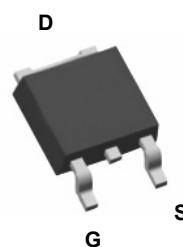
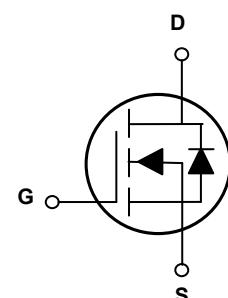


## Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	24mΩ(Max.)
$I_D$	72A



TO-252 (DPAK)



Schematic Diagram

## Features and Benefits

- Turbo HVMOSFET process technology.
- Low on-resistance and low gate charge.
- Outstanding lightning characteristics.
- Fast switching and reverse body recovery.
- High ruggedness and robustness.



## Description

The GSFD24020 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	$V_{(BR)DSS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous, @ Steady-State ( $T_c=25^\circ\text{C}$ )	$I_D$	72	A
Drain Current-Continuous, @ Steady-State ( $T_c=100^\circ\text{C}$ )		45	
Drain Current-Pulsed <sup>1</sup> ( $T_c=25^\circ\text{C}$ )	$I_{DM}$	288	A
Power Dissipation <sup>2</sup> ( $T_c=25^\circ\text{C}$ )	$P_D$	170	W
Single Pulse Avalanche Energy	$E_{AS}$	140	mJ
Single Pulse Avalanche Current	$I_{AS}$	53	A
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	60	°C/W
Junction-to-Case	$R_{\theta JC}$	0.74	°C/W
Maximum Junction Temperature	$T_J$	-55 To +150	°C
Storage Temperature Range	$T_{STG}$	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	200	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V}$ $T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V},$ $T_J=125^\circ\text{C}$	-	10	-	
Gate-Source Forward Leakage	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=46\text{A}$	-	19.4	24	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	3	-	5	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{\text{DD}}=100\text{V}, I_{\text{D}}=46\text{A},$ $V_{\text{GS}}=10\text{V}$	-	36	-	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{\text{gs}}$		-	22	-	
Gate-Drain ("Miller") Charge <sup>3,4</sup>	$Q_{\text{gd}}$		-	4.3	-	
Gate Plateau <sup>3,4</sup>	$V_{\text{plateau}}$		-	6.9	-	
Turn-On Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=100\text{V}, R_{\text{G}}=2.5\Omega,$ $V_{\text{GS}}=10\text{V}, I_{\text{D}}=46\text{A}$	-	22	-	nS
Rise Time <sup>3,4</sup>	$t_r$		-	80	-	
Turn-Off Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{off})}$		-	34	-	
Fall Time <sup>3,4</sup>	$t_f$		-	9.6	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V},$ $F=1\text{MHz}$	-	2655	-	pF
Output Capacitance	$C_{\text{oss}}$		-	1593	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	37	-	
Gate Resistance	$R_g$	$F=1\text{MHz}$	-	4.4	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current (Body Diode)	$I_s$	$T_c=25^\circ\text{C}$ , MOSFET symbol showing the integral reverse p-n junction diode.	-	-	72	A
Pulsed Source Current	$I_{\text{s,pulse}}$		-	-	288	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=46\text{A}$	-	-	1.4	V
Reverse Recovery Time <sup>3</sup>	$t_{\text{rr}}$	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=46\text{A},$ $dI/dt=100\text{A}/\mu\text{s}$	-	128	-	nS
Reverse Recovery Charge <sup>3</sup>	$Q_{\text{rr}}$		-	0.59	-	uC

Notes:

1. Pulse time 5 $\mu\text{s}$ .
2. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power will decrease by 1.67W/°C for every 1 degree of temperature rise.
3. Pulse test: Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

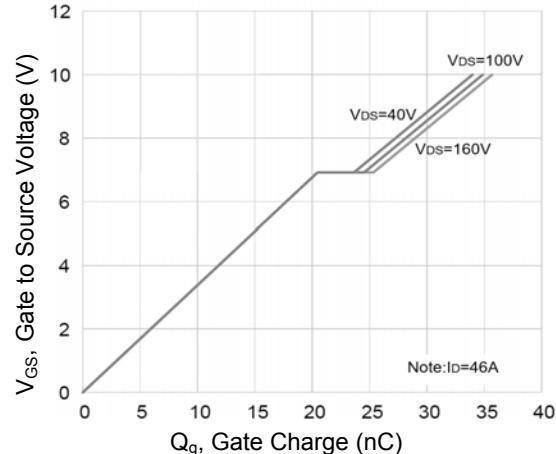
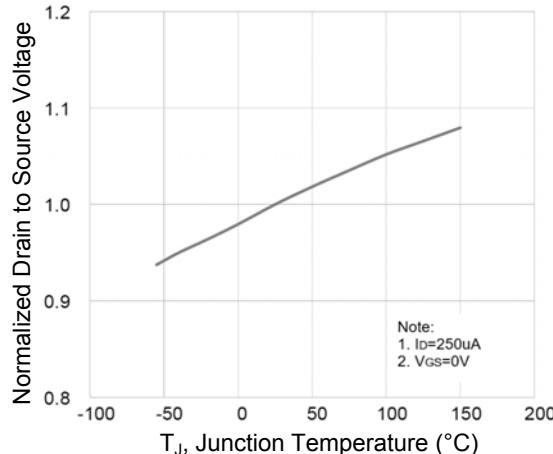
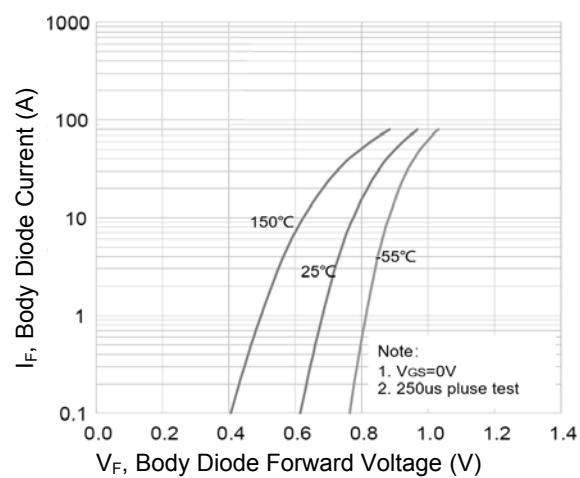
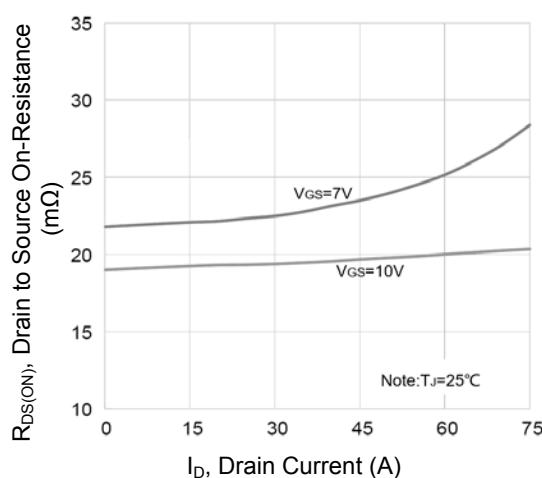
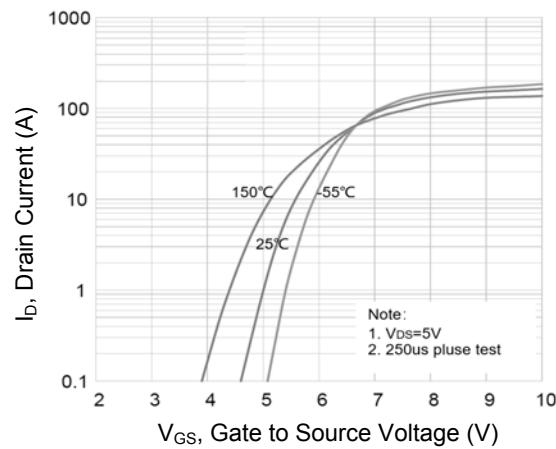
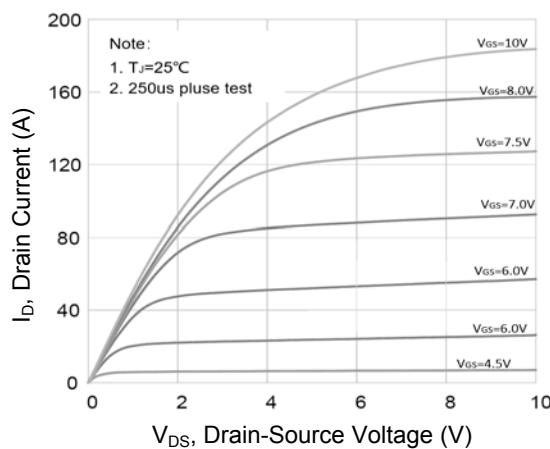


Figure 5. Normalized  $BV_{DSS}$  vs.  $T_J$

Figure 6. Gate Charge Characteristics

### Typical Electrical and Thermal Characteristic Curves

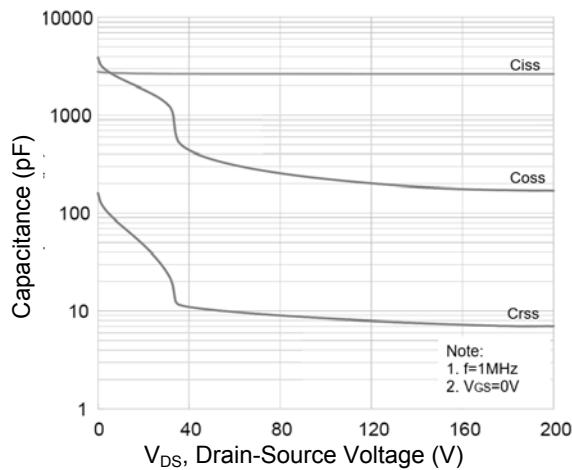


Figure 7. Capacitance Characteristic

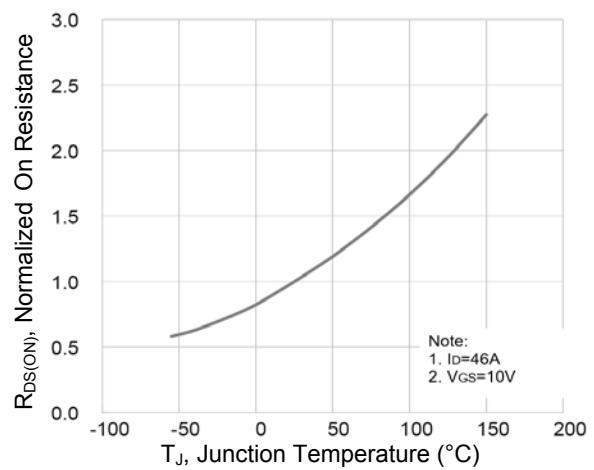


Figure 8. Normalized  $R_{DS(ON)}$  vs.  $T_J$

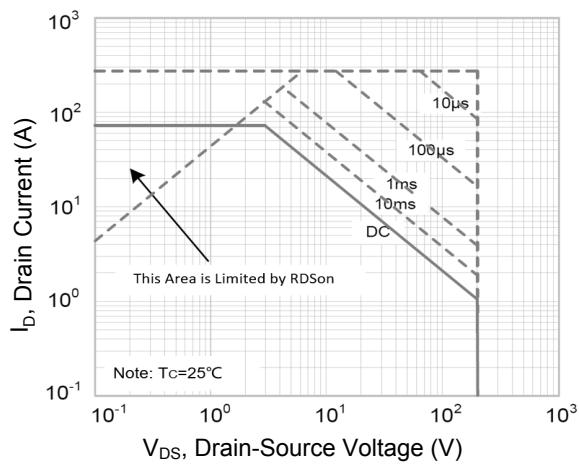
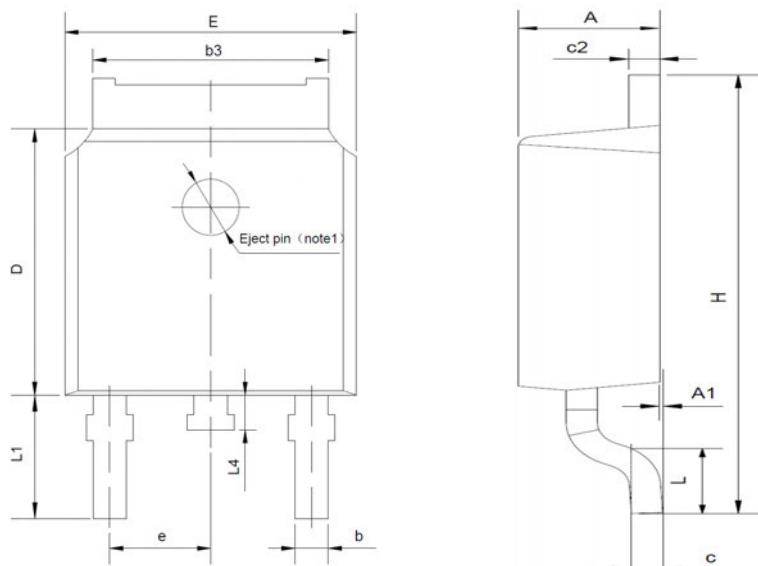


Figure 9. Safe Operation Area

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



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.100	2.500	0.083	0.098
A1	0.000	0.127	0.000	0.005
b	0.660	0.890	0.026	0.035
b3	5.100	5.460	0.201	0.215
c	0.450	0.650	0.018	0.026
c2	0.450	0.650	0.018	0.026
D	5.800	6.400	0.228	0.252
E	6.300	6.900	0.248	0.272
e	2.300 TYP		0.091 TYP	
H	9.600	10.600	0.378	0.417
L	1.400	1.700	0.055	0.067
L1	2.900 REF		0.114 REF	
L4	0.600	1.000	0.024	0.039