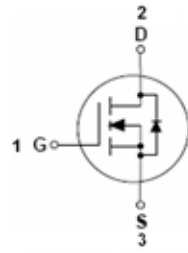


Features

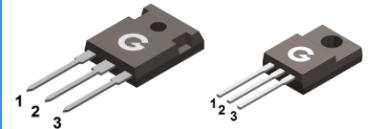
- Low power loss by high speed switching and low on-resistance
- Excellent thermal behavior
- Superior hard commutation robustness
- HBM: JESD22-A114-B: 2
- Product validation acc. JEDEC Standard

HF



Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- Telecom
- Solar



TO-247

TO-220MF

Mechanical Data

- Case: TO-247, TO-220MF
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
SJM65R070U	TO-247	30 pcs / Tube	SJM65R070U
SJM65R070F	TO-220MF	50 pcs / Tube	SJM65R070F

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	650	V
Gate-to-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current (T _C = 25°C)	I _D	50	A
Continuous Drain Current (T _C = 100°C)		32	A
Pulsed Drain Current (t _p = 10μs, T _C = 25°C)	I _{DM}	200	A
Single Pulse Avalanche Energy ^{*2}	E _{AS}	800	mJ
Power Dissipation (TO-247, T _C = 25°C)	P _D	329	W
Power Dissipation (TO-220MF, T _C = 25°C)		50	W
Operating Junction Temperature Range	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case (TO-247)	R _{θJC}	-	0.22	0.38	°C/W
Thermal Resistance Junction-to-Case (TO-220MF)		-	2	2.5	°C/W
Thermal Resistance Junction-to-Air (TO-247)	R _{θJA}	-	-	40	°C/W
Thermal Resistance Junction-to-Air (TO-220MF)		-	-	62	°C/W

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *1	V _{GS} = 10V, I _D = 25A	-	60	70	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.5	3.1	4.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	1.5	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 40V f = 250kHz	-	3118	-	pF
C _{OSS}	Output Capacitance		-	231	-	
C _{RSS}	Reverse Transfer Capacitance		-	0.4	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 400V V _{GS} = 15V R _G = 3.3Ω I _D = 25A	-	26	-	ns
t _r	Turn-on Rise Time		-	57	-	
t _{d(OFF)}	Turn-Off Delay Time		-	78	-	
t _f	Turn-Off Fall Time		-	21	-	
Q _G	Total Gate-Charge	V _{DD} = 400V V _{GS} = 10V I _D = 25A	-	80	-	nC
Q _{GS}	Gate to Source Charge		-	19	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	37	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 25A, V _{GS} = 0V	-	0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 25A, V _R = 400V di/dt = 100 A/μs	-	480	-	ns
Q _{rr}	Reverse Recovery Charge		-	7.1	-	μC

Notes:

- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E_{AS} data shows Max. rating. The test condition is V_{DD} = 100V, V_{GS} = 15V, L = 50mH

Ratings and Characteristics Curves (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

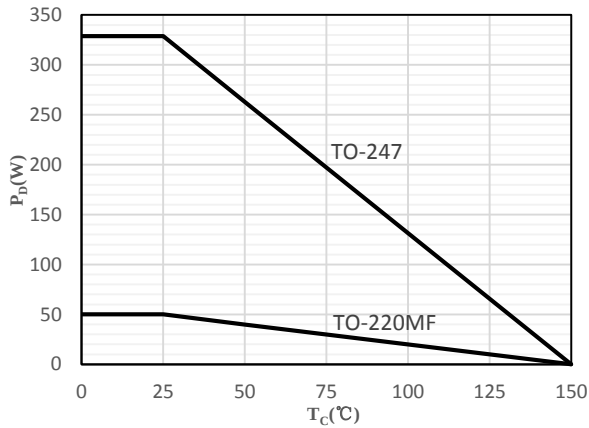


Fig 1 Power Dissipation

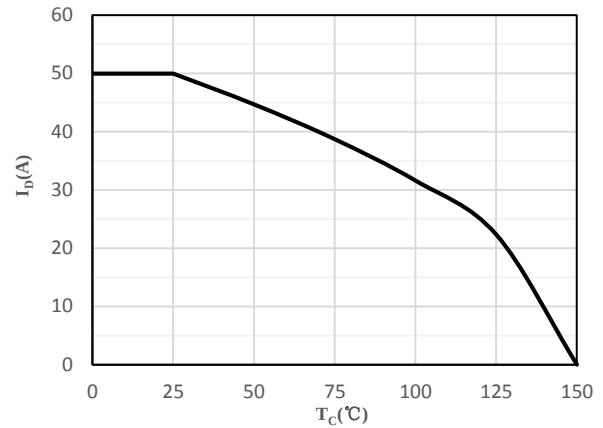


Fig 2 Drain Current

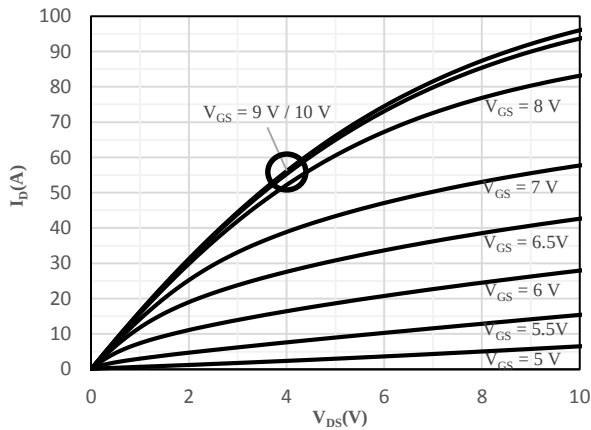


Fig 3 Typical Output Characteristics

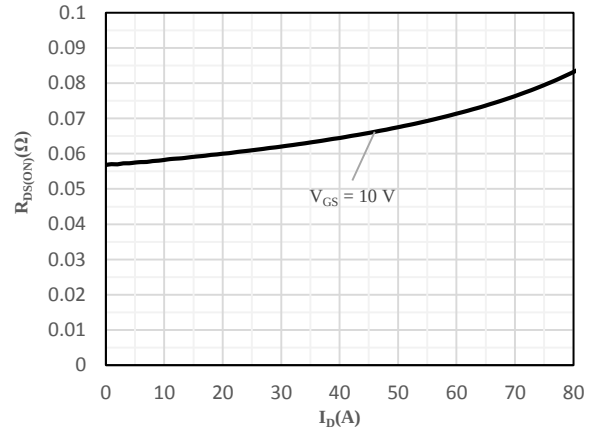


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

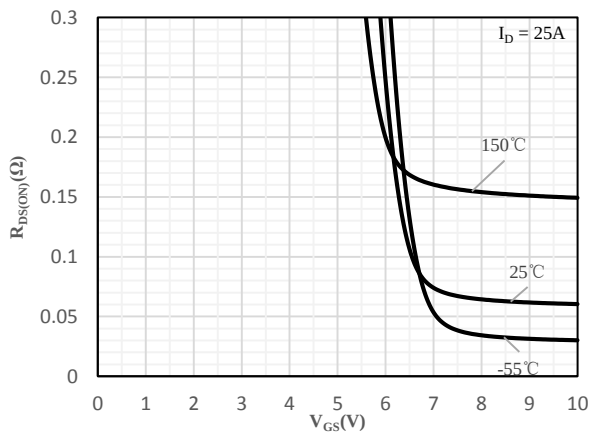


Fig 5 On-Resistance vs. Gate-Source Voltage

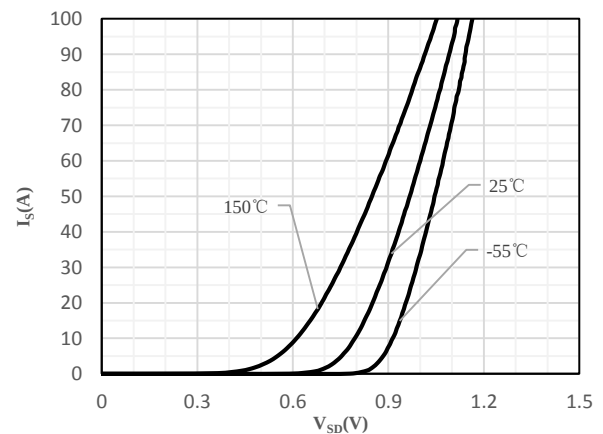


Fig 6 Body-Diode Characteristics

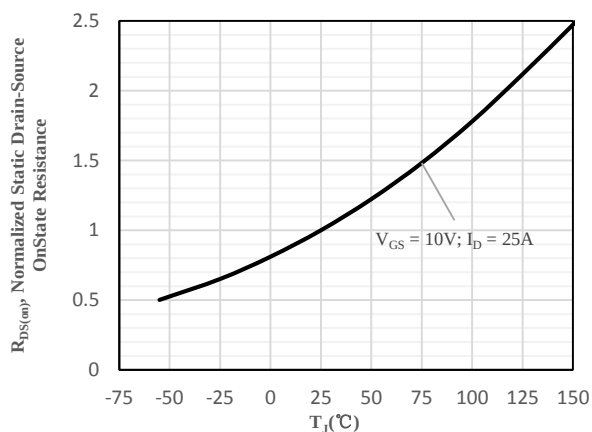


Fig 7 Normalized On-Resistance vs. Junction Temperature

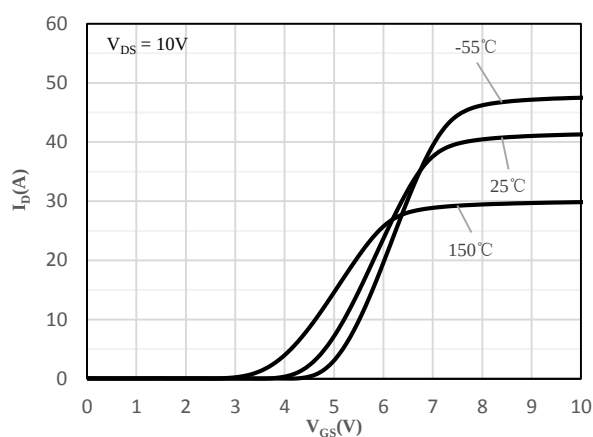


Fig 8 Transfer Characteristics

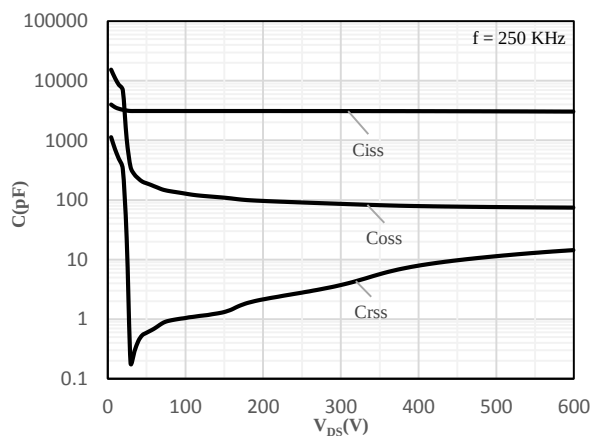


Fig 9 Capacitance Characteristics

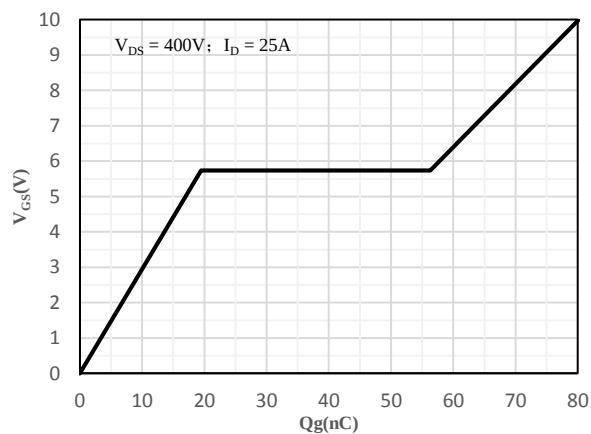


Fig 10 Gate-Charge Characteristics

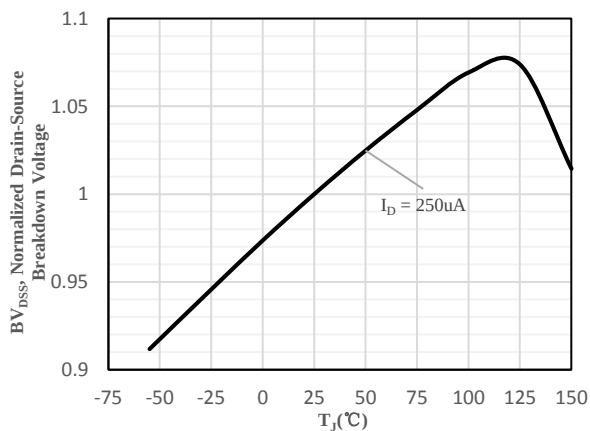


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

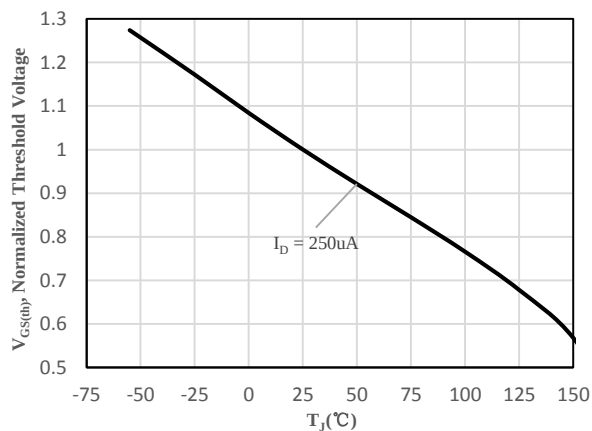


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

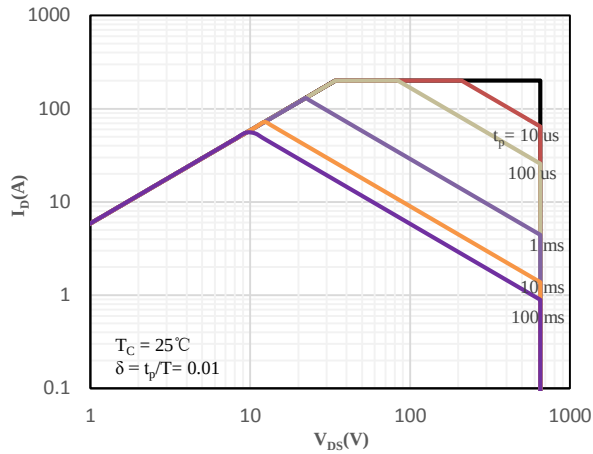


Fig 13 Safe Operating Area (TO-247)

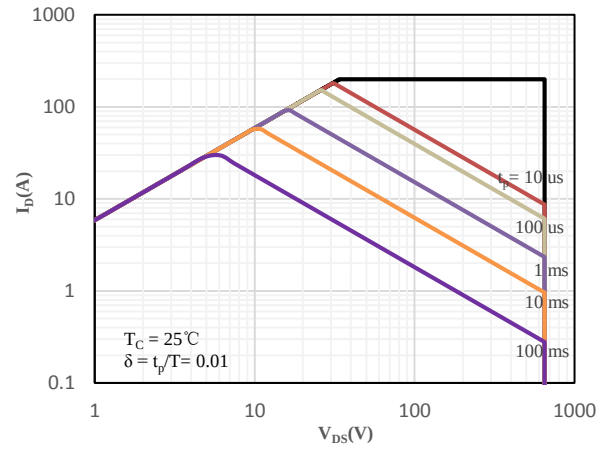


Fig 14 Safe Operating Area (TO-220MF)

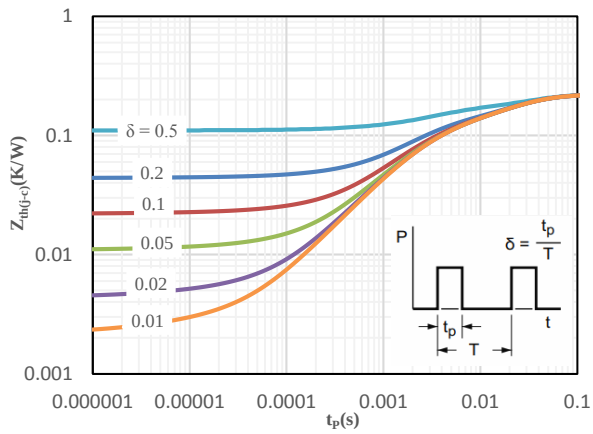


Fig 15 Maximum transient thermal impedance
(TO-247)

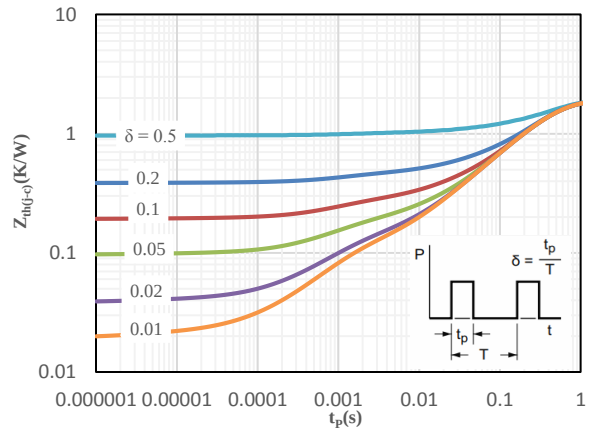
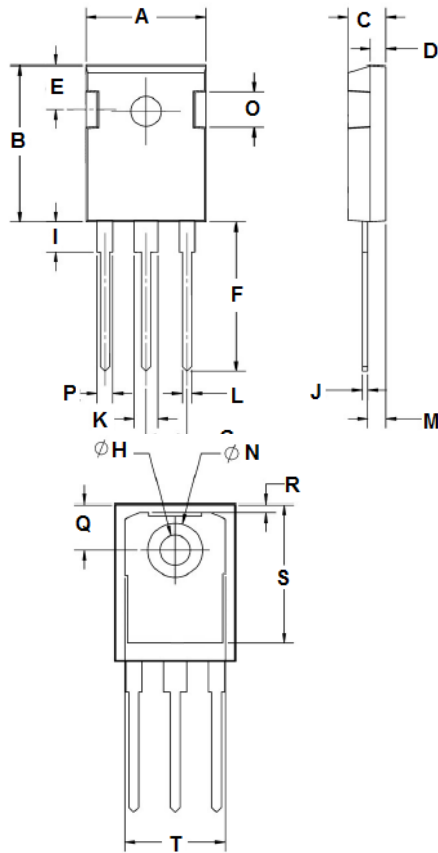
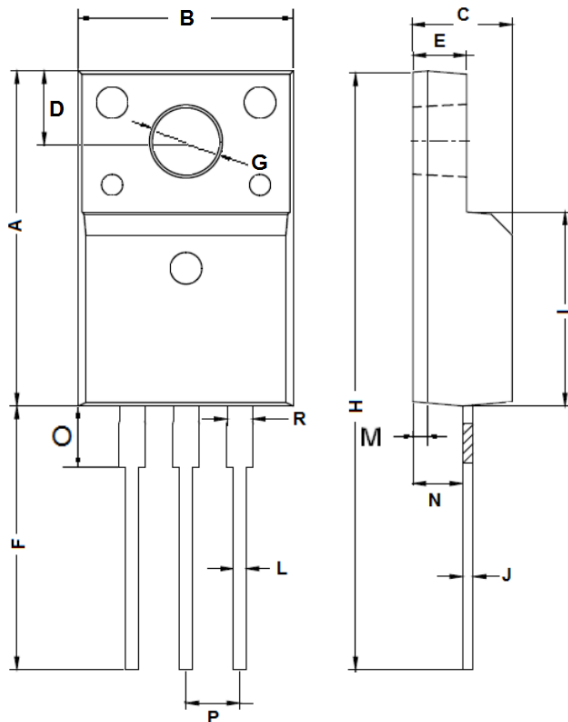


Fig 16 Maximum transient thermal impedance
(TO-220MF)

Package Outline Dimensions (Unit: mm)



TO-247		
Dimension	Min.	Max.
A	15.50	16.10
B	20.70	21.30
C	4.70	5.30
D	1.80	2.20
E	5.20	5.80
F	19.70	20.30
G	5.20	5.60
H	3.30	3.70
I	3.90	4.30
J	0.50	0.70
K	2.80	3.20
L	1.00	1.40
M	2.20	2.60
N	7.00	7.20
O	4.90	5.30
P	1.80	2.20
Q	5.70	5.90
R	0.80	1.20
S	17.00	17.80
T	13.60	14.20



TO-220MF		
Dimension	Min.	Max.
A	15.60	16.00
B	9.90	10.30
C	4.50	4.90
D	3.00	3.60
E	2.44	2.64
F	12.20	12.60
G	3.00	3.30
H	27.80	28.60
I	8.70	9.70
J	0.40	0.60
L	0.70	0.90
M	0.55	0.75
N	2.50	2.70
O	2.70	3.10
P	2.45	2.65
R	1.10	1.30