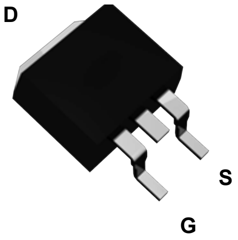
GSFT10176

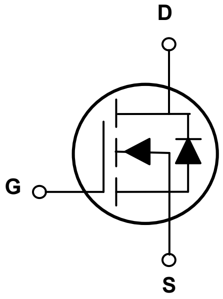
100V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	100V
$R_{DS(ON)}$	3.4mΩ
I_D	175A



TO-263 (D^2PAK)



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 GSFT10176 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	Max.	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	175	A
Drain Current-Continuous (T_C=100°C)		110	
Drain Current-Pulsed[1]	I_{DM}	700	A
Single Pulse Avalanche Energy[2]	E_{AS}	1250	mJ
Single Pulse Avalanche Current[2]	I_{AS}	50	A
Power Dissipation (T_C=25°C)	P_D	290	W
Power Dissipation-Derate above 25°C		2.32	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.43	°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	Conditions	Min.	Typ.	Max.	Unit
On/Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	100	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=80V, V_{GS}=0V, T_J=25℃	-	-	1	μA
		V_{DS}=80V, V_{GS}=0V, T_J=85℃	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.8	3.4	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =250uA	2	2.7	4	V
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=3A	-	18	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=50V, I_D=80A V_{GS}=10V	-	92	135	nC
Gate-Source Charge[3,4]	Q_{gs}		-	19	30	
Gate-Drain Charge[3,4]	Q_{gd}		-	27	40	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=50V, R_G=6Ω V_{GS}=10V, I_D=80A	-	20	30	nS
Rise Time[3,4]	t_r		-	15	23	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	60	90	
Fall Time[3,4]	t_f		-	130	195	
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, F=1MHz	-	5600	8400	pF
Output Capacitance	C_{oss}		-	1200	1800	
Reverse Transfer Capacitance	C_{rss}		-	6	9	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	2	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	175	A
Pulsed Source Current	I_{SM}		-	-	350	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V
Reverse Recovery Time	t_{rr}	V_R=100V, I_S=10A di/dt=100A/μs T_J=25°C	-	210	-	nS
Reverse Recovery Charge	Q_{rr}		-	600	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25Ω,starting T_J=25°C.
3. Pulse test: pulse width ≤300us,duty cycle≤2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

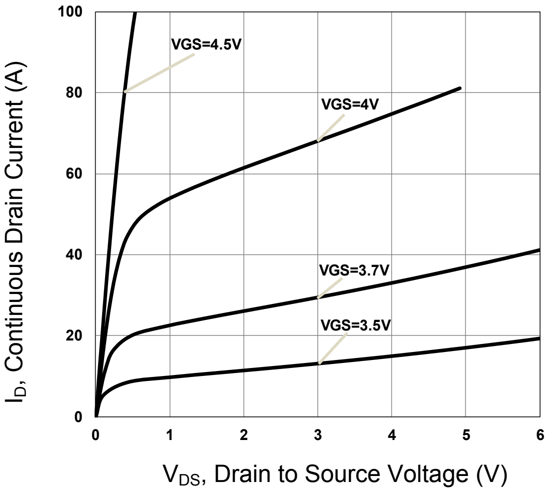


Figure 1. Typical Output Characteristics

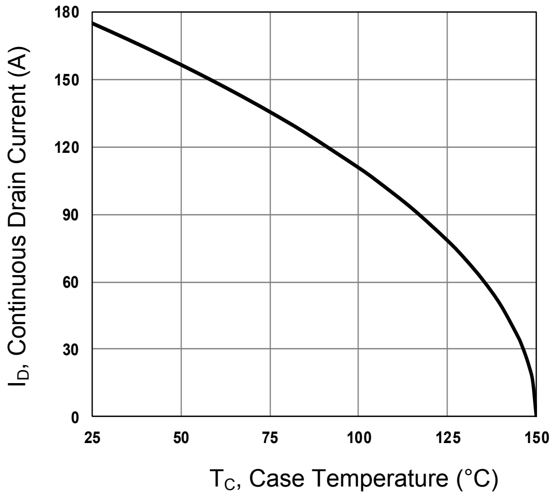


Figure 2. Continuous Drain Current vs. T_C

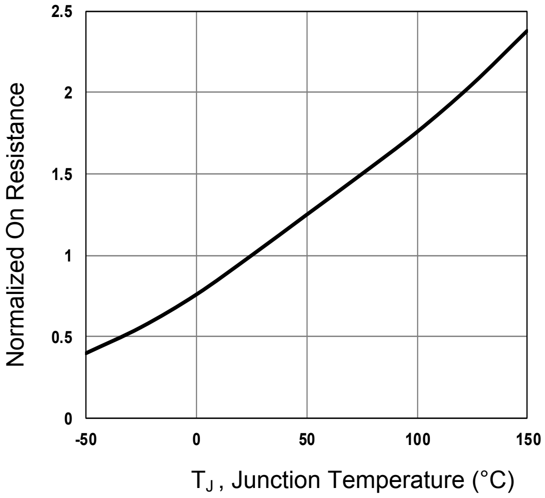


Figure 3. Normalized R_{DSON} vs. T_J

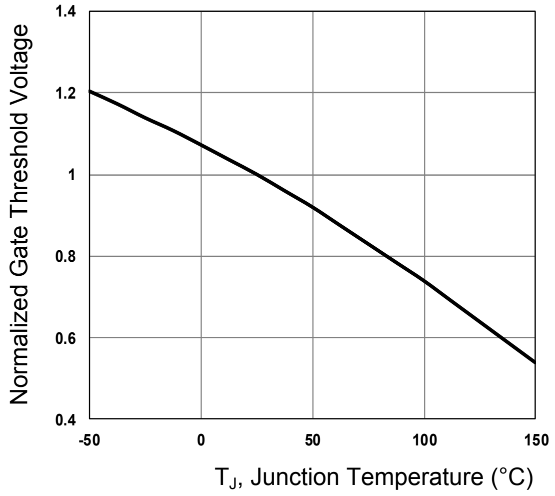


Figure 4. Normalized V_{th} vs. T_J

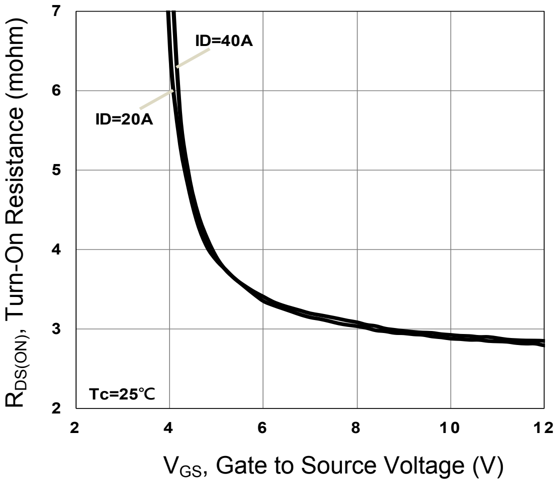


Figure 5. Turn-On Resistance vs. V_{GS}

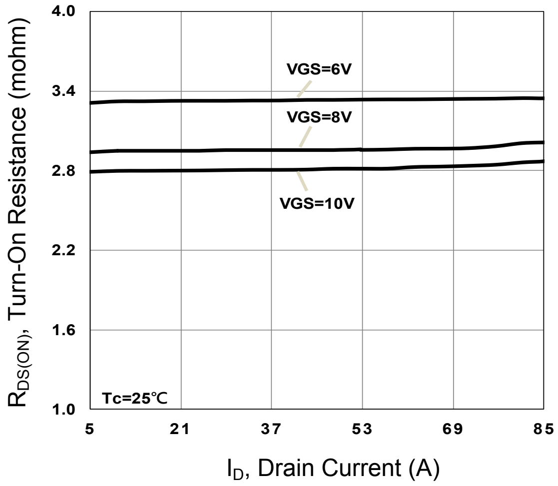


Figure 6. Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

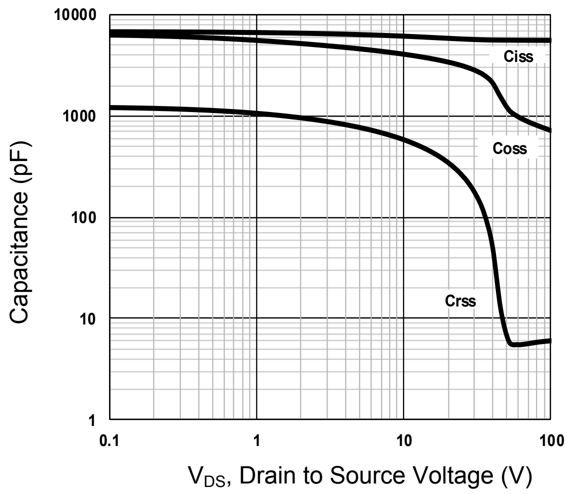


Figure 7. Capacitance Characteristics

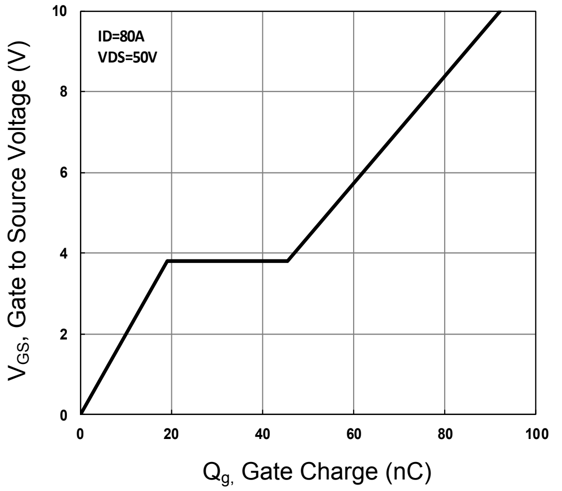


Figure 8. Gate Charge Characteristics

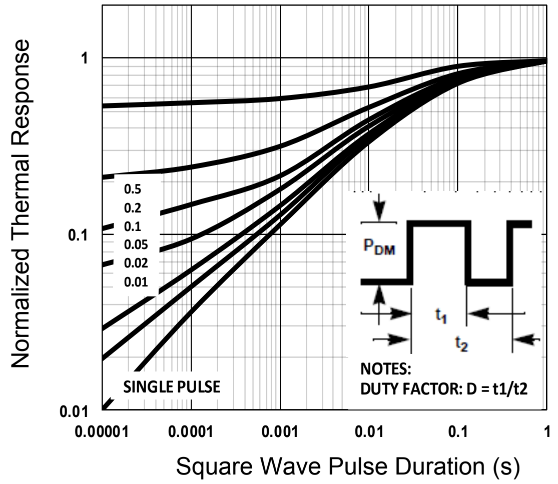


Figure 9. Normalized Transient Impedance

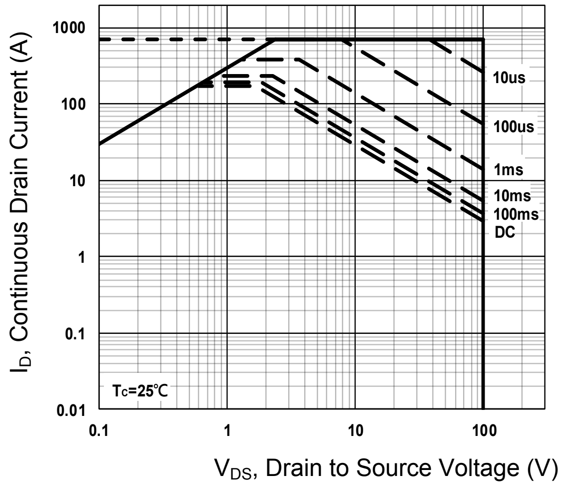


Figure 10. Maximum Safe Operation Area

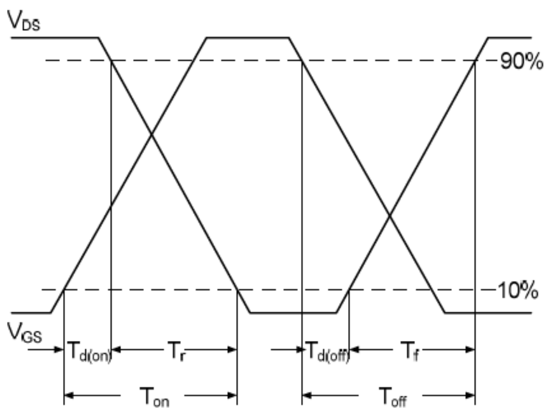


Figure 11. Switching Time Waveform

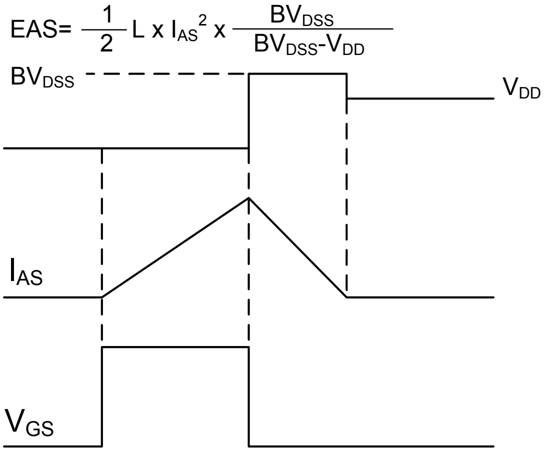
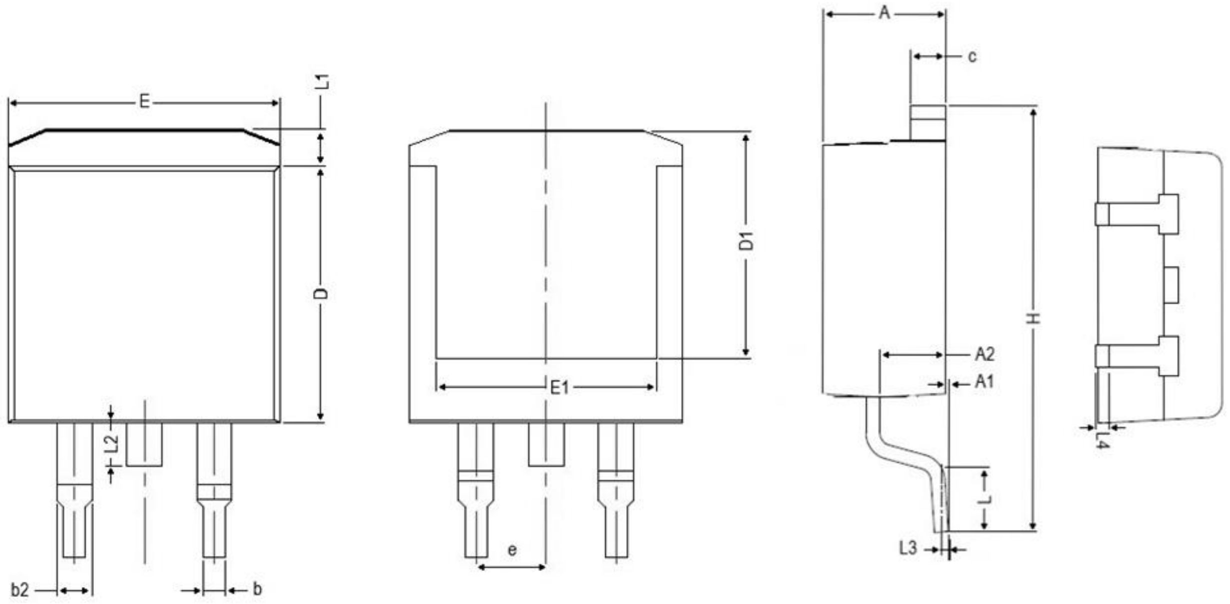


Figure 12. EAS Waveform

Package Outline Dimensions (TO-263 D^{2}PAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	4.850	4.250	0.191	0.167
A1	0.250	0.000	0.001	0.000
A2	2.900	2.350	0.114	0.093
b	0.950	0.700	0.037	0.028
b2	1.600	1.000	0.063	0.039
c	1.450	1.200	0.057	0.047
D	9.500	8.350	0.374	0.329
D1	9.150	6.400	0.360	0.252
E	10.500	9.600	0.413	0.378
E1	8.900	7.500	0.350	0.295
e	2.540 BSC		0.100 BSC	
H	15.900	14.600	0.626	0.575
L	2.800	2.000	0.110	0.079
L1	1.700	1.150	0.067	0.045
L2	2.100	1.400	0.083	0.055
L3	0.250 BSC		0.010 BSC	
L4	0.750	0.200	0.030	0.001