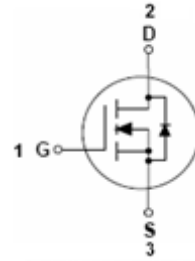


Features

- Best-in-class $R_{DS(on)}$ and Q_G
- Ultra-fast body diode
- Excellent thermal behavior
- HBM: JESD22-A114-B: 2
- Product validation acc. JEDEC Standard
- RoHS compliant with Halogen-free

HF

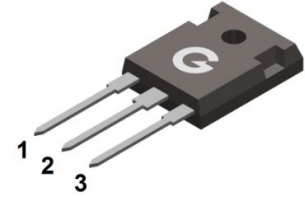


Applications

- Soft switching applications
- EV charging
- Solar inverter
- Server

Mechanical Data

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



TO-247

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
SJM65R040FRU	TO-247	30 pcs / Tube	SJM65R040FRU

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ 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 ($T_C = 25^\circ\text{C}$)	I_D	70	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		45	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	280	A
Single Pulse Avalanche Energy ^{*2}	E_{AS}	2500	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	500	W
Operating Junction Temperature Range	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	0.2	0.25	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air	$R_{\theta JA}$	-	-	40	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 1mA	650	-	-	V
		V _{GS} = 0V, I _D = 5mA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650V, V _{GS} = 0V	-	-	10	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 = 40A	-	35	40	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 1.2mA	3	4.7	5.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	1.6	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 40V f = 250kHz	-	8187	-	pF
C _{OSS}	Output Capacitance		-	950	-	
C _{RSS}	Reverse Transfer Capacitance		-	10.3	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 400V V _{GS} = 15V I _D = 40A R _G = 3.3Ω	-	56	-	ns
t _r	Turn-on Rise Time		-	81	-	
t _{d(OFF)}	Turn-Off Delay Time		-	131	-	
t _f	Turn-Off Fall Time		-	15	-	
Q _G	Total Gate-Charge	V _{DD} = 400V V _{GS} = 10V I _D = 40A	-	166	-	nC
Q _{GS}	Gate to Source Charge		-	52	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	67	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 40A, V _{GS} = 0V	-	0.96	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 40A, V _R = 400V	-	200	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	1.2	-	μC

Notes:

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

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

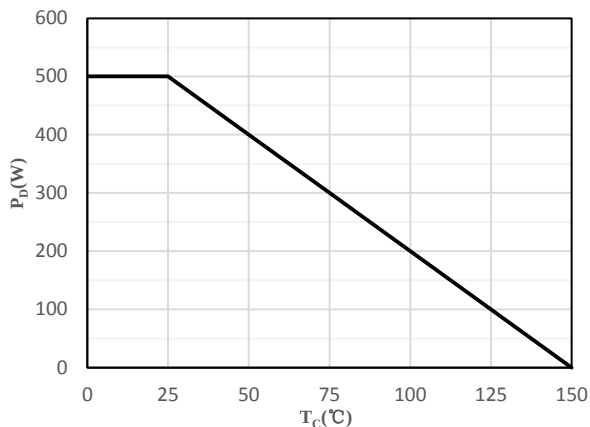


Fig 1 Power Dissipation

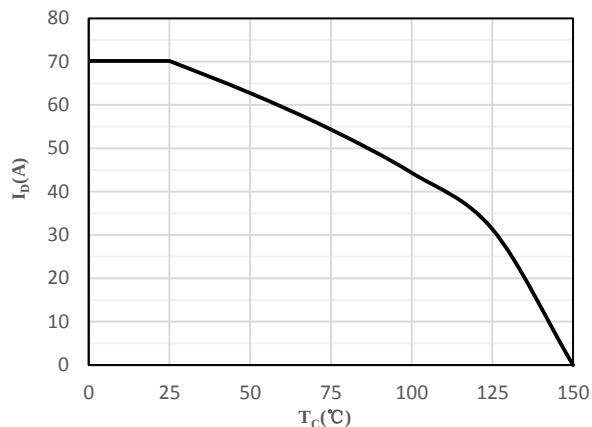


Fig 2 Drain Current

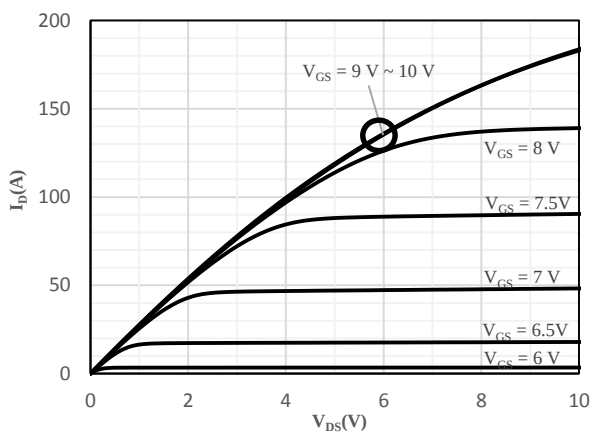


Fig 3 Typical Output Characteristics

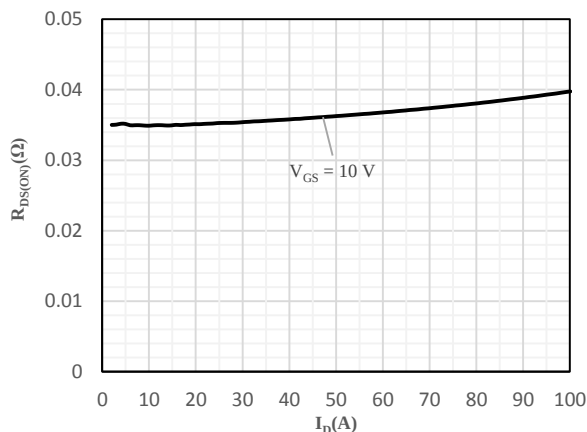


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

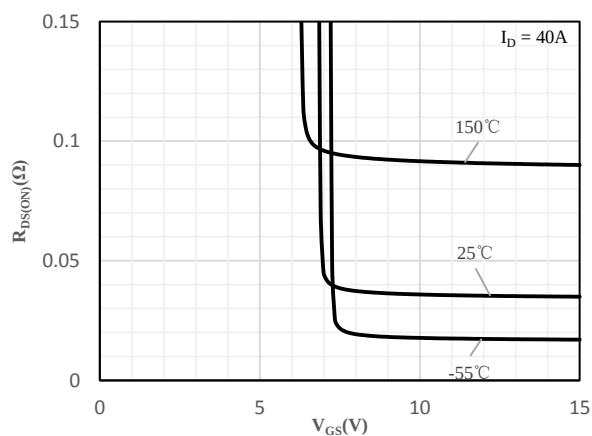


Fig 5 On-Resistance vs. Gate-Source Voltage

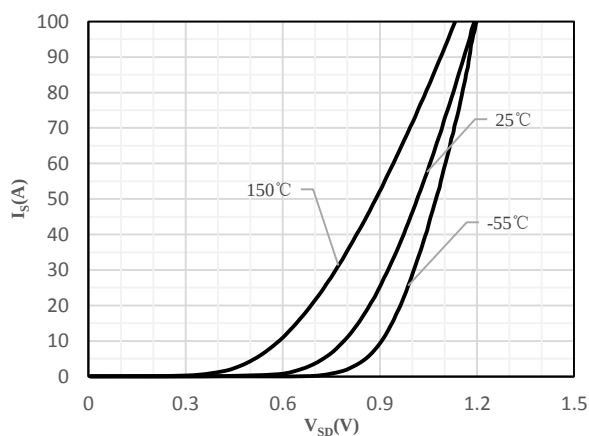


Fig 6 Body-Diode Characteristics

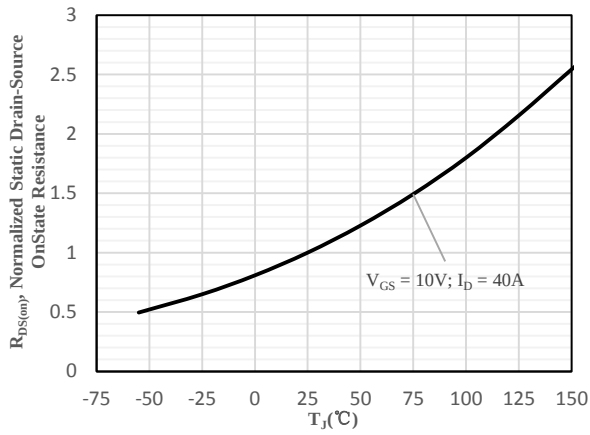


Fig 7 Normalized On-Resistance vs. Junction Temperature

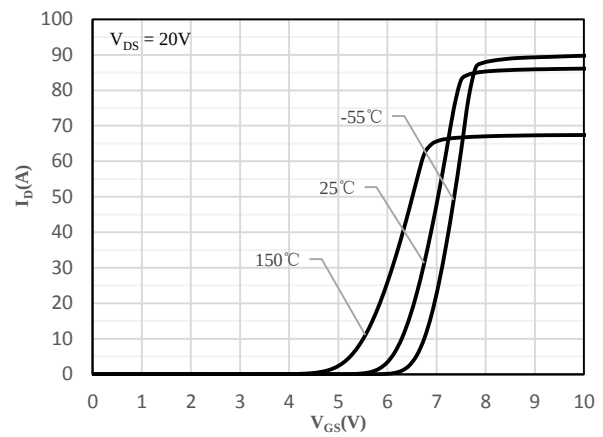


Fig 8 Transfer Characteristics

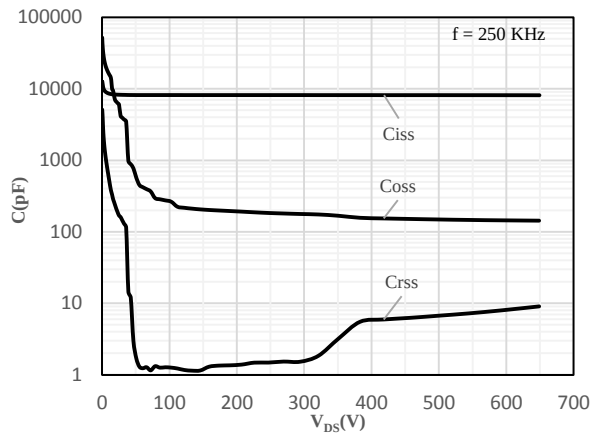


Fig 9 Capacitance Characteristics

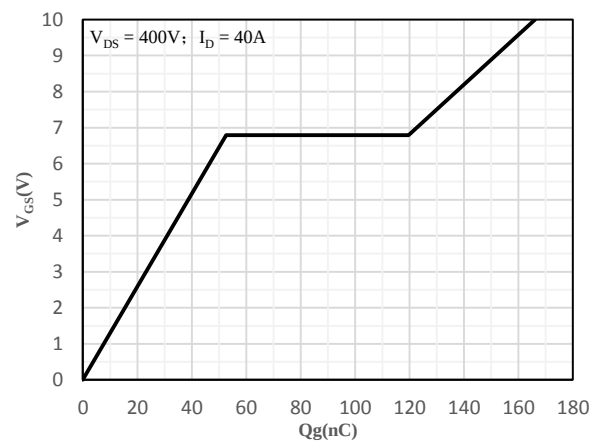


Fig 10 Gate-Charge Characteristics

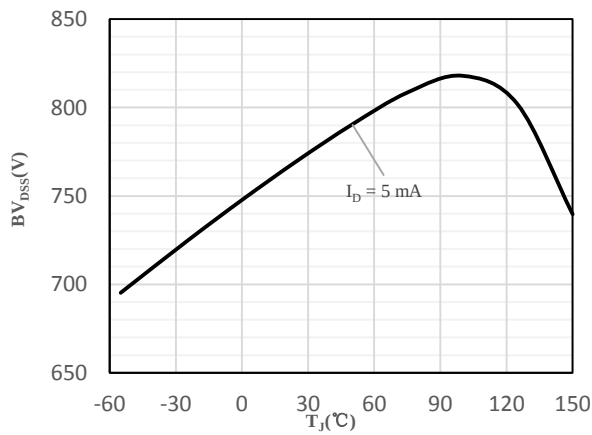


Fig 11 Breakdown Voltage vs. Junction Temperature

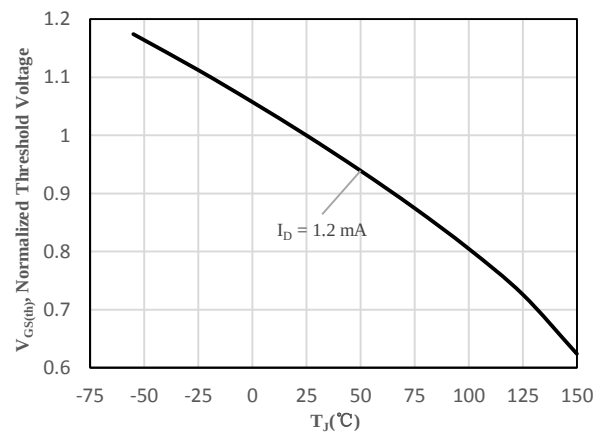


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

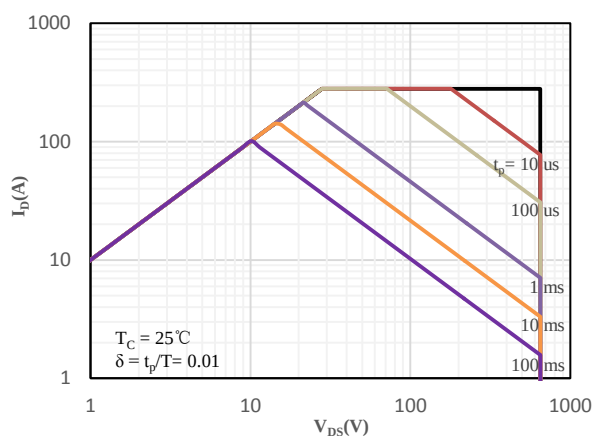


Fig 13 Safe Operating Area

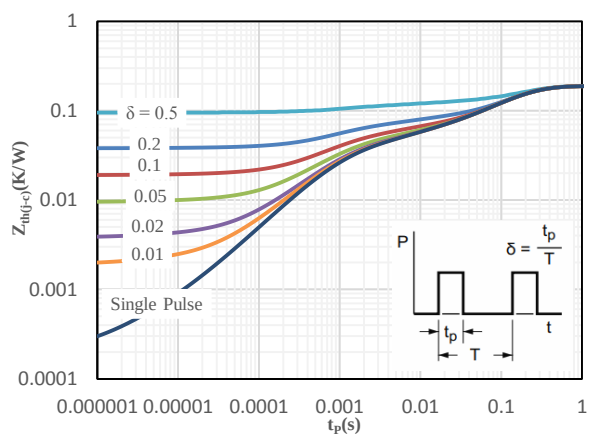
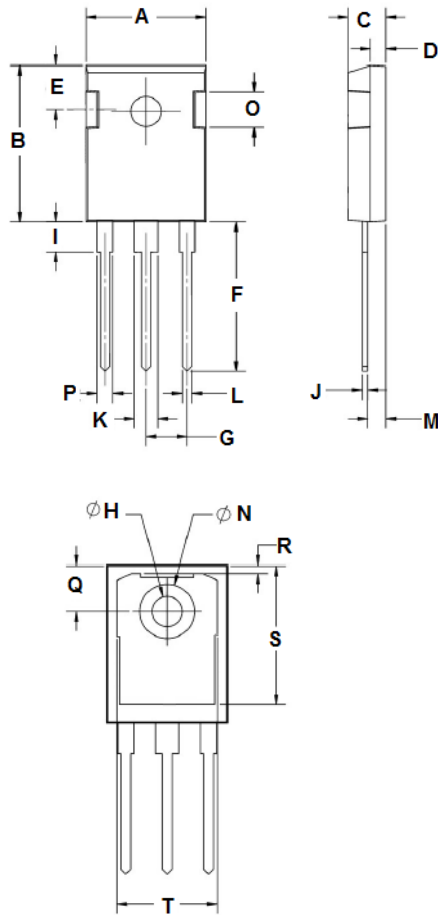


Fig 14 Maximum transient thermal impedance

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