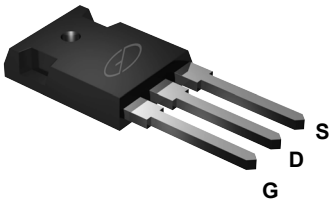
GOOD-ARK SEMICONDUCTOR

GSFA15002

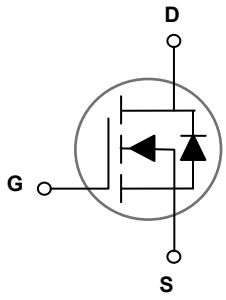
1500V N-Channel MOSFET

Main Product Characteristics

V_{DS}	1500V
$R_{DS(ON)}$	10Ω
I_D	2.5A



TO-247



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 GSFA15002 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 supply and a wide variety of other applications.

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	1500	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current (Tc=25°C)	$I_{D\ (DC)}$	2.5	A
Continuous Drain Current (Tc=100°C)	$I_{D\ (DC)}$	1.6	A
Pulsed Drain Current[1]	$I_{DM\ (pluse)}$	10	A
Maximum Power Dissipation (Tc=25°C)	P_D	100	W
Power Dissipation-Derate Above 25°C		0.8	W/°C
Single Pulse Avalanche Energy[2]	E_{AS}	36.5	mJ
Avalanche Current[2]	I_{AS}	2.7	A
Thermal Resistance，Junction-to-Case	$R_{\theta JC}$	1.25	°C/W
Thermal Resistance，Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Operating Junction Temperature Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off States						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	1500	-	-	V
Zero Gate Voltage Drain Current(Tc=25°C)	I_{DSS}	V_{DS}=1200V, V_{GS}=0V	-	-	1	μA
Zero Gate Voltage Drain Current(Tc=85°C)	I_{DSS}	V_{DS}=960V, V_{GS}=0V	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	3.2	5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	7	10	Ω
Forward Transconductance	gfs	V_{DS}=10V I_D=1A	-	1	-	S
Gate Resistance	Rg	VGS=0V,V_{DS}=0V,F=1.0MHz	-	5.6	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=100V, V_{GS}=0V, F=1.0MHz	-	1150	2300	pF
Output Capacitance	C_{oss}		-	50	100	pF
Reverse Transfer Capacitance	C_{rss}		-	23	46	pF
Total Gate Charge[3,4]	Q_g	V_{DS}=100V, I_D=1A, V_{GS}=10V	-	41	82	nC
Gate-Source Charge[3,4]	Q_{gs}		-	12	24	nC
Gate-Drain Charge[3,4]	Q_{gd}		-	12.4	25	nC
Switching Times						
Turn-on Delay Time[3,4]	$t_{d(on)}$	V_{DD}=100V, I_D=1A, R_G=6Ω, V_{GS}=10V	-	38	70	nS
Turn-on Rise Time[3,4]	t_r		-	32	65	nS
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	48	95	nS
Turn-Off Fall Time[3,4]	t_f		-	45	90	nS
Source- Drain Diode Characteristics						
Source-Drain Current(Body Diode)	I_S	V_D=V_G=0V,Force Current	-	-	2.5	A
Pulsed Source-Drain Current(Body Diode)	I_{SM}		-	-	5.0	A
Forward On Voltage	V_{SD}	T_J=25°C, I_S=1A, V_{GS}=0V	-	-	1.0	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_S=I_F=2A, di/dt=100A/μS	-	1.83	-	uS
Reverse Recovery Charge	Q_{rr}		-	48.7	-	uC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. V_{DD}=100V,V_{GS}=10V,L=10mH,I_{AS}=2.7A.,R_G=25 ,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

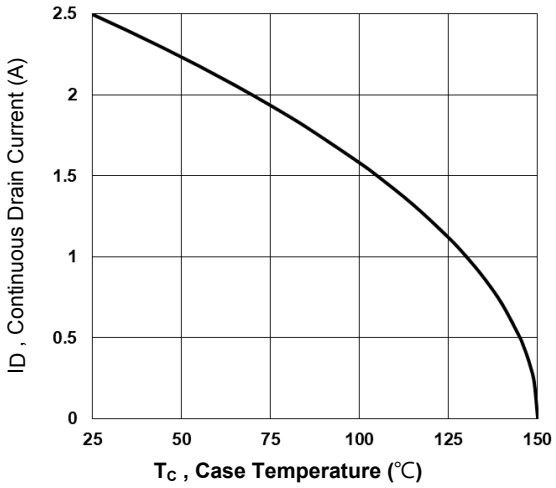


Fig.1 Continuous Drain Current vs. T_C

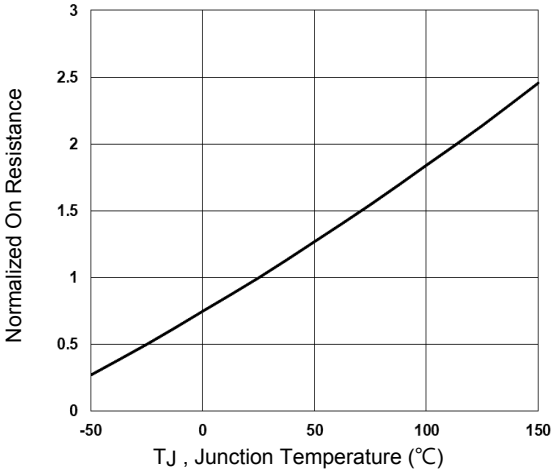


Fig.2 Normalized RDSON vs. T_J

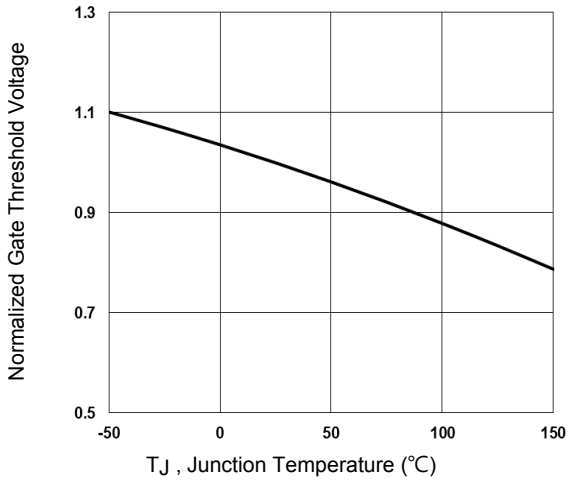


Fig.3 Normalized Vth vs. TJ

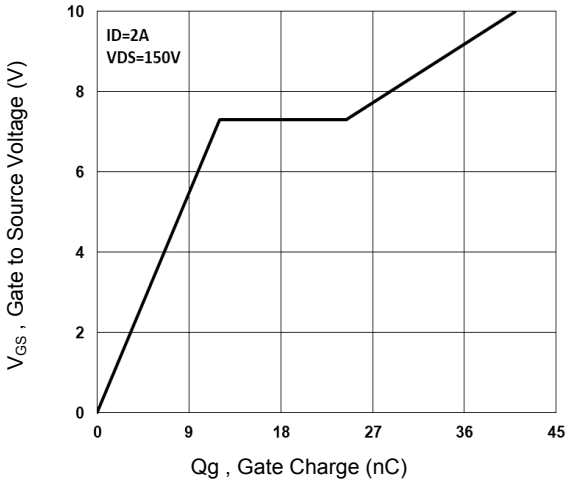


Fig.4 Gate Charge Characteristics

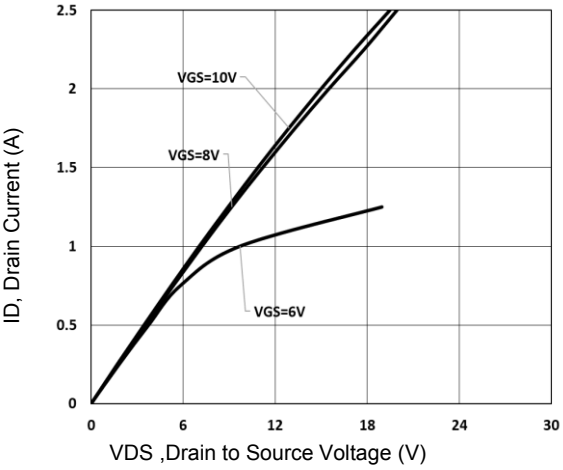


Fig.5 Typical Output Characteristics

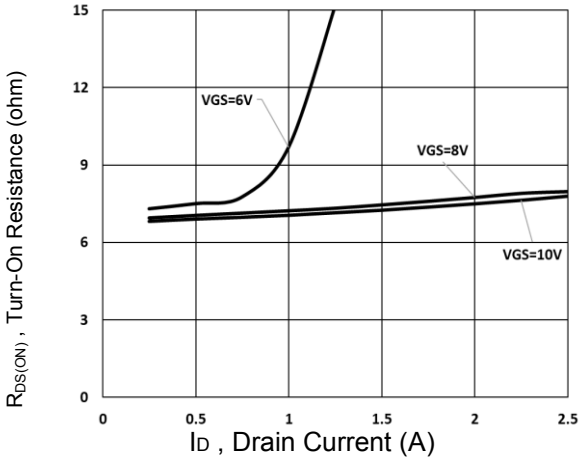


Fig.6 Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

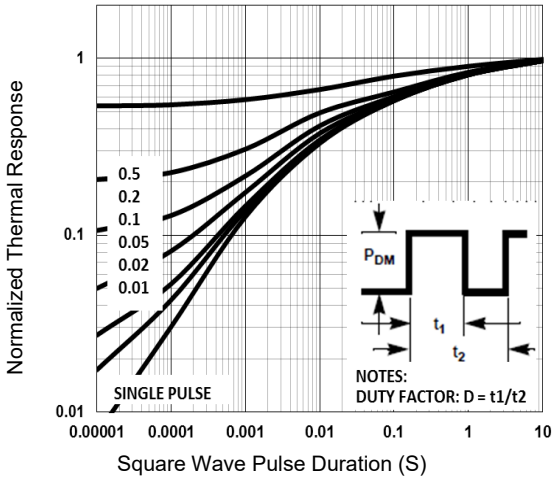


Fig.7 Normalized Transient Impedance

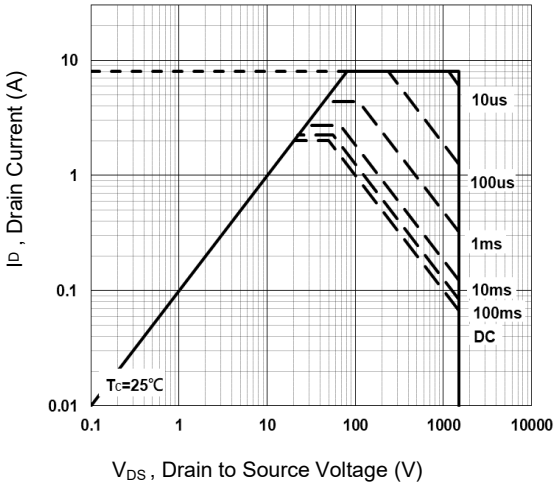
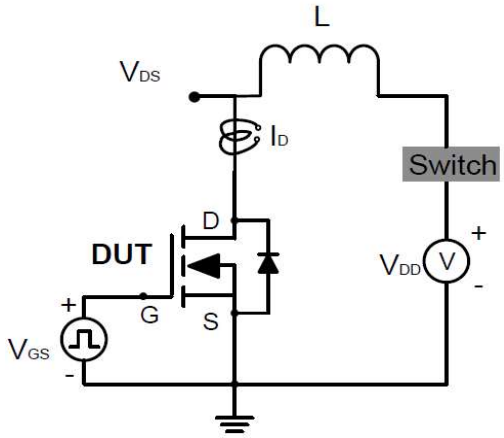
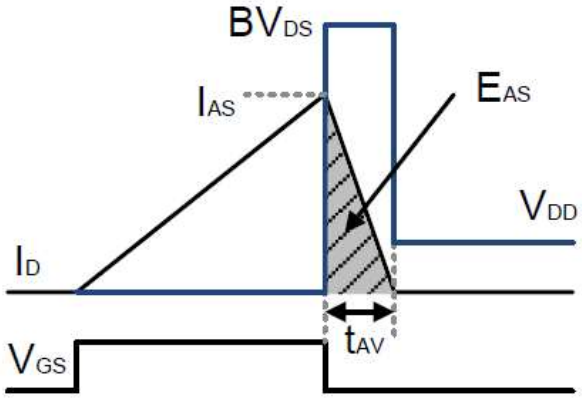


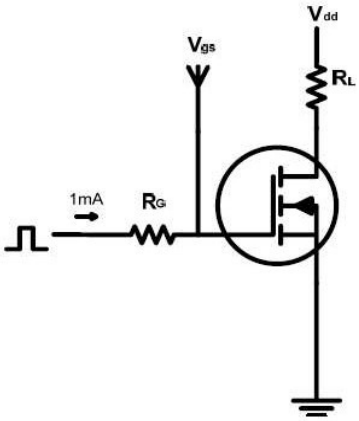
Fig.8 Maximum Safe Operation Area

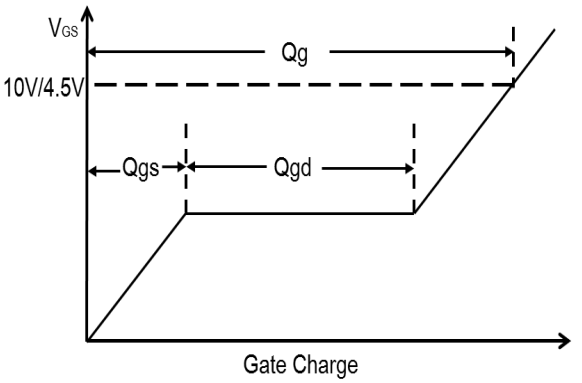
Test Circuits & Waveforms



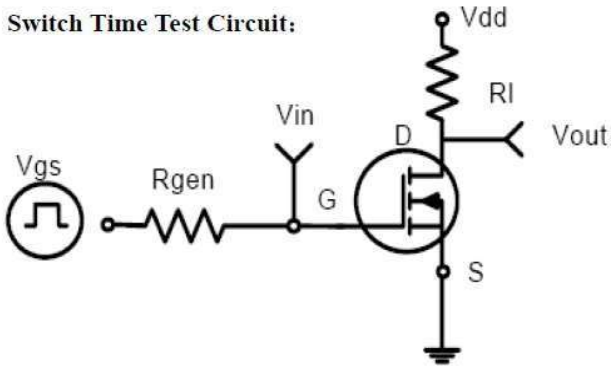


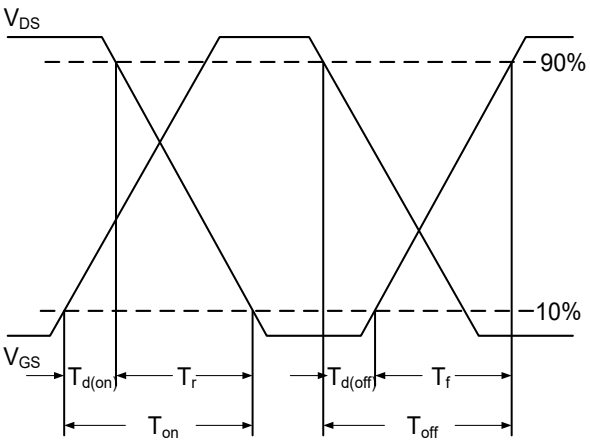
Firgure 9. E_{AS} Test Circuit and waveforms





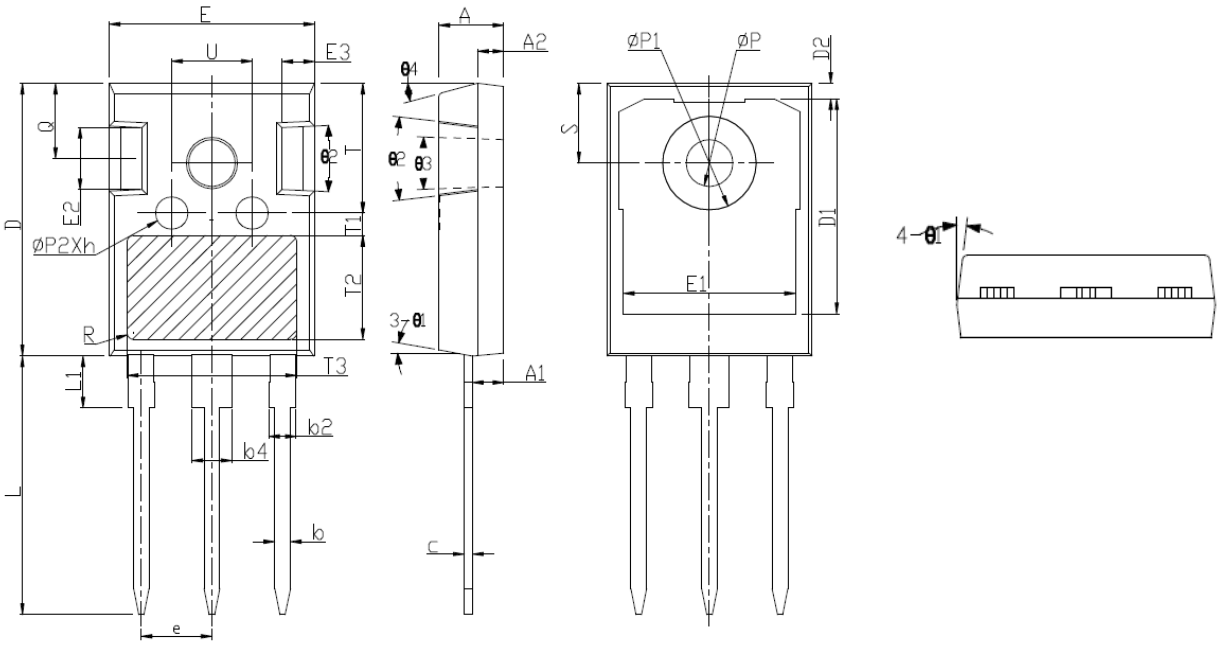
Firgure 10. Gate Charge Test Circuit and waveforms





Firgure 11. Switch Time Test Circuit and waveforms

Package Outline Dimensions TO-247



SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.75	5.00	5.25	L	19.52	19.92	20.32
A1	2.16	2.41	2.66	L1	-	-	4.30
A2	1.85	2.00	2.15	ΦP	3.35	3.60	3.85
b	1.11	1.20	1.35	ΦP1	-	-	7.30
b2	1.90	2.01	2.25	ΦP2	2.25	2.50	2.75
b4	2.90	3.10	3.25	Q	5.50	5.80	6.10
c	0.51	0.61	0.75	S	6.15BSC		
D	20.60	21.00	21.40	R	0.50REF		
D1	16.15	16.55	16.95	T	9.70	-	10.30
D2	1.00	1.20	1.40	T1	1.65REF		
E	15.50	15.80	16.10	T2	8.00REF		
E1	13.00	13.30	13.60	T3	12.80REF		
E2	4.70	5.00	5.30	U	5.9	-	6.5
E3	2.25	2.50	2.75	θ1	4°	7°	10°
e	5.44BSC			θ2	2°	5°	8°
h	0.00	0.10	0.25	θ3	1°	-	2°
				θ4	10°	15°	20°