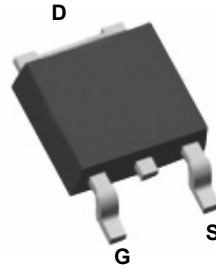
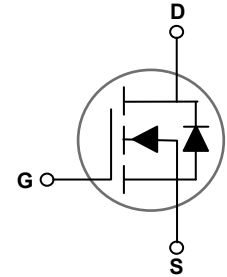


Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	12m Ω
I_D	45A



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

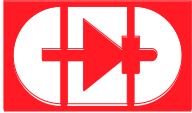


Description

The GSFD0346 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$)	I_D	45	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)		28	
Drain Current-Pulsed ¹	I_{DM}	180	A
Single Pulse Avalanche Energy ²	E_{AS}	13	mJ
Single Pulse Avalanche Current ²	I_{AS}	16	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	33	W
Power Dissipation-De-rate above 25°C		0.26	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.8	$^\circ\text{C}/\text{W}$
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 ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1mA$	-	0.04	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V,$ $T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=30V, V_{GS}=0V,$ $T_J=125^\circ\text{C}$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	9.4	12	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	13	18	m Ω
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
Gate Threshold Voltage	$V_{GS(th)}$		-	-4	-	mV/ $^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=3A$	-	6.4	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{DS}=15V, I_D=5A,$ $V_{GS}=4.5V$	-	7.4	12	nC
Gate-Source Charge ^{3,4}	Q_{gs}		-	2.3	5	
Gate-Drain Charge ^{3,4}	Q_{gd}		-	3	6	
Turn-On Delay Time ^{3,4}	$t_{d(on)}$	$V_{DD}=15V, R_G=6\Omega,$ $V_{GS}=10V, I_D=1A$	-	3.8	7	nS
Rise Time ^{3,4}	t_r		-	10	19	
Turn-Off Delay Time ^{3,4}	$t_{d(off)}$		-	22	42	
Fall Time ^{3,4}	t_f		-	6.6	13	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1MHz$	-	620	900	pF
Output Capacitance	C_{oss}		-	85	125	
Reverse Transfer Capacitance	C_{rss}		-	60	90	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V$ $f=1MHz$	-	2.8	5.6	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V,$	-	-	45	A
Pulsed Source Current ³	I_{SM}	Force Current	-	-	180	A
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=1A,$ $T_J=25^\circ\text{C}$	-	-	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
3. Pulse Test: pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

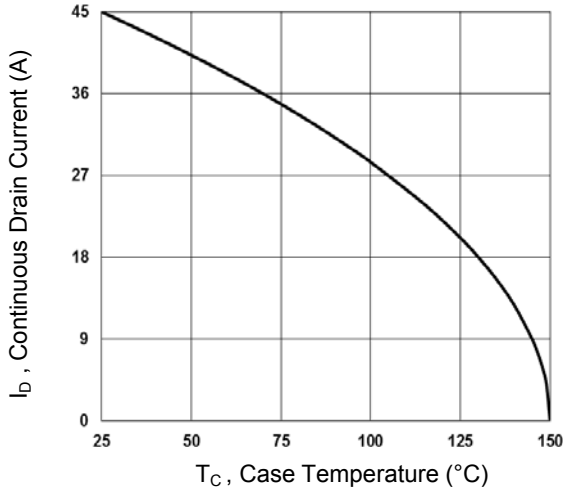


Figure 1. Continuous Drain Current vs. T_c

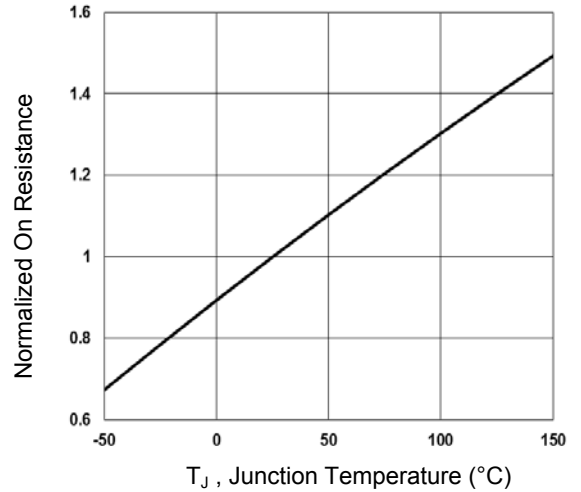


Figure 2. Normalized $R_{DS(ON)}$ vs. T_j

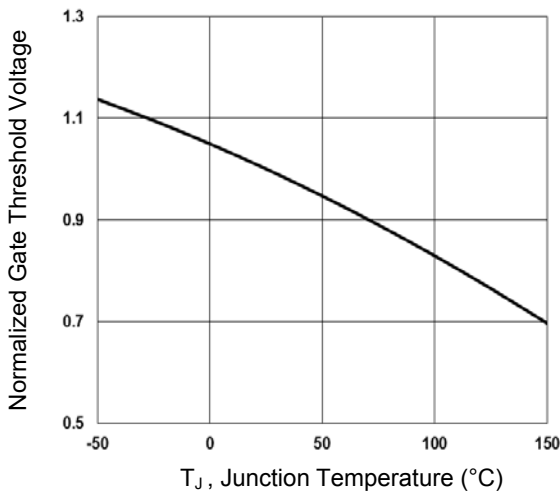


Figure 3. Normalized V_{th} vs. T_j

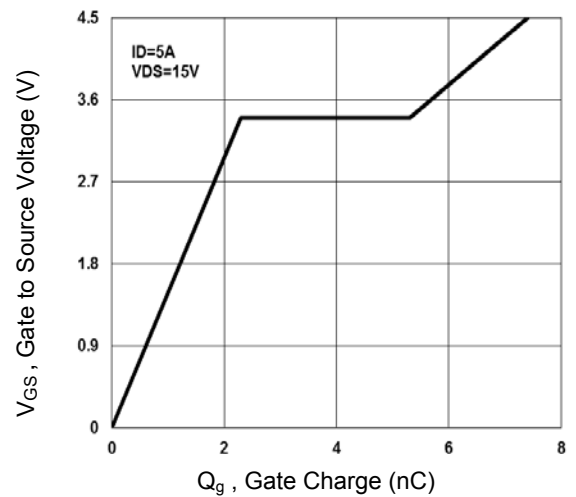


Figure 4. Gate Charge Waveform

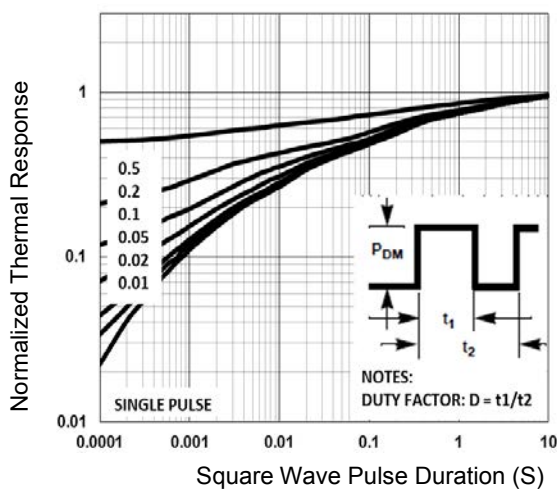


Figure 5. Normalized Transient Response

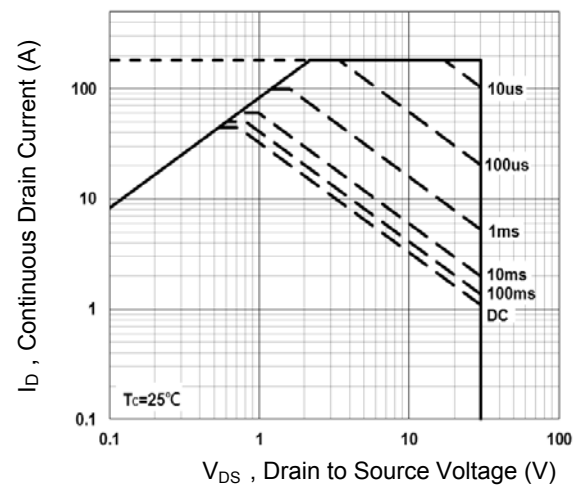


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

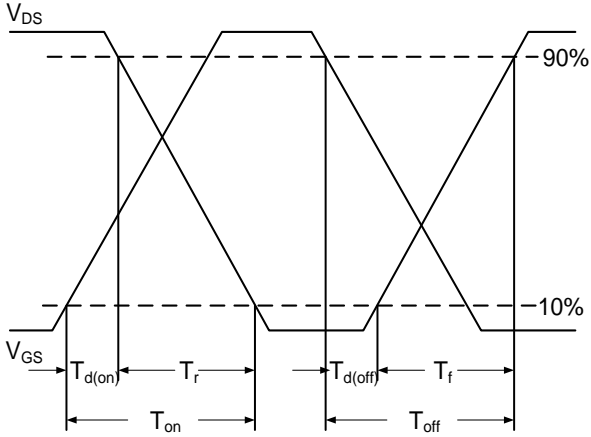


Figure 7. Switching Time Waveform

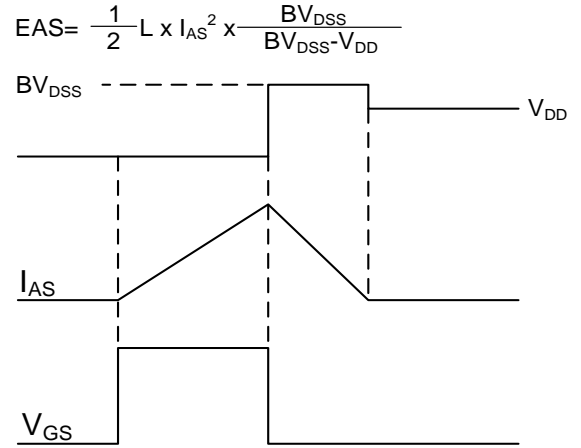
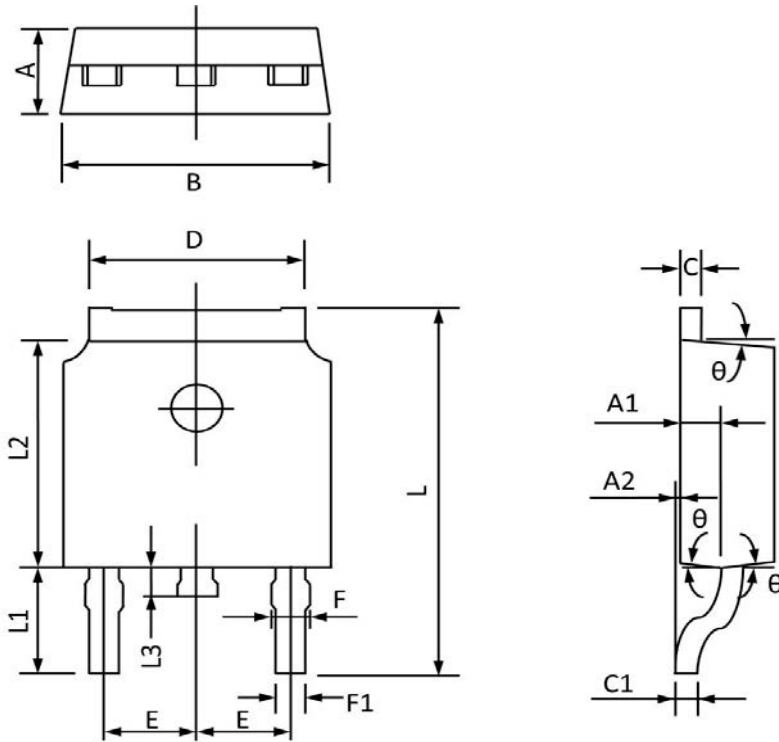


Figure 8. E_{AS} Waveform

Package Outline Dimensions

TO-252/DPAK



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094
A1	0.910	1.110	0.036	0.044
A2	0.000	0.150	0.000	0.006
B	6.500	6.700	0.256	0.264
C	0.460	0.580	0.018	0.023
C1	0.460	0.580	0.018	0.023
D	5.100	5.460	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.740	0.940	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.800	10.400	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.000	6.200	0.236	0.244
L3	0.600	1.000	0.024	0.039
θ	3°	9°	3°	9°