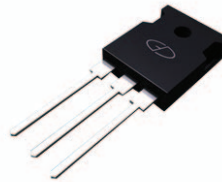
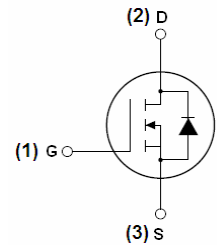


Main Product Characteristics

V_{DS}	100V
$R_{DS(ON)}$	3m Ω
I_D	180A



TO-247



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switch mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The GSFA10180 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	I_D	180	A
Drain Current-Continuous (T _C =100°C)	$I_D(100^\circ\text{C})$	128	A
Pulsed Drain Current	I_{DM}	720	A
Maximum Power Dissipation	P_D	300	W
Derating Factor		2	W/°C
Single Pulse Avalanche Energy ⁵	E_{AS}	1800	mJ
Thermal Resistance, Junction-to-Case ²	$R_{\theta JC}$	0.5	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To +175	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	-	4.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=100A$	-	-	3	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=50A$	40	-	-	S
Dynamic Characteristics⁴						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1.0MHz$	-	11500	-	PF
Output Capacitance	C_{oss}		-	2480	-	PF
Reverse Transfer Capacitance	C_{rss}		-	75	-	PF
Switching Characteristics⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=100A, V_{GS}=10V, R_G=1.6\Omega$	-	25	-	nS
Turn-On Rise Time	t_r		-	75	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	89	-	nS
Turn-Off Fall Time	t_f		-	29	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=100A, V_{GS}=10V$	-	158	-	nC
Gate-Source Charge	Q_{gs}		-	52	-	nC
Gate-Drain Charge	Q_{gd}		-	29	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}=0V, I_S=180A$	-	-	1.2	V
Diode Forward Current ²	I_S	$V_{GS}=0V, I_S=180A$	-	-	180	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = I_S, di/dt=100A/\mu s^3$	-	75	-	nS
Reverse Recovery Charge	Q_{rr}		-	185	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristic Curves

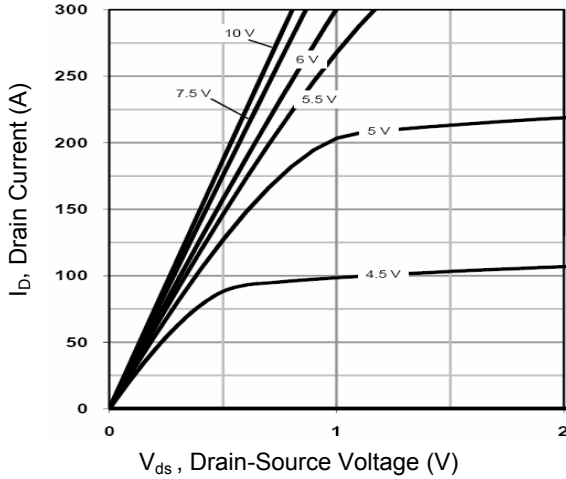


Figure 1. Output Characteristics

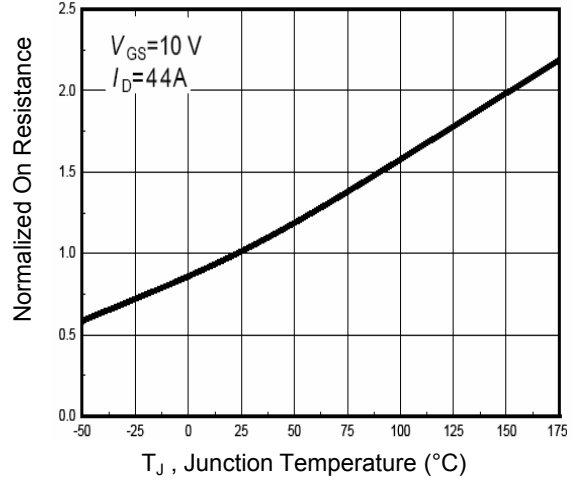


Figure 2. $R_{DS(on)}$ -Junction Temperature

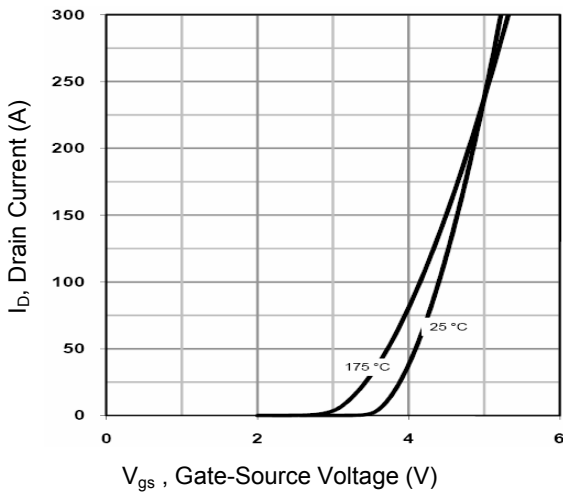


Figure 3. Transfer Characteristics

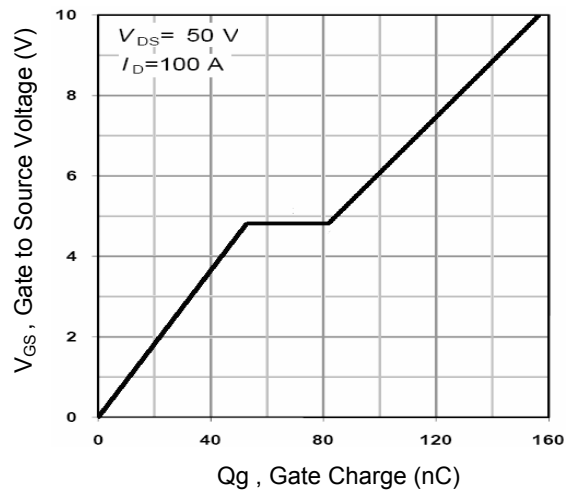


Figure 4. Gate Charge Waveform

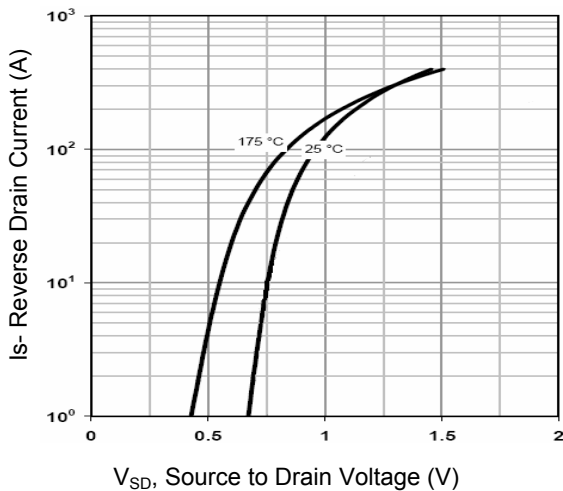


Figure 5. Source-Drain Diode Forward

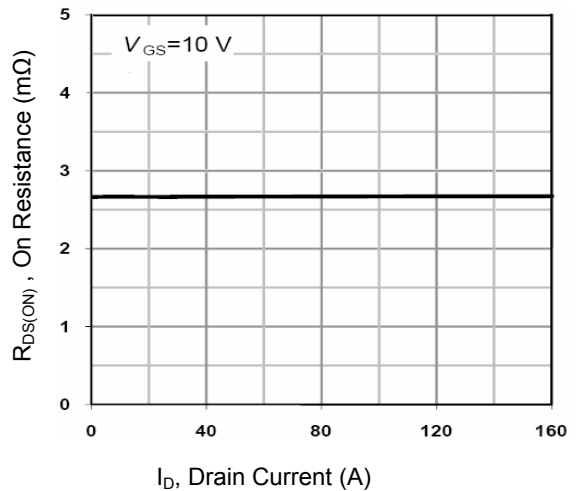


Figure 6. R_{dson} -Drain Current

Typical Electrical and Thermal Characteristic Curves

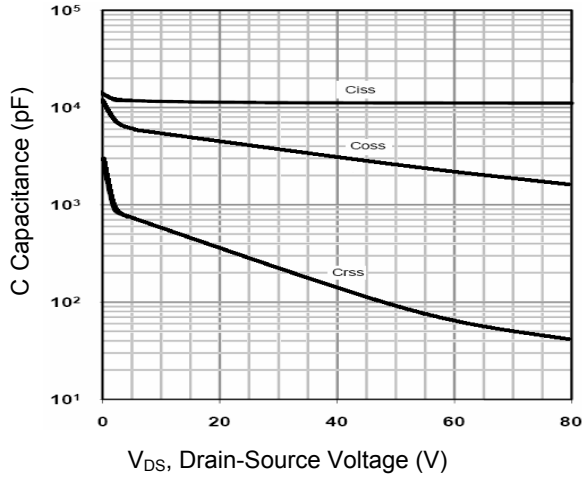


Figure 7. Capacitance vs. V_{DS}

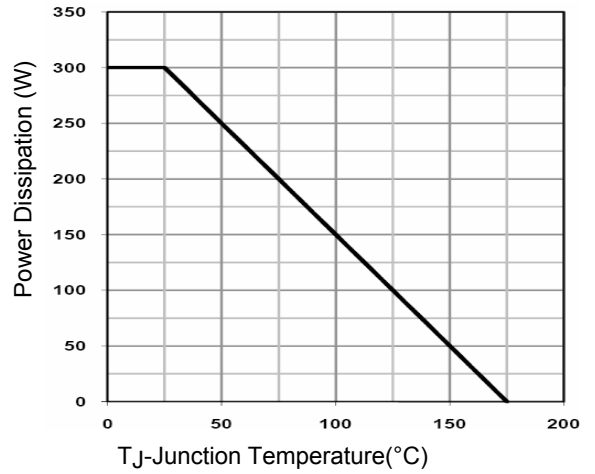


Figure 8. Power De-rating

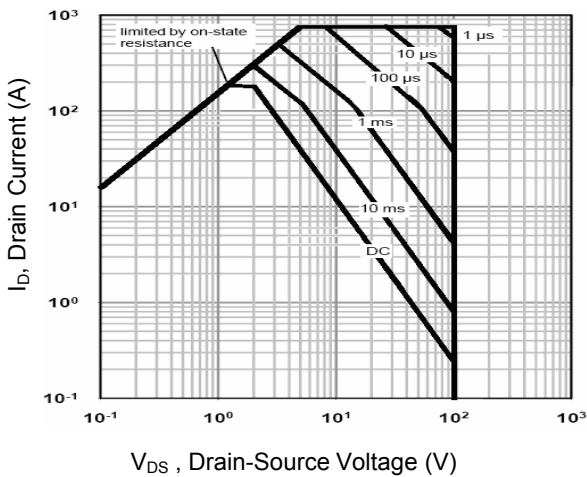


Figure 9. Safe Operation Area

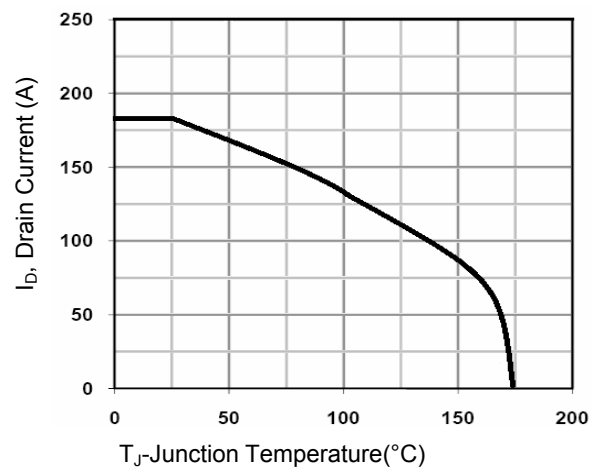


Figure 10. Current De-rating

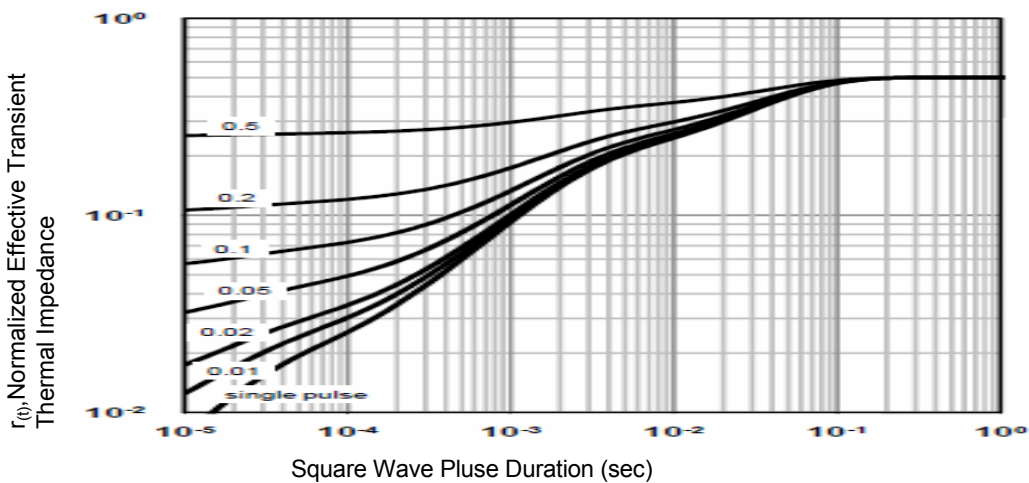


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

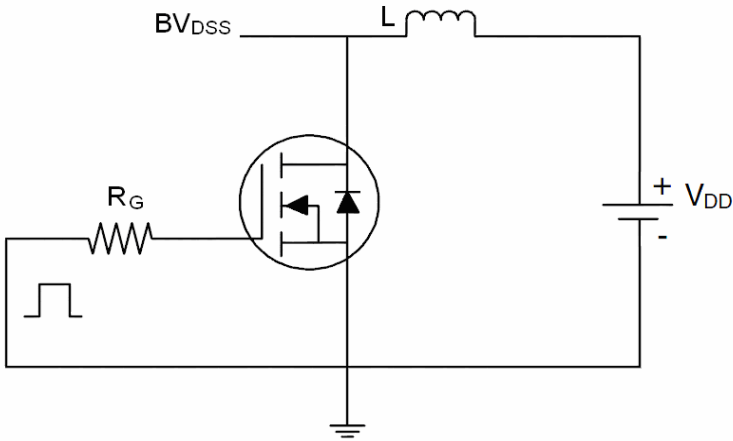


Figure 12. E_{AS} Test Circuit

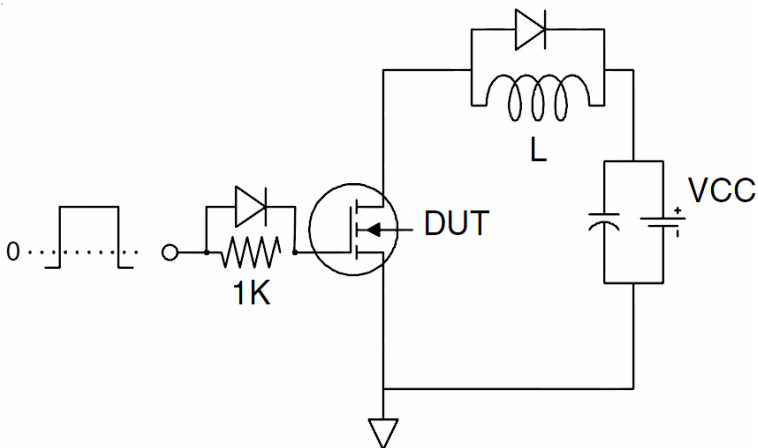


Figure 13. Gate Charge Test Circuit

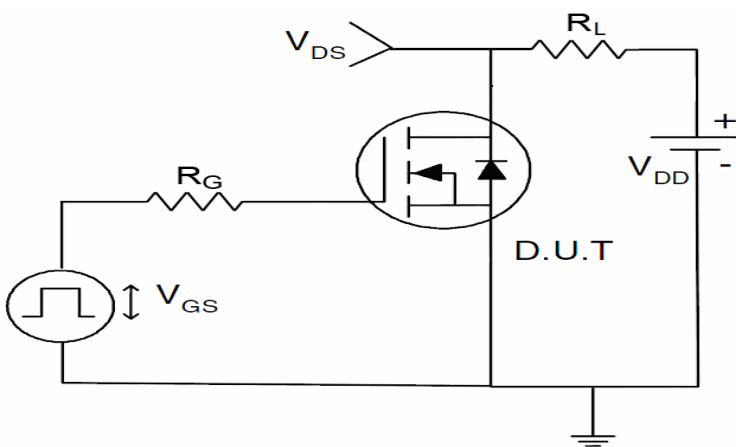
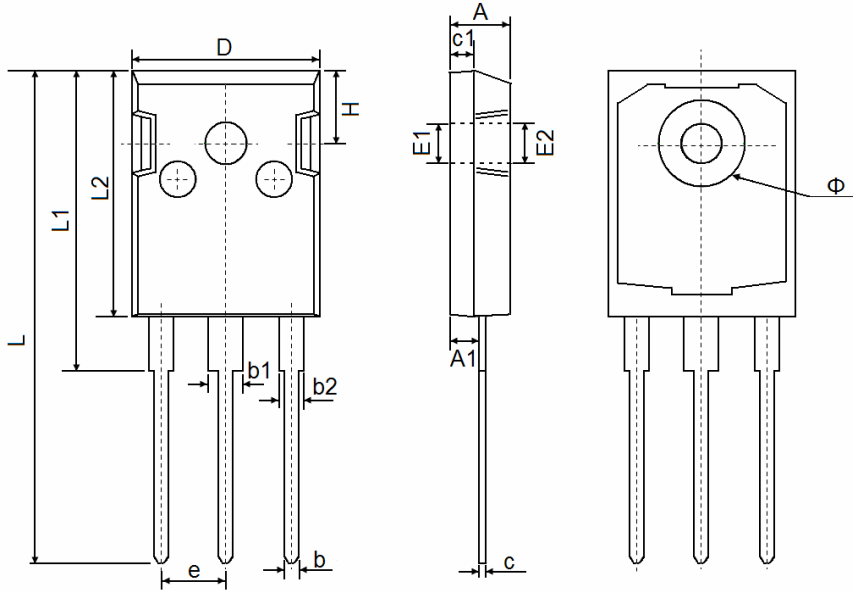


Figure 14. Switch Time Test Circuit

Package Outline Dimensions (TO-247)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	