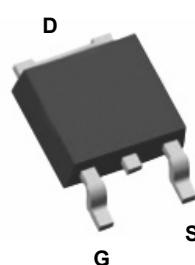
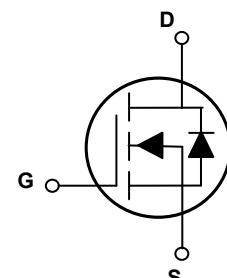


Main Product Characteristics

$V_{(BR)DSS}$	500V
$R_{DS(ON)}$	1.5Ω (Max.)
I_D	5A



TO-252 (DPAK)



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 GSFD5005 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}	500	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous, at Steady-State, ($T_C=25^\circ\text{C}$) ¹	I_D	5	A
Drain Current-Continuous, at Steady-State, ($T_C=100^\circ\text{C}$)	I_D	3.1	A
Drain Current-Pulsed ²	I_{DM}	20	A
Single Pulse Avalanche Energy ³	E_{AS}	234	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	76	W
Linear Derating Factor ($T_C=25^\circ\text{C}$)		0.61	W/ $^\circ\text{C}$
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.64	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$

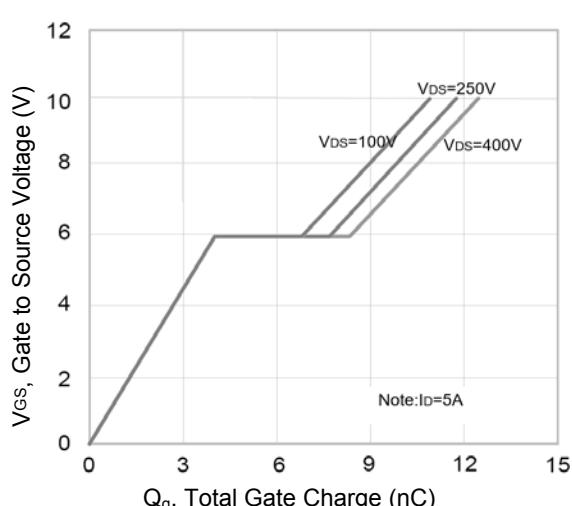
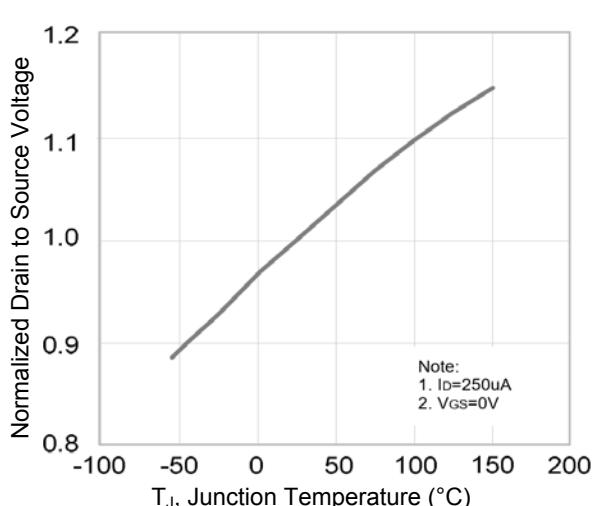
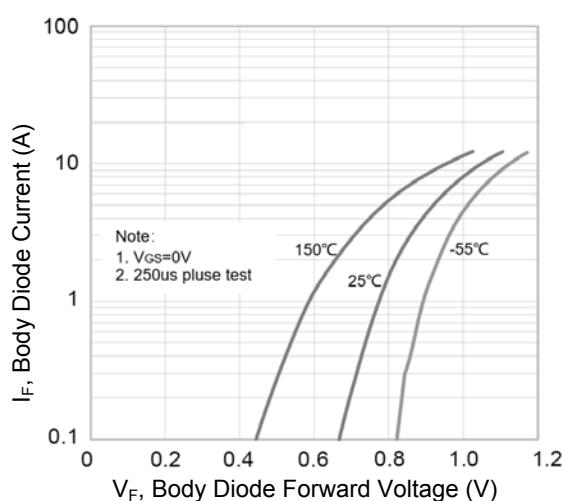
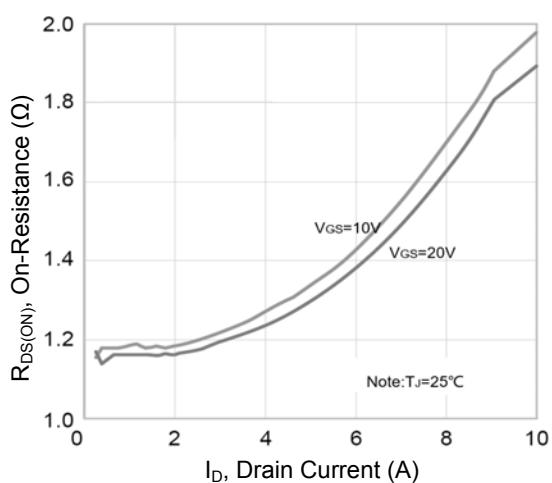
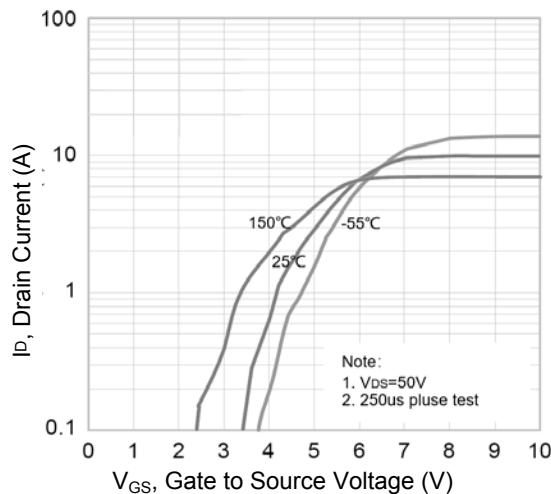
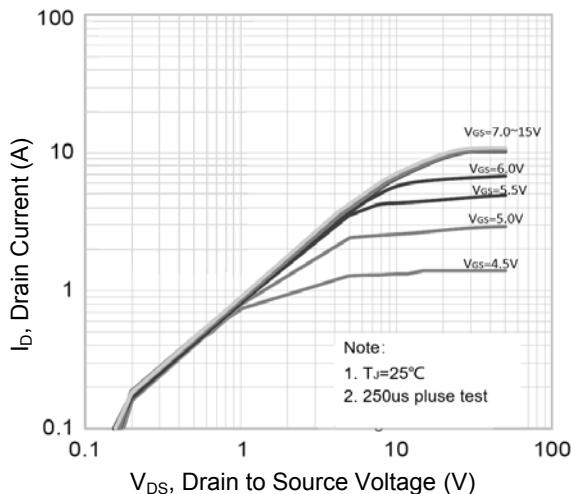
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	500	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=500\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-Source Forward Leakage	I_{GSS}	$V_{\text{GS}}=\pm 30\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=2.5\text{A}$	-	1.2	1.5	Ω
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=250\mu\text{A}$	2.1	3	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	$V_{\text{DS}}=400\text{V}, I_D=5\text{A}, V_{\text{GS}}=10\text{V}$	-	12.2	-	nC
Gate-Source Charge	Q_{gs}		-	4.1	-	
Gate-Drain ("Miller") Charge	Q_{gd}		-	4.3	-	
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DS}}=250\text{V}, R_G=25\Omega, V_{\text{GS}}=10\text{V}, I_D=5\text{A}$	-	15.3	-	nS
Rise Time	t_r		-	37.4	-	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	27	-	
Fall Time	t_f		-	22	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	479	-	pF
Output Capacitance	C_{oss}		-	73	-	
Reverse Transfer Capacitance	C_{rss}		-	2.3	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	3.8	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_s	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	5	A
Pulsed Source Current (Body Diode)	I_{SM}	$T_J=25^\circ\text{C}, I_F=5\text{A}, \frac{di}{dt}=100\text{A}/\mu\text{s}$	-	-	20	A
Diode Forward Voltage	V_{SD}		-	-	1.4	V
Reverse Recovery Time	T_{rr}	$T_J=25^\circ\text{C}, I_F=5\text{A}, \frac{di}{dt}=100\text{A}/\mu\text{s}$	-	420	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.2	-	μC

Note:

1. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
2. Repetitive rating: Pulsed width limited by maximum junction temperature.
3. $L=30\text{mH}$, $V_{\text{DD}}=130\text{V}$, $T_J=25^\circ\text{C}$.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves



Typical Electrical and Thermal Characteristic Curves

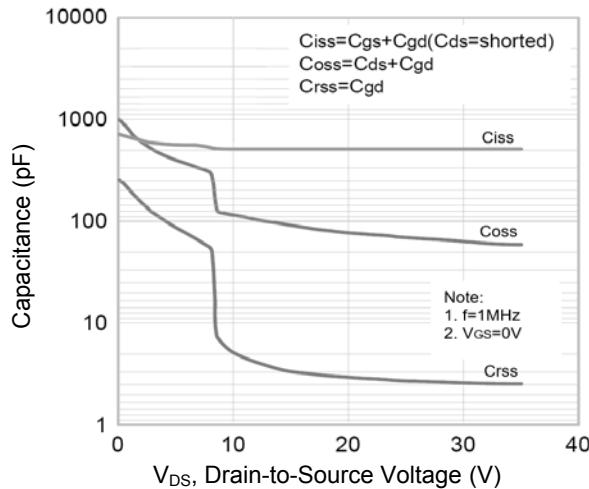


Figure 7. Capacitance Characteristics

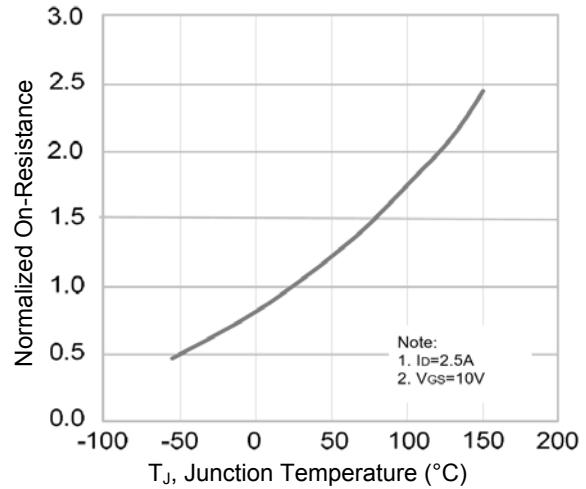


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

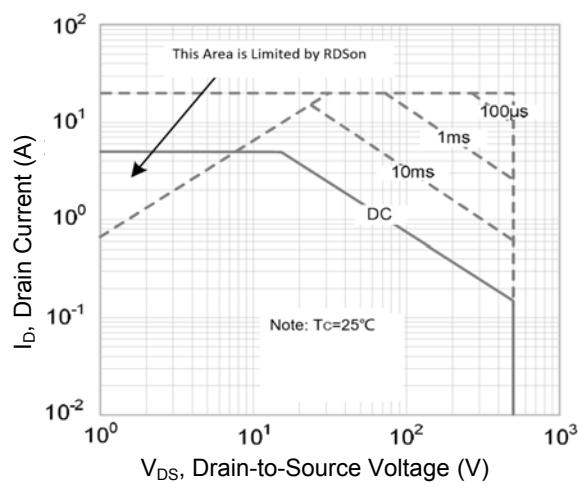
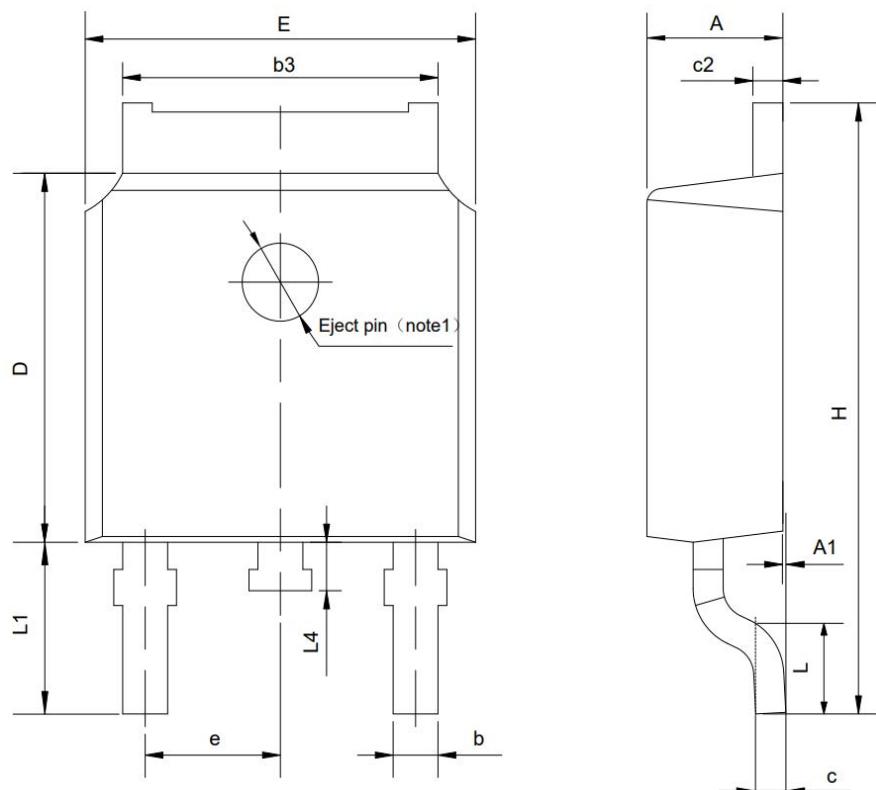


Figure 9. Safe Operation Area

Package Outline Dimensions TO-252 (DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.10	2.50	0.083	0.098
A1	0.00	0.13	0.000	0.005
b	0.66	0.89	0.026	0.035
b3	5.10	5.46	0.201	0.215
c	0.45	0.65	0.018	0.026
c2	0.45	0.65	0.018	0.026
D	5.80	6.40	0.228	0.252
E	6.30	6.90	0.248	0.272
e	2.30 TYP		0.091 TYP	
H	9.60	10.60	0.378	0.417
L	1.40	1.70	0.055	0.067
L1	2.90 REF		0.114 REF	
L4	0.60	1.00	0.024	0.039