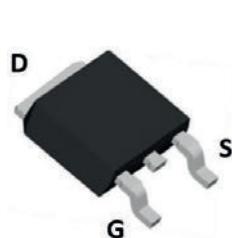
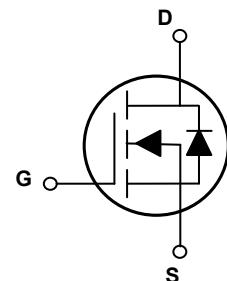


### Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	1.4Ω (Max.)
$I_D$	7A



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 GSFD6507 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	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ )	$I_D$	7	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )		4.2	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	28	A
Single Pulsed Avalanche Energy <sup>3</sup>	$E_{AS}$	398	mJ
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	150	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.83	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Operating and Storage Temperature Range	$T_J/T_{STG}$	-55 to +150	°C

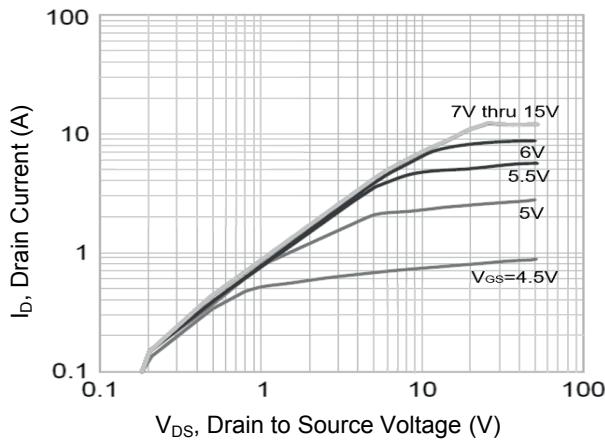
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	650	-	-	V
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=520\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	50	$\mu\text{A}$
Gate to Body Leakage Current	$I_{\text{GSS}}$	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=\pm 30\text{V}$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2	-	4	V
Static Drain-Source On-Resistance <sup>2</sup>	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}$	-	1.2	1.4	$\Omega$
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1.0\text{MHz}$	-	1192	-	pF
Output Capacitance	$C_{\text{oss}}$		-	99	-	pF
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	3.2	-	pF
Total Gate Charge	$Q_g$	$V_{\text{DD}}=520\text{V}, I_D=7\text{A}, V_{\text{GS}}=10\text{V}$	-	21.4	-	nC
Gate-Source Charge	$Q_{\text{gs}}$		-	4.54	-	nC
Gate-Drain ("Miller") Charge	$Q_{\text{gd}}$		-	10.2	-	nC
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=325\text{V}, I_D=7\text{A}, R_G=25\Omega$	-	28.4	-	ns
Turn-on Rise Time	$t_r$		-	51.47	-	ns
Turn-off Delay Time	$t_{\text{d}(\text{off})}$		-	38.93	-	ns
Turn-off Fall Time	$t_f$		-	29.07	-	ns
<b>Source-Drain Ratings and Characteristics</b>						
Maximum Continuous Drain to Source Diode Forward Current	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	7	A
Maximum Pulsed Drain to Source Diode Forward Current	$I_{\text{SM}}$		-	-	28	A
Drain to Source Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{SD}}=7\text{A}$	-	-	1.4	V
Reverse Recovery Time	$T_{\text{rr}}$	$V_{\text{GS}}=0\text{V}, I_S=7\text{A}, \frac{di}{dt}=100\text{A}/\mu\text{s}$	-	536.5	-	ns
Reverse Recovery Charge	$Q_{\text{rr}}$		-	3.67	-	$\mu\text{C}$

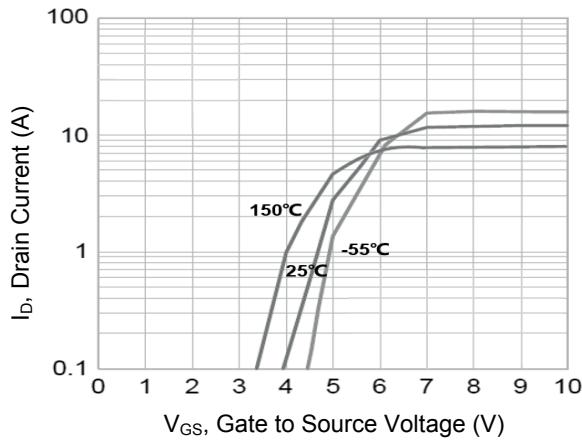
Note:

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.  $L=30\text{mH}, I_{AS}=4.8\text{A}, V_{DD}=120\text{V}, T_J=25^\circ\text{C}$ .

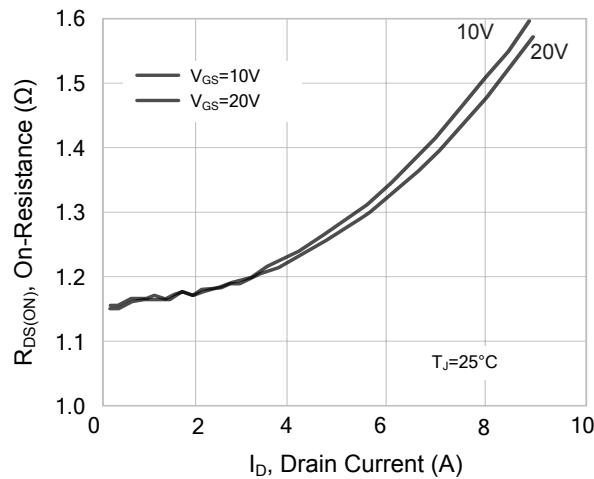
## Typical Electrical and Thermal Characteristic Curves



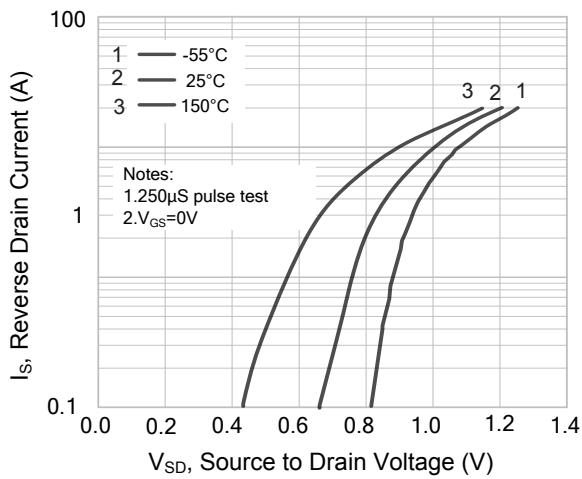
**Figure 1. Output Characteristics**



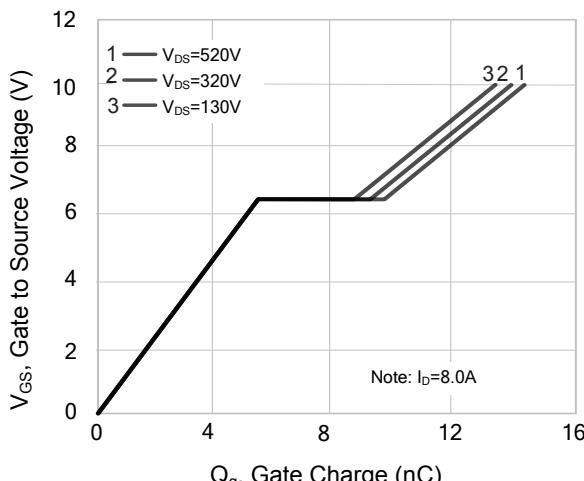
**Figure 2. Transfer Characteristics**



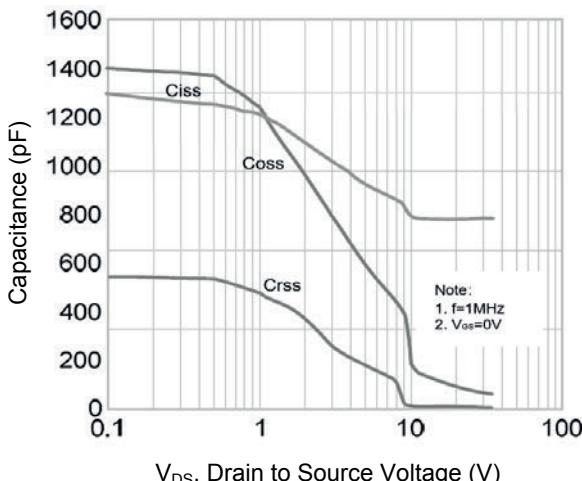
**Figure 3.  $R_{DS(ON)}$  Vs. Drain Current**



**Figure 4. Body Diode Characteristics**



**Figure 5. Gate Charge**



**Figure 6. Capacitance Characteristics**

## Typical Electrical and Thermal Characteristic Curves

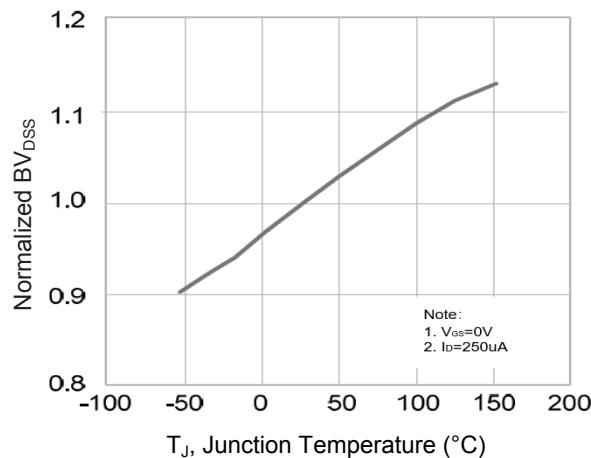


Figure 7. Normalized  $BV_{DSS}$  Vs.  $T_J$

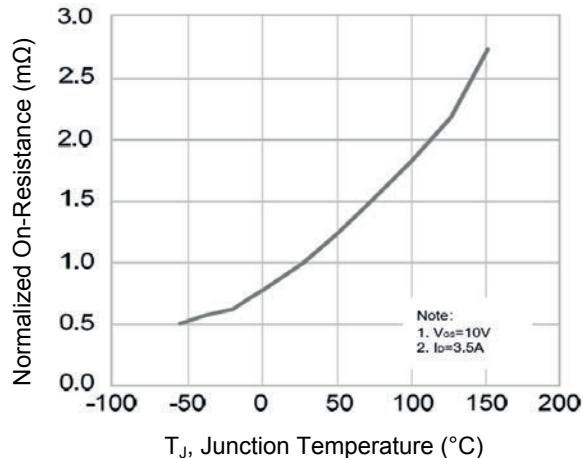


Figure 8. Normalized  $R_{DS(ON)}$  Vs.  $T_J$

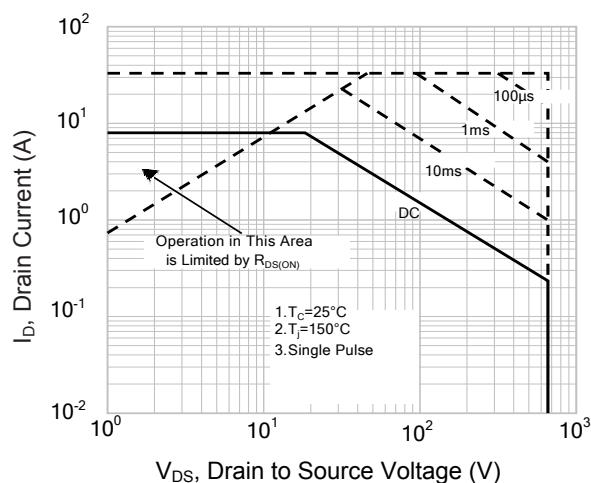


Figure 9. Safe Operation Area

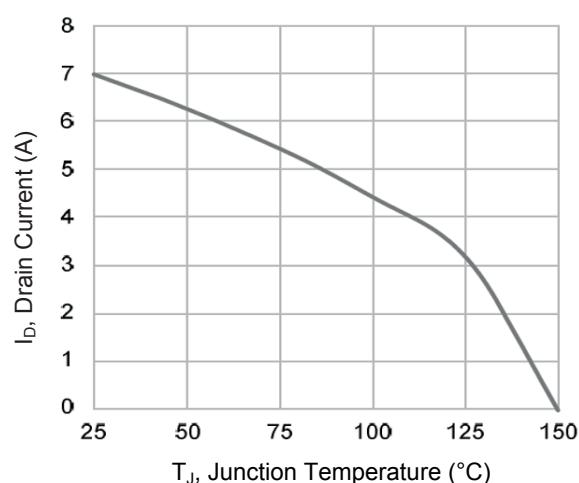
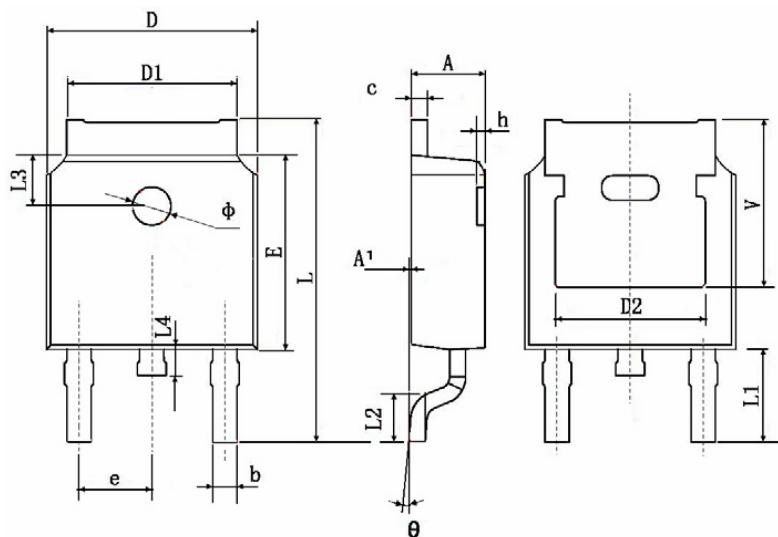


Figure 10. Current De-Rating

**Package Outline Dimensions TO-252 (DPAK)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	0.094
A1	0.00	0.13	0.000	0.005
b	0.66	0.86	0.026	0.034
c	0.46	0.58	0.018	0.023
D	6.50	6.70	0.256	0.264
D1	5.10	5.46	0.201	0.215
D2	4.83 TYP.		0.190 TYP.	
E	6.00	6.20	0.236	0.244
e	2.19	2.39	0.086	0.094
L	9.80	10.40	0.386	0.409
L1	2.90 TYP.		0.114 TYP.	
L2	1.40	1.70	0.055	0.067
L3	1.60 TYP.		0.063 TYP.	
L4	0.60	1.00	0.024	0.039
Φ	1.10	1.30	0.043	0.051
θ	0°	8°	0°	8°
h	0.00	0.30	0.000	0.012
V	5.35 TYP.		0.211 TYP.	