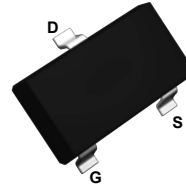
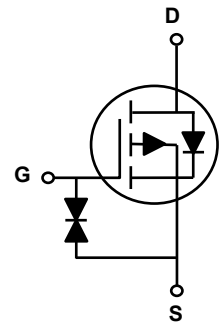


Main Product Characteristics

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 ($T_A=25^\circ\text{C}$ 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	$^\circ\text{C/W}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ 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 _{iss}	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristic Curves

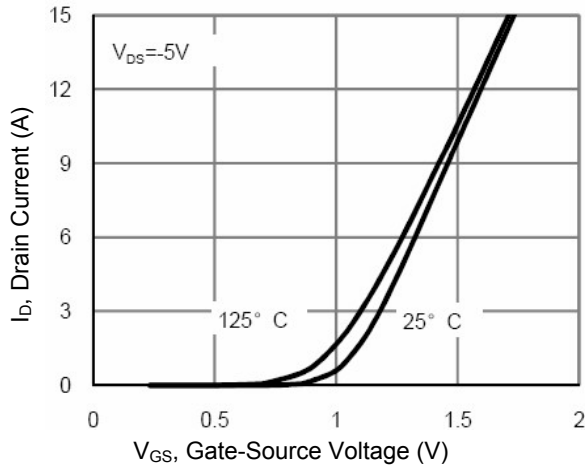


Figure 1. Transfer Characteristics

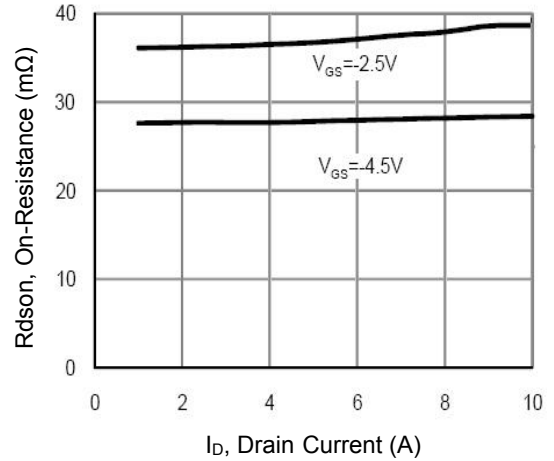


Figure 2. Drain-Source On-Resistance

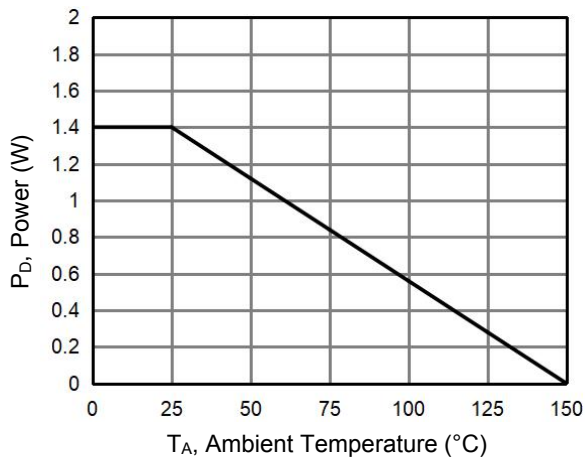


Figure 3. Power Dissipation

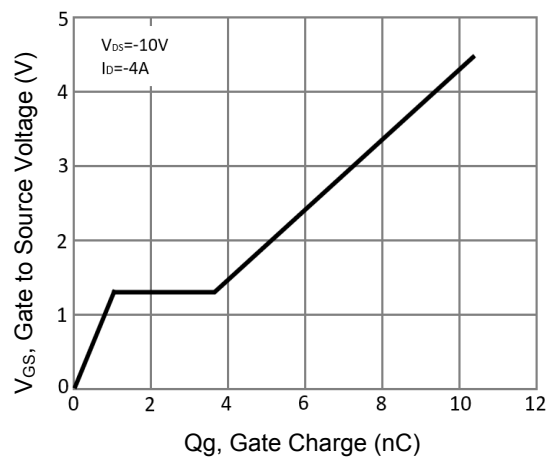


Figure 4. Gate Charge

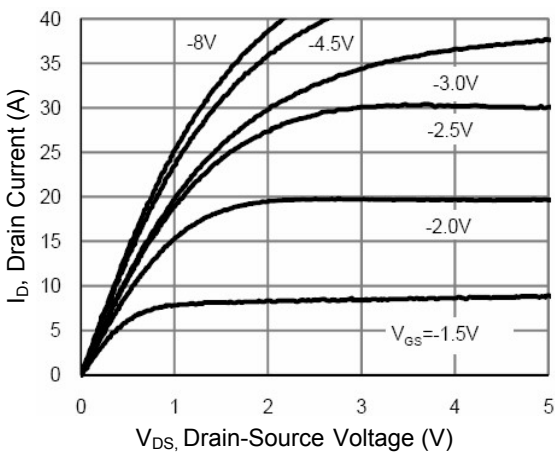


Figure 5. Output Characteristics

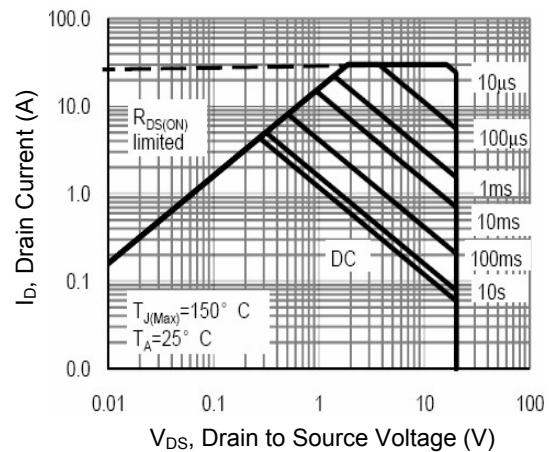


Figure 6. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

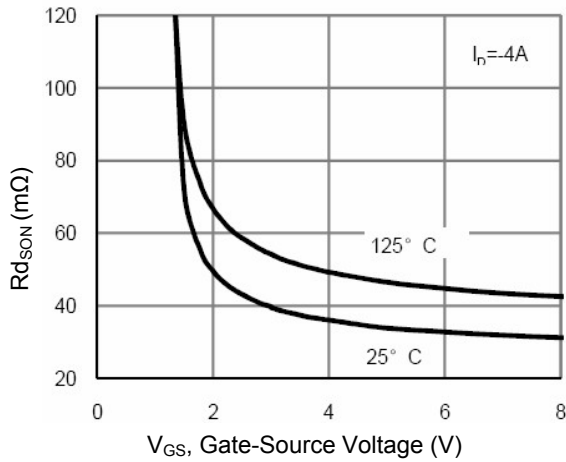


Figure 7. $R_{DS(on)}$ vs. V_{GS}

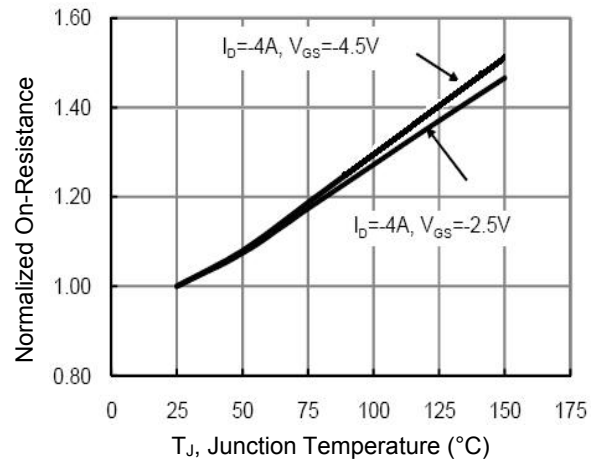


Figure 8. Drain to Source On-Resistance

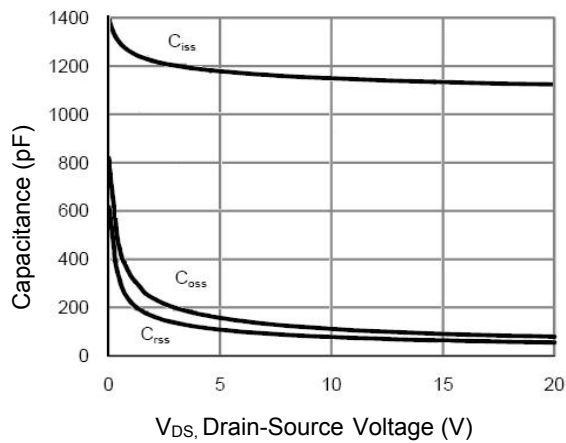


Figure 9. Capacitance vs. V_{DS}

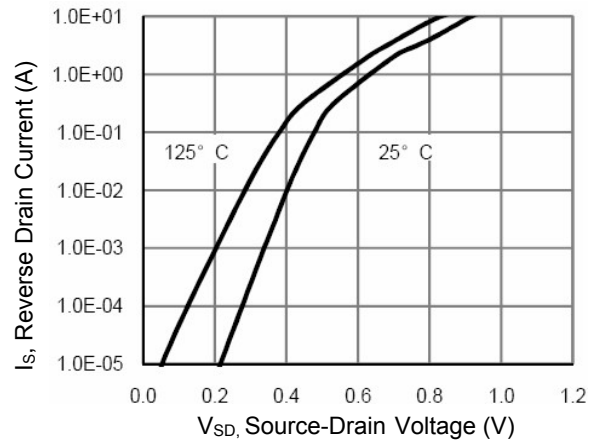


Figure 10. Source-Drain Diode Forward

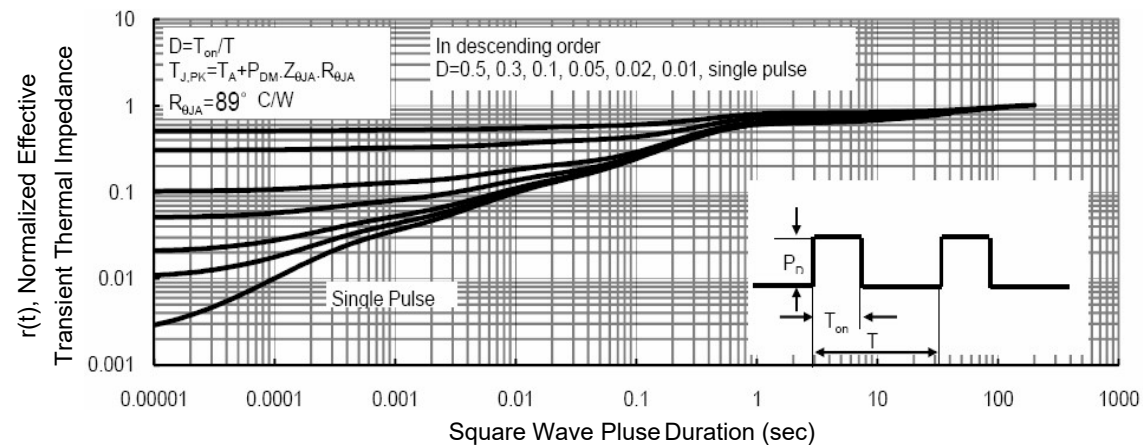


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

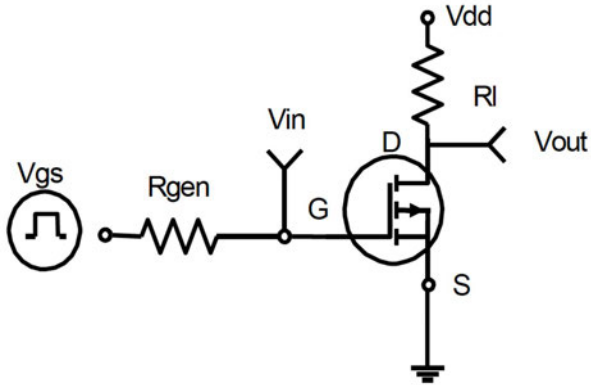


Figure 12. Switching Test Circuit

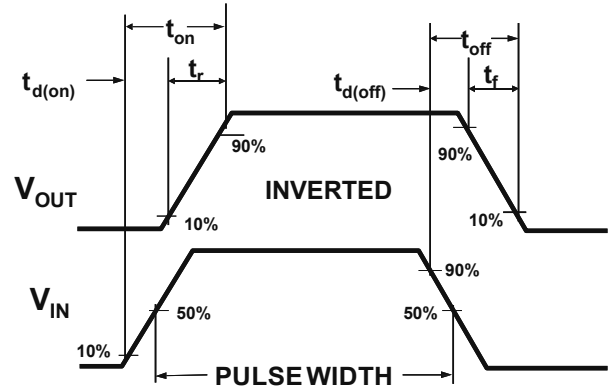
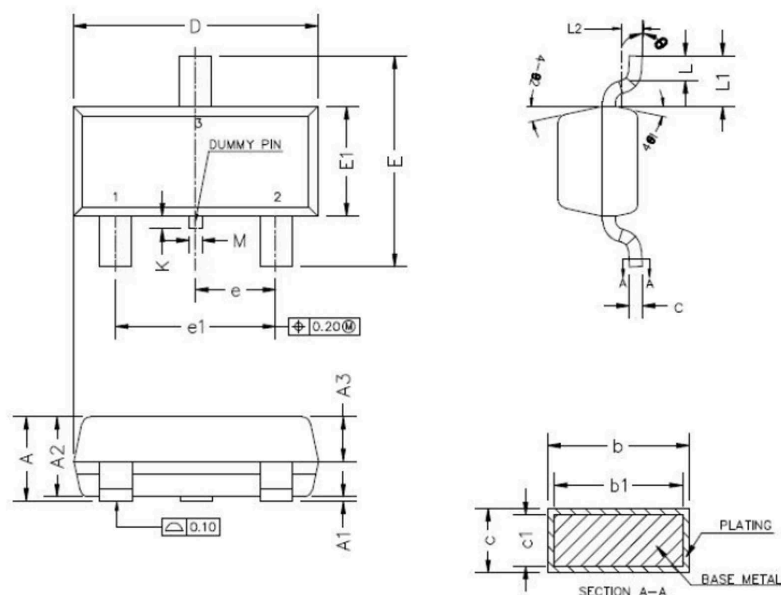


Figure 13. Switching Waveforms

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