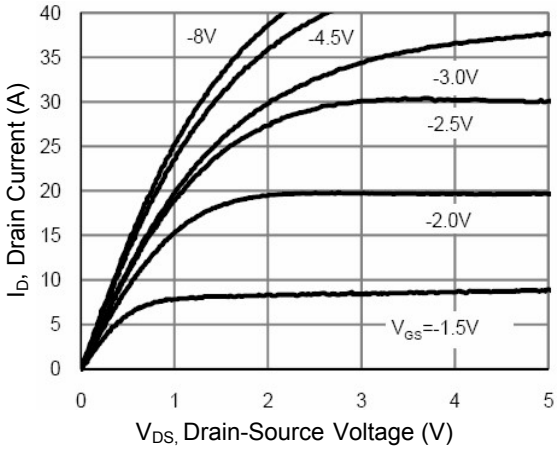


Figure 5. Output Characteristics

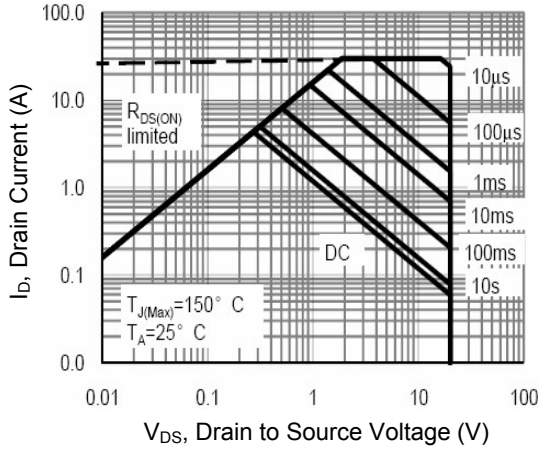


Figure 6. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

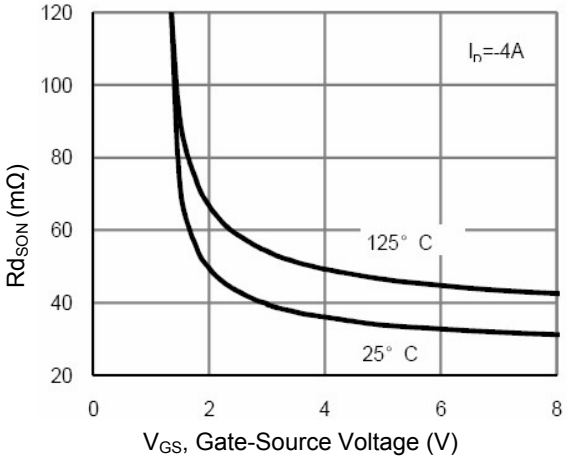


Figure 7. Rdson vs. V_{GS}

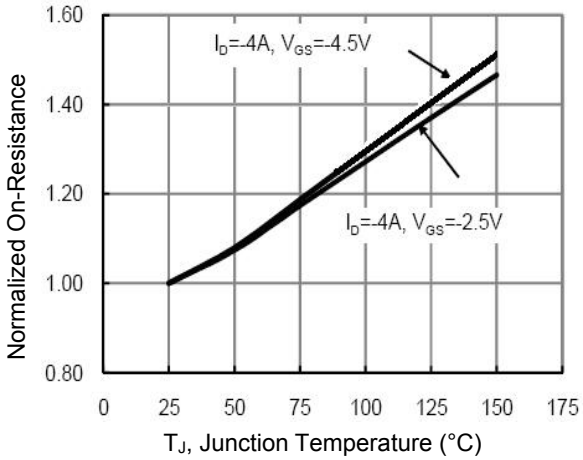


Figure 8. Drain to Source On-Resistance

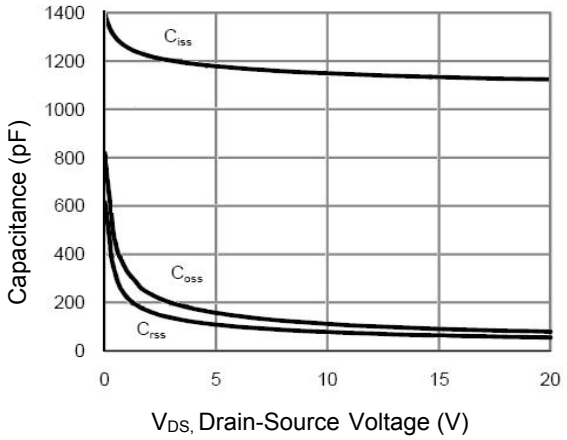


Figure 9. Capacitance vs. V_{DS}

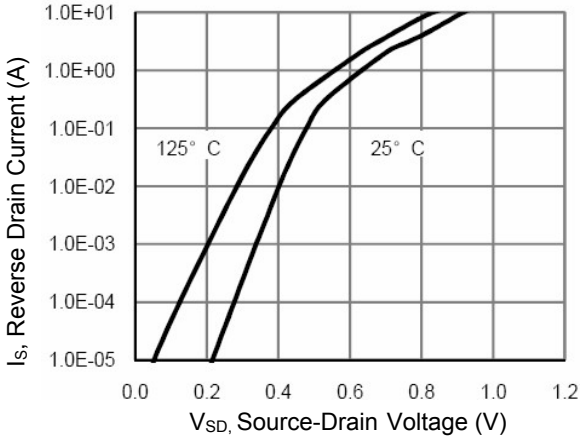


Figure 10. Source-Drain Diode Forward

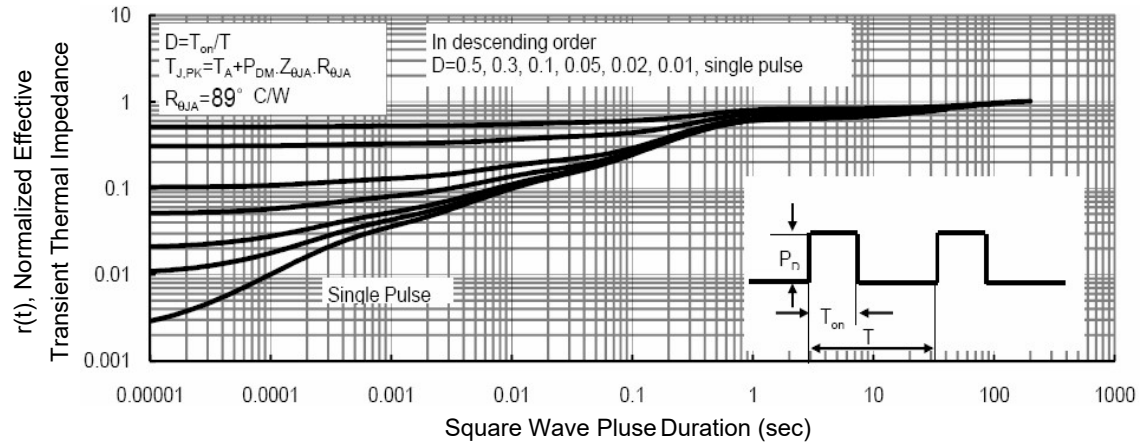
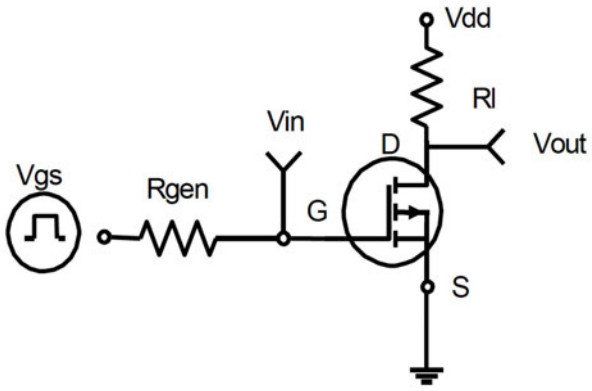
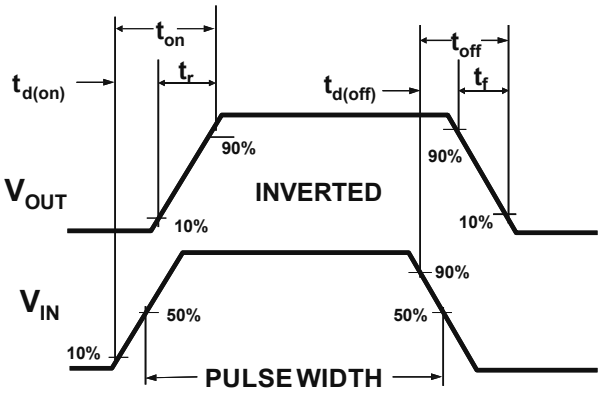


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

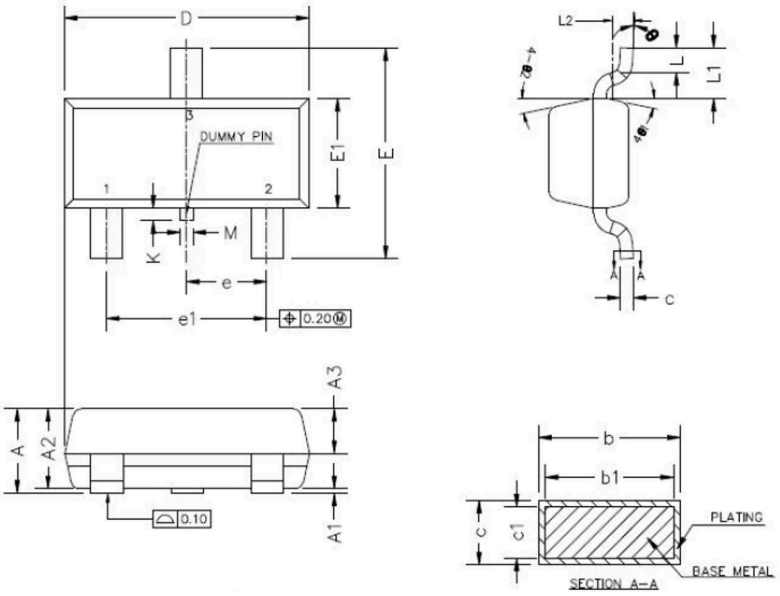


Firgure 12. Switching Test Circuit



Firgure 13. Switching Waveforms

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.890	1.120	0.035	0.044
A1	0.010	0.100	0.000	0.004
A2	0.880	1.020	0.035	0.040
A3	0.430	0.630	0.017	0.025
b	0.360	0.500	0.014	0.020
b1	0.350	0.450	0.014	0.018
c	0.140	0.200	0.006	0.008
c1	0.140	0.160	0.006	0.006
D	2.800	3.000	0.110	0.118
E	2.350	2.640	0.093	0.104
E1	1.200	1.400	0.047	0.055
e	0.900	1.000	0.035	0.039
e1	1.800	2.000	0.071	0.079
L	0.400	0.600	0.016	0.024
L1	0.600 REF		0.024 REF	
L2	0.250 BSC		0.010 BSC	
θ	0°	8°	0°	8°
θ1	10°	14°	10°	14°
θ2	10°	14°	10°	14°

Order Information

Device	Package	Marking	Carrier	Quantity
GSFC3415	SOT-23	3415	Tape & Reel	3,000 pcs / Reel