

Features

- Low power loss by high speed switching and low on-resistance
- Excellent thermal behavior
- HBM: JESD22-A114-B: 1B
- Product validation acc. JEDEC Standard

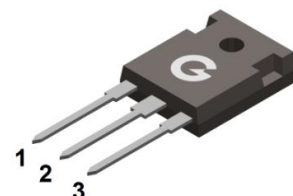
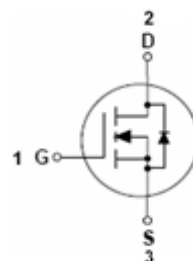
HF

APPLICATIONS

- PFC power supply stages
- Solar inverter
- Telecom
- Server
- UPS

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
SJ60R180U	TO-247	30 pcs / Tube	SJ60R180U

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	600	V
Gate-to-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current (T _C = 25°C)	I _D	21	A
Continuous Drain Current (T _C = 100°C)		13.2	A
Pulsed Drain Current (t _p = 10μs, T _C = 25°C)	I _{DM}	84	A
Single Pulse Avalanche Energy *2	E _{AS}	500	mJ
Power Dissipation (T _C = 25°C)	P _D	208	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	R _{θJC}	-	0.41	0.6	°C/W
Thermal Resistance Junction-to-Air	R _{θJA}	-	-	40	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	600	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, 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 = 10A	-	0.15	0.18	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	4.4	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	1579	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 40V	-	111	-	
C _{RSS}	Reverse Transfer Capacitance	f = 250kHz	-	4	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *3	V _{DD} = 400V V _{GS} = 10V I _D = 7A	-	64	-	ns
t _r	Turn-on Rise Time *3		-	16	-	
t _{d(OFF)}	Turn-Off Delay Time *3		-	55	-	
t _f	Turn-Off Fall Time *3		-	14	-	
Q _G	Total Gate-Charge	V _{DD} = 520V	-	39	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	5	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 10A	-	14	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 10A, V _{GS} = 0V	-	0.84	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 1A, V _R = 400V	-	138	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	0.79	-	μC

Notes:

- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 100V, V_{GS} = 15V, L = 50mH$
- Guaranteed by design, not subject to production

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

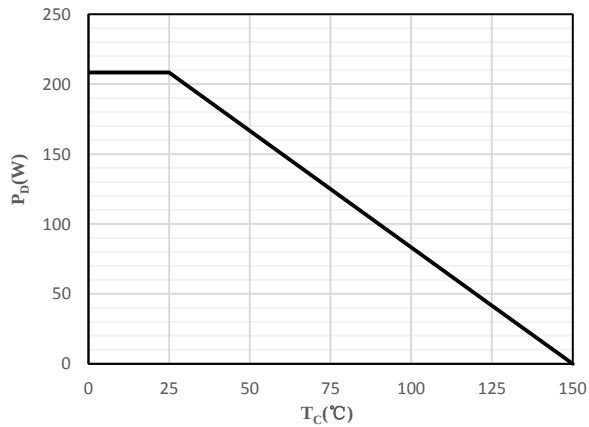


Fig 1 Power Dissipation

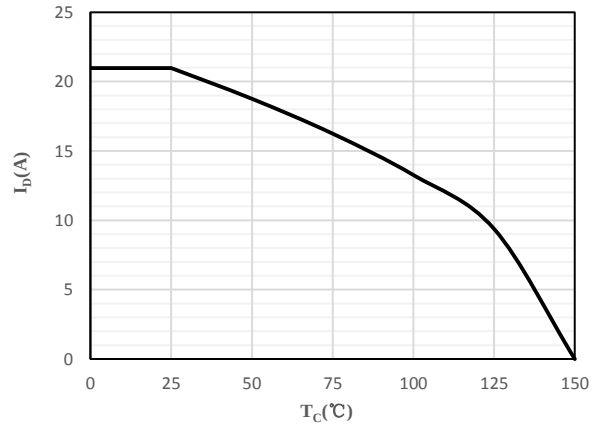


Fig 2 Drain Current

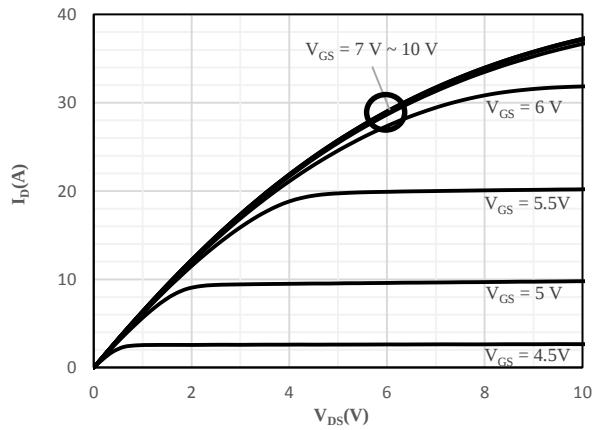


Fig 3 Typical Output Characteristics

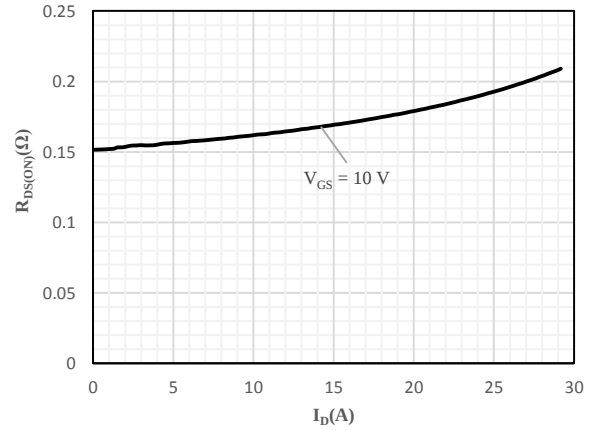


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

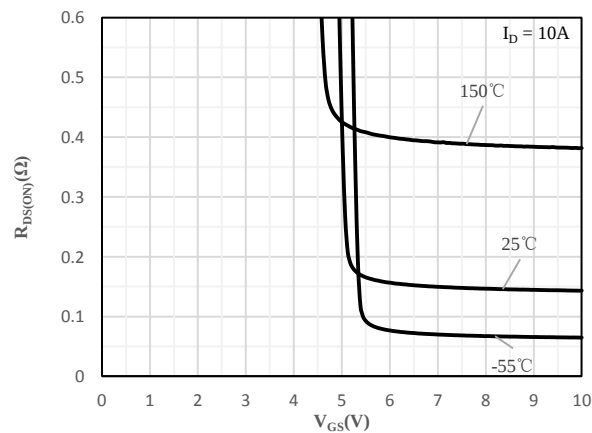


Fig 5 On-Resistance vs. Gate-Source Voltage

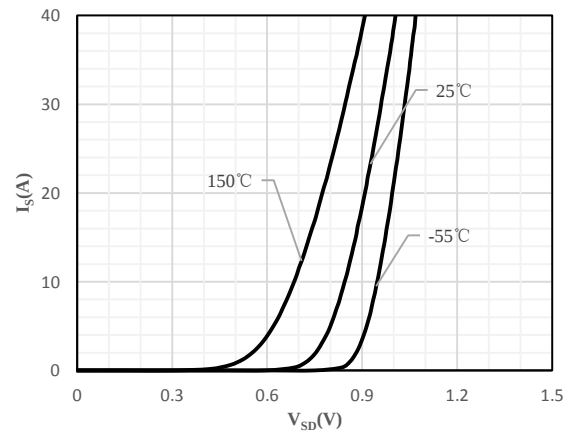


Fig 6 Body-Diode Characteristics

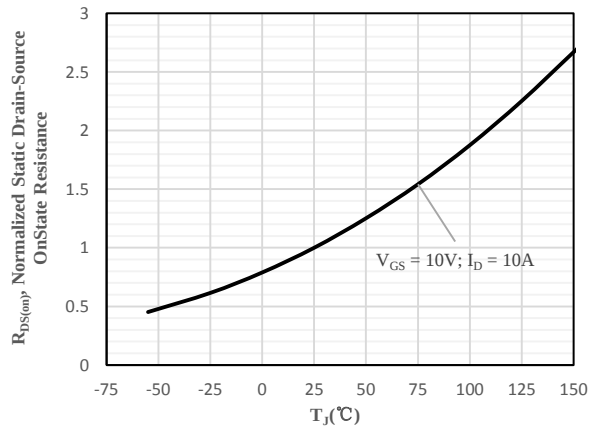


Fig 7 Normalized On-Resistance vs. Junction Temperature

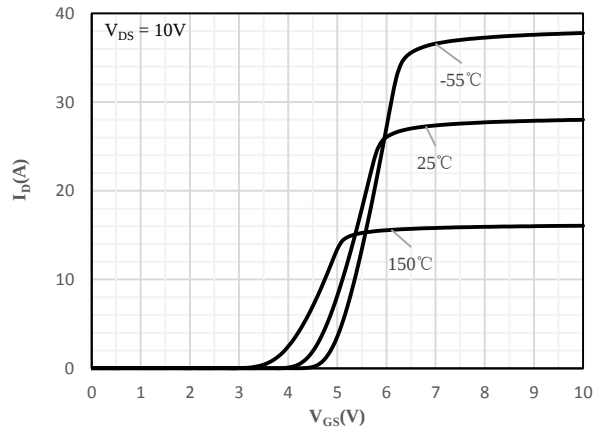


Fig 8 Transfer Characteristics

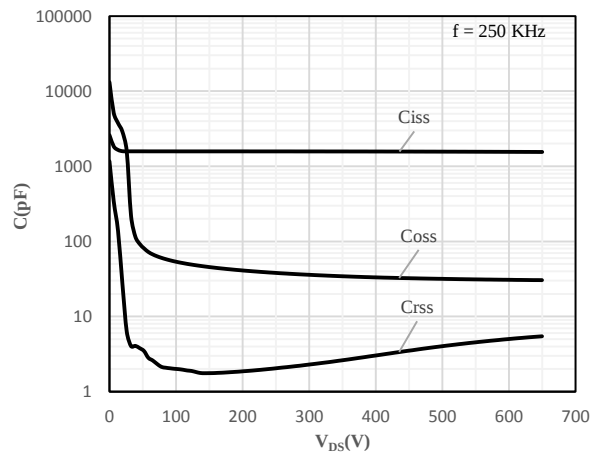


Fig 9 Capacitance Characteristics

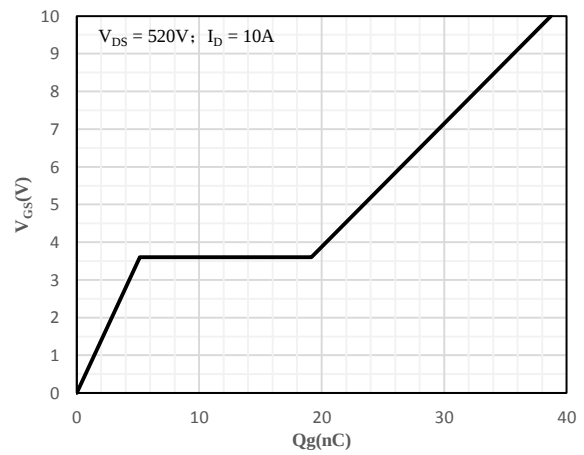


Fig 10 Gate-Charge Characteristics

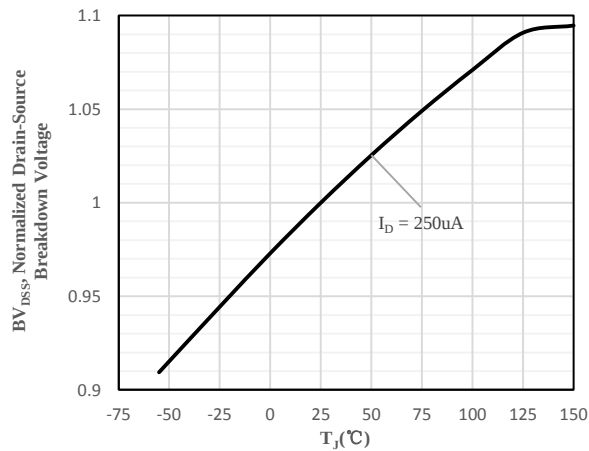


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

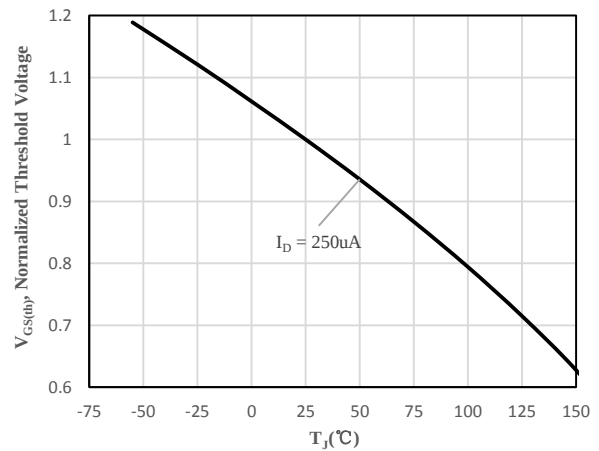


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

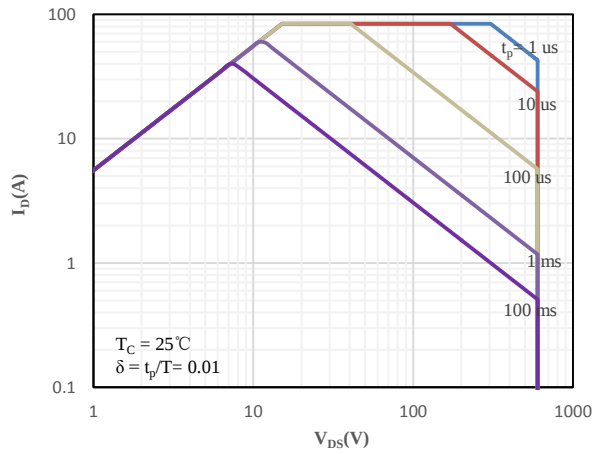


Fig 13 Safe Operation Area

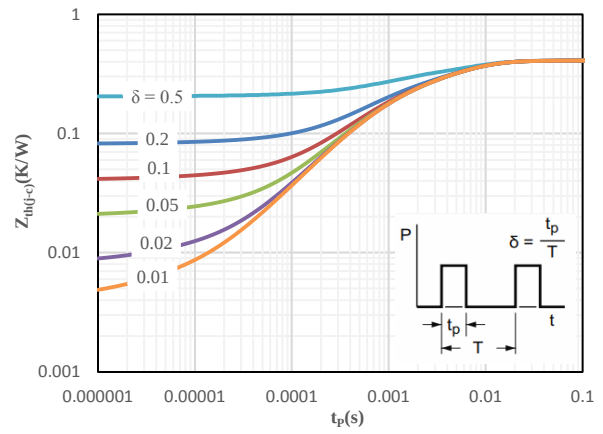
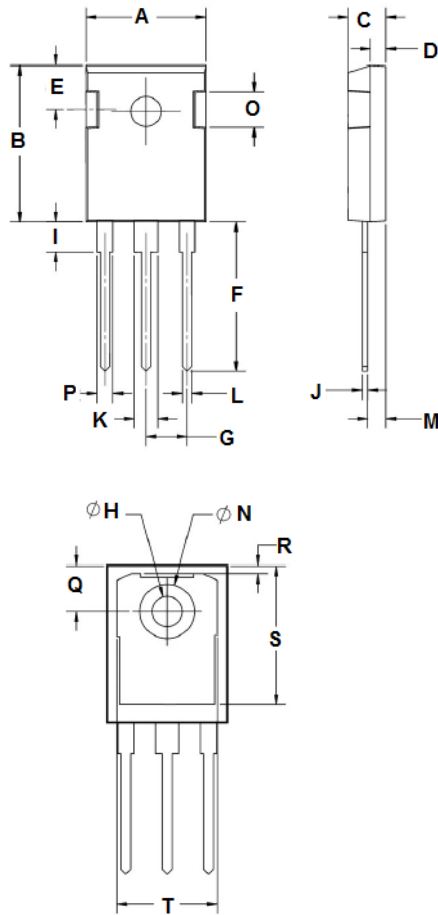


Fig 14 Maximum transient thermal impedance

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

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