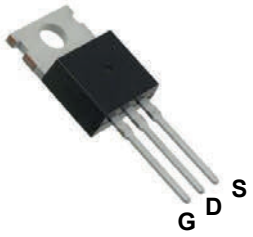
GOOD-ARK SEMICONDUCTOR

GSFT60R099

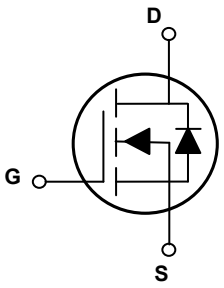
600V N-Channel Power MOSFET

Main Product Characteristics

BV_{DSS}	600V
$R_{DS(ON)}$	99mΩ (Max)
I_D	36A



TO-220



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 GSFT60R099 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, EV Charger, motor driver and a wide variety of other applications.

Absolute Maximum Ratings (T_J=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current[1], T_C=25°C	I_D	36	A
Continuous Drain Current[1], T_C=100°C		22.8	
Pulsed Drain Current[2], T_C=25°C	$I_{D.pulse}$	108	A
Continuous Diode Forward Current[1], T_C=25°C	I_S	36	A
Diode Pulsed Current[2], T_C=25°C	$I_{S.pulse}$	108	A
Power Dissipation[3], T_C=25°C	P_D	261	W
Single Pulsed Avalanche Energy[5]	E_{AS}	845	mJ
MOSFET dv/dt Ruggedness, V_{DS}=0 to 480V	dv/dt	50	V/ns
Reverse Diode dv/dt, V_{DS}=0 to 480V, I_{SD}≤I_D		50	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.48	°C/W
Thermal Resistance, Junction to Ambient[4]	$R_{\theta JA}$	62	°C/W
Operation and Storage Temperature Range	T_{stg}, T_J	-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	$V_{(BR)DSS}$	V_{GS}=0V, I_D=1mA	600	-	-	V
		V_{GS}=0V, I_D=1mA T_J=150°C	650	-	-	
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=18A	-	0.085	0.099	Ω
		V_{GS}=10V, I_D=18A T_J=150°C	-	0.195	-	
Gate Resistance	R_G	f=1MHz, Open drain	-	6.2	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=1mA	3.0	-	4.5	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=16A V_{GS}=10V	-	57.8	-	nC
Gate-Source Charge	Q_{gs}		-	17.2	-	
Gate-Drain Charge	Q_{gd}		-	18.8	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.9	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, R_G=2.5Ω V_{GS}=10V, I_D=16A	-	40.2	-	nS
Rise Time	t_r		-	29.4	-	
Turn-Off Delay Time	$t_{d(off)}$		-	87.2	-	
Fall Time	t_f		-	8.4	-	
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V f=100KHz	-	3231	-	pF
Output Capacitance	C_{oss}		-	223.8	-	
Reverse Transfer Capacitance	C_{rss}		-	2.2	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=36A	-	-	1.4	V
Reverse Recovery Time	t_{rr}	I_S=16A, di/dt=100A/μs	-	138	-	nS
Reverse Recovery Charge	Q_{rr}		-	756	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	10.1	-	A

Note:

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Pd is based on max. junction temperature, using junction-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. copper, in a still air environment with T_A=25°C.
5. V_{DD}=100V, V_{GS}=10V, L=80mH, starting T_J=25°C.

Typical Electrical and Thermal Characteristic Curves

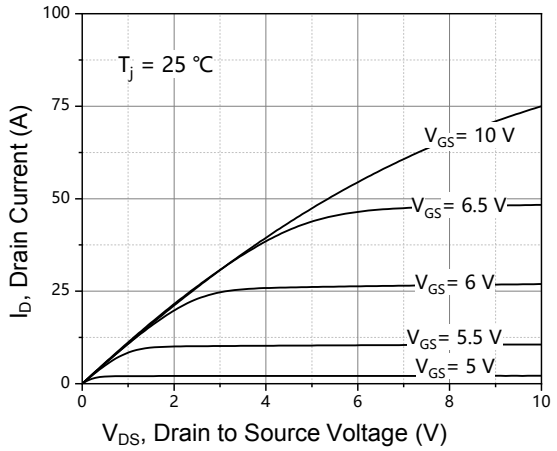


Figure 1. Typical Output Characteristics

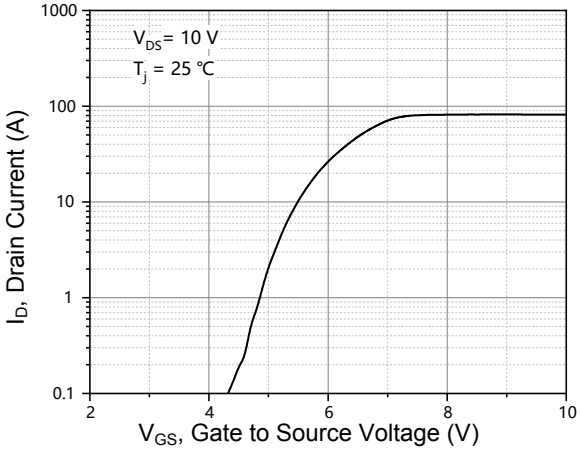


Figure 2. Transfer Characteristics

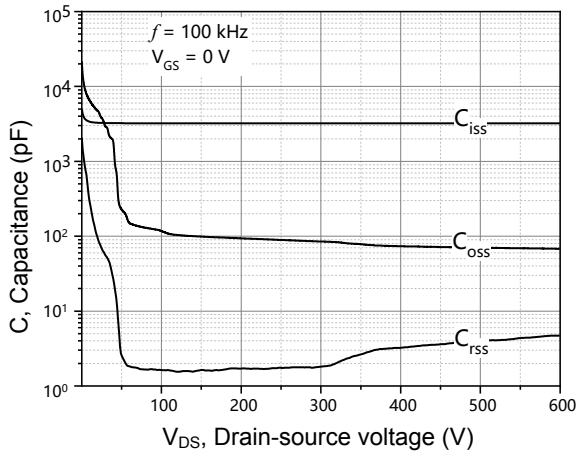


Figure 3. Typ. Capacitances

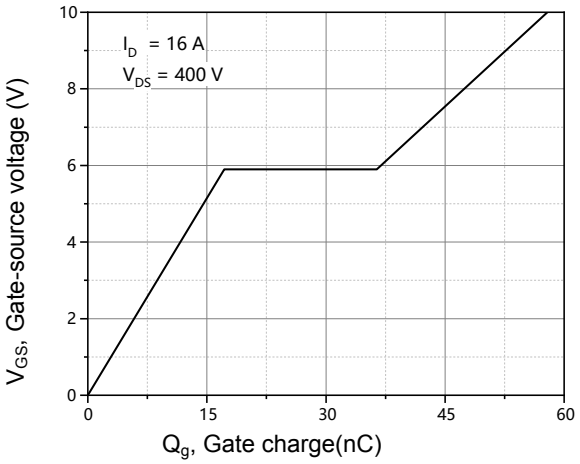


Figure 4. Typ. Gate Charge

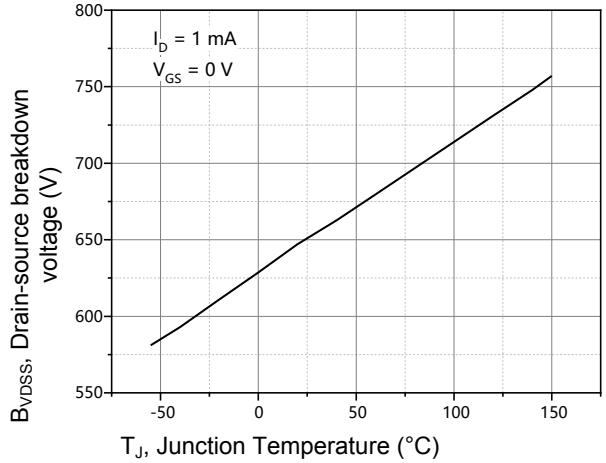


Figure 5. Drain-source breakdown voltage

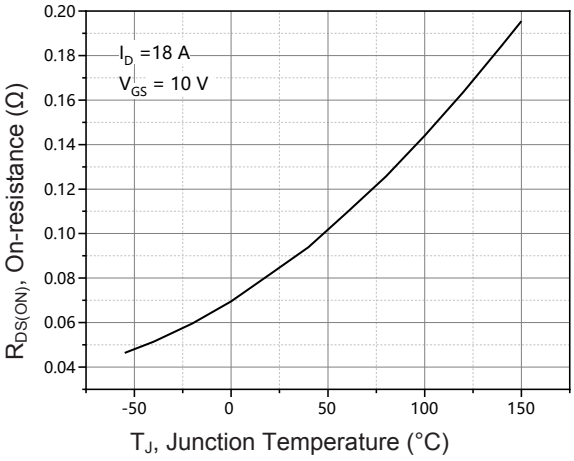


Figure 6. Drain-source on-state resistance

Typical Electrical and Thermal Characteristic Curves

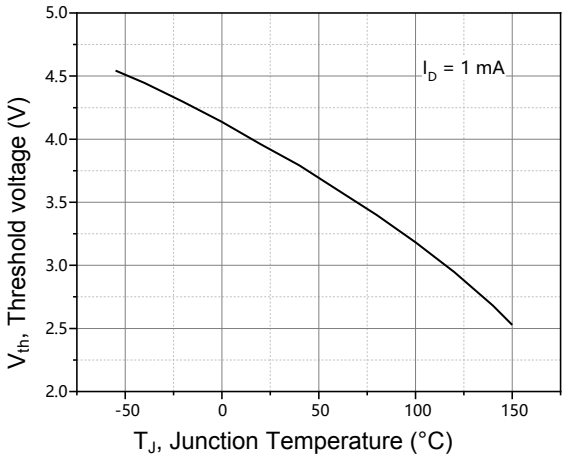


Figure 7. Threshold voltage

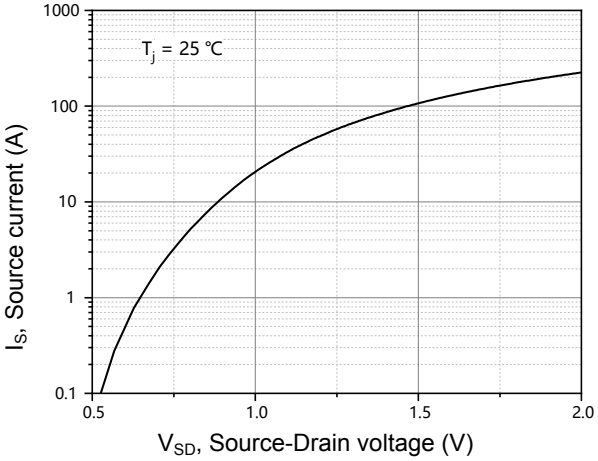


Figure 8. Forward characteristic of body diode

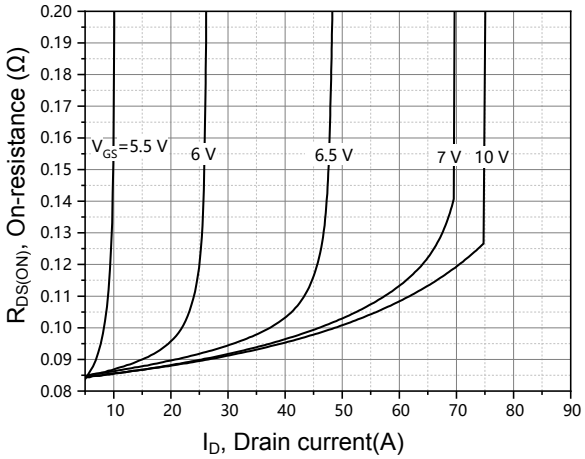


Figure 9. Drain-source on-state resistance

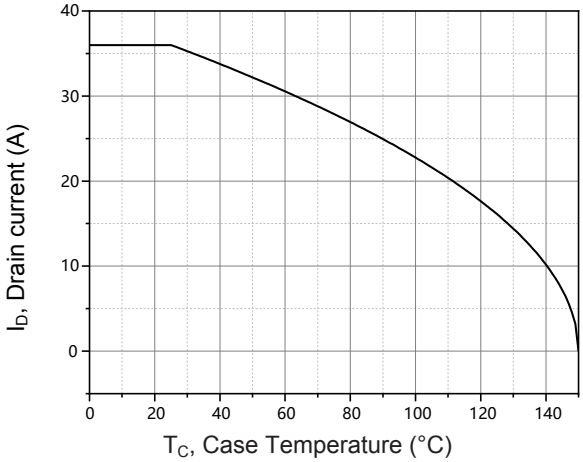


Figure 10. Drain current

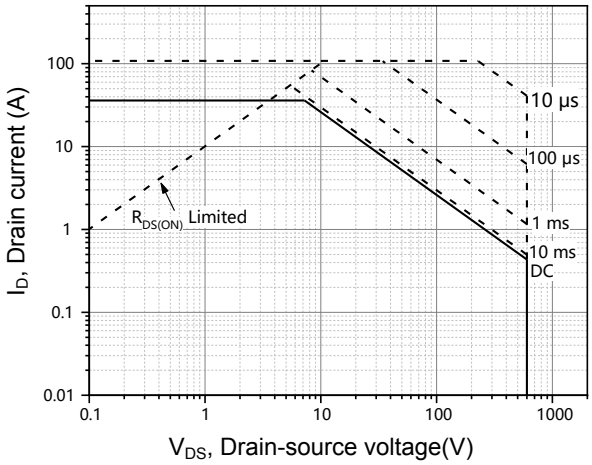


Figure 11. Safe operation area for T_C=25°C

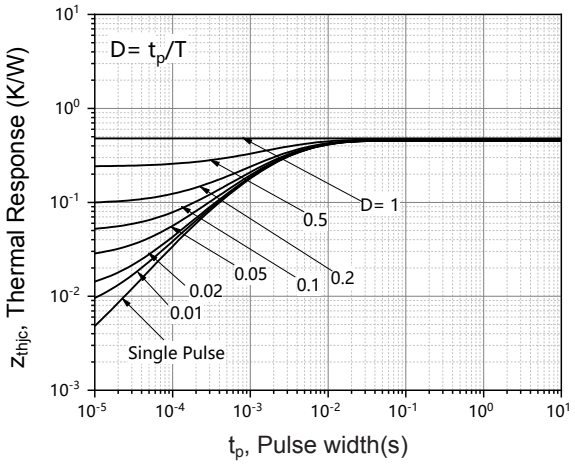
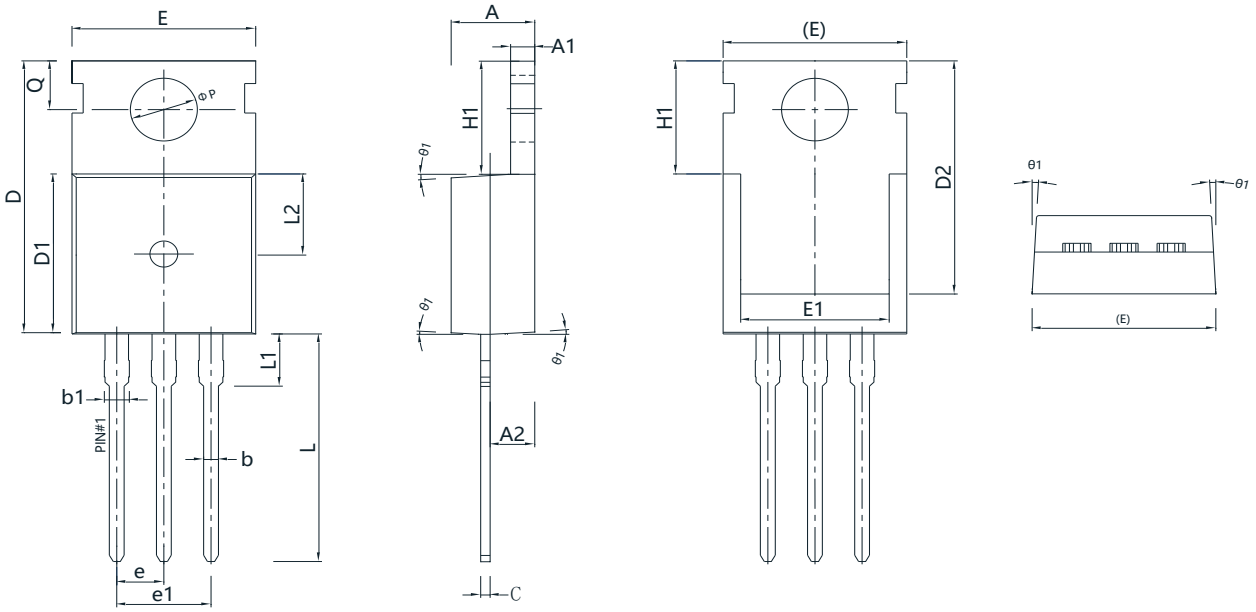


Figure 12. Max. transient thermal impedance

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.400	4.600	0.173	0.181
A1	1.270	1.330	0.050	0.052
A2	2.300	2.500	0.091	0.098
b	0.700	0.900	0.028	0.035
b1	1.270	1.400	0.050	0.055
c	0.450	0.600	0.018	0.024
D	15.300	16.100	0.602	0.634
D1	9.100	9.300	0.358	0.366
D2	13.100	13.700	0.516	0.539
E	9.700	10.200	0.382	0.402
E1	7.800	8.200	0.307	0.323
e	2.540 BSC		0.100 BSC	
e1	5.080 BSC		0.200 BSC	
H1	6.300	6.700	0.248	0.264
L	12.780	13.380	0.503	0.527
L1	-	3.500	-	0.138
L2	4.600 REF		0.181 REF	
ΦP	3.550	3.650	0.140	0.144
Q	2.730	2.870	0.107	0.113
θ1	1°	5°	1°	5°