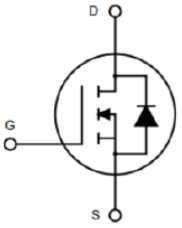
AM65R040NW

650V N-Channel S/J MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.040Ω(max)
I_D	68A
Trr	222nS(typ)

TO-247-3L



Schematic Diagram

Features and Benefits

- Low on-resistance and Low gate charge.
- Very low switching and conduction loss.
- Ultra-Fast switching and reverse body recovery.
- Excellent high communication ruggedness.

Description

AM65R040NW is a N-channel power MOSFET designed according to super junction technology. This device has very low on-resistance and hard ruggedness for switching applications. It's very low conduction loss and ultra-fast switching can make applications more efficient and faster.

Applications

- Server
- EV Charging
- Telecom and UPS

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

Parameter	Symbol	Parameter.	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-to-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, @ Steady-State	ID @ T_C = 25°C	68	A
Continuous Drain Current, @ Steady-State	ID @ T_C = 100°C	43	A
Pulsed Drain Current	I_{DM}	204	A
Power Dissipation	PD @ TC =25°C	500	W
Single Pulse Avalanche Energy[1]	E_{AS}	2300	mJ
Body diode reverse voltage slope[2]	dv/dt	15	V/ns
MOS dv/dt ruggedness3	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	0.25	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to + 150	°C
Soldering temperature	Tsold	260	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, ID=250μA	650	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	VDS=650V, VGS=0V, T_J= 25℃	-	-	20	μA
Gate-to-Source Forward Leakage	I_{GSS}	VDS=0V,V_{GS}=20V	-	-	100	nA
		VDS=0V,V_{GS}= -20V	-	-	-100	
Static Drain-to-Source On- Resistance	$R_{DS\ (on)}$	V_{GS}=10V, ID=34A	-	35	40	mΩ
Gate Threshold Voltage	$V_{GS\ (th)}$	V_{DS}=V_{GS}, I_D=250μA	3	4	5	V
Gate Resistance	Rg	f=1MHz	-	2.6	-	Ω
Input Capacitance	Ciss	V_{GS}=0V V_{DS}=100V, f=100KHz	-	2590	-	pF
Output Capacitance	Coss		-	260	-	
Reverse transfer capacitance	Crss		-	2.37	-	
Total Gate Charge [4,5]	Qg	I_D=68A, V_{DD}=480V,V_{GS}=10V	-	156	-	nC
Gate-to-Source Charge [4,5]	Qgs		-	48	-	
Gate-to-Drain("Miller") Charge[4,5]	Qgd		-	64	-	
Turn-on Delay Time[4,5]	td(on)	V_{DD}=325V, V_{GS}=10V, R_G=25Ω, ID=68A	-	137	-	nS
Rise Time[4,5]	tr		-	177	-	
Turn-Off Delay Time[4,5]	td(off)		-	365	-	
Fall Time[4,5]	tf		-	22	-	

Source-Drain Ratings and Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	I_S=68A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time [4]	t_{rr}	I_s=68A,V_{DD}=100V, di/dt=100A/us	-	222	-	nS
Reverse Recovery Charge [4]	Q_{rr}		-	2.03	-	μC
Reverse Recovery Peak Current [4]	Irrm			18.3		A

Notes:

1. L=79㎜H,V_{DD}=100V, R_G=25Ω, I_D = I_{AR}, starting temperature T_J=25°C .
2. V_{DS}=0~400V, I_{SD}≤I_S, T_J=25°C .
3. V_{DS}=0~480V.
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
5. Essentially Independent of Operating Temperature.

Typical Electrical and Thermal Characteristic Curves

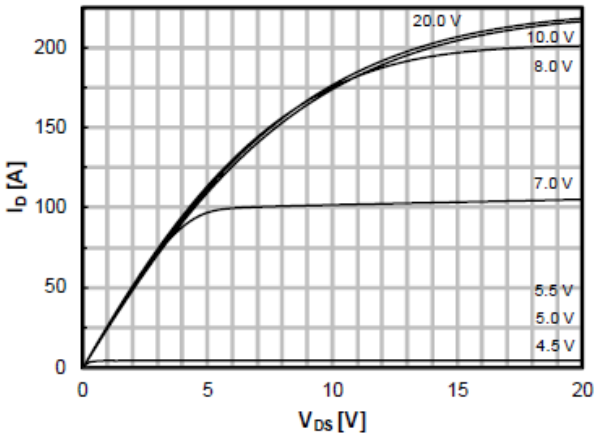


Fig. 1 Output Characteristics

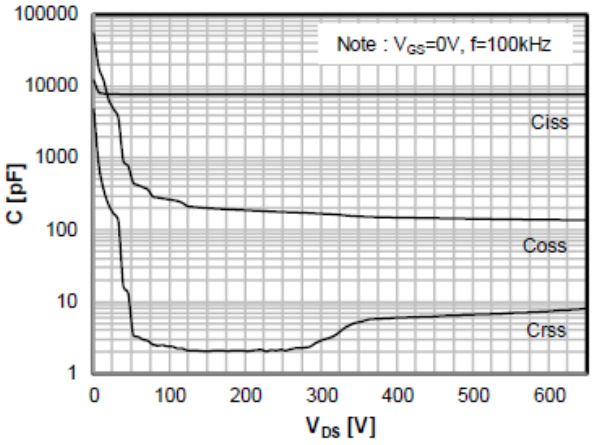


Fig. 2 Capacitances

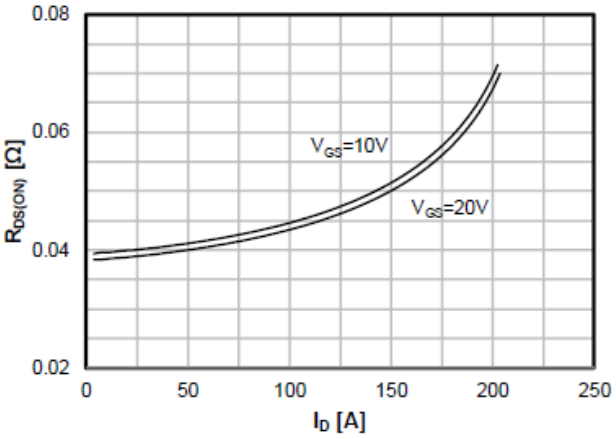


Fig. 3 On-state Resistance

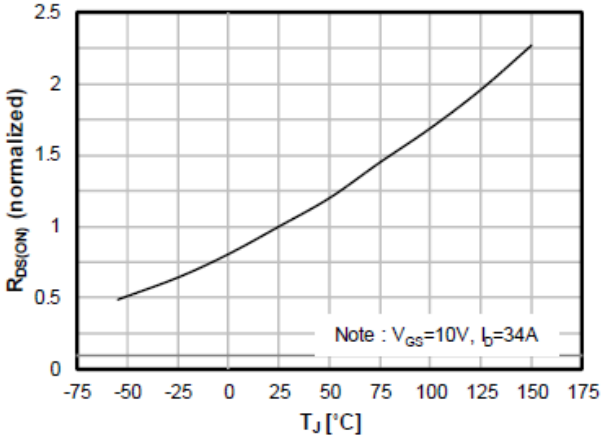


Fig. 4 On-state Resistance with Temperature

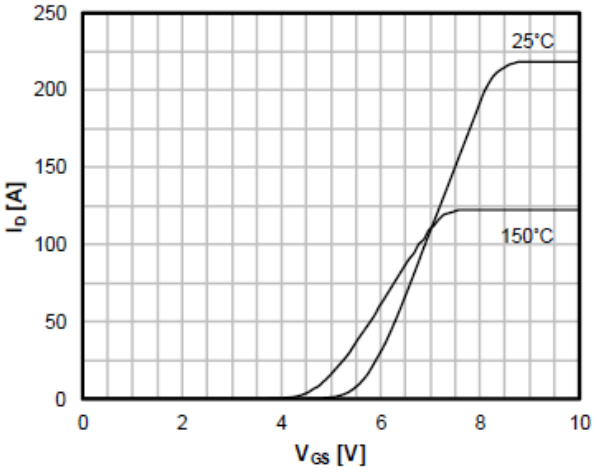


Fig. 5 Transfer Characteristics

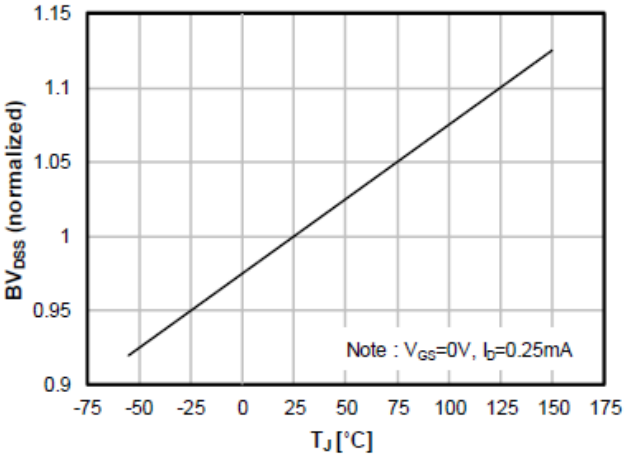


Fig. 6 Breakdown Voltage with Temperature

Typical Electrical and Thermal Characteristic Curves

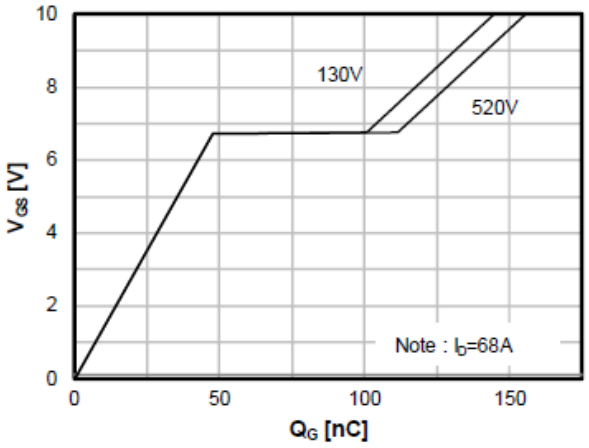


Fig. 7 Gate Charge

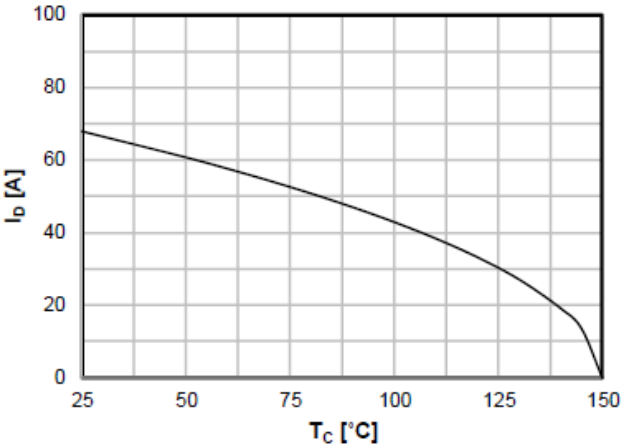


Fig. 8 Maximum Drain Current

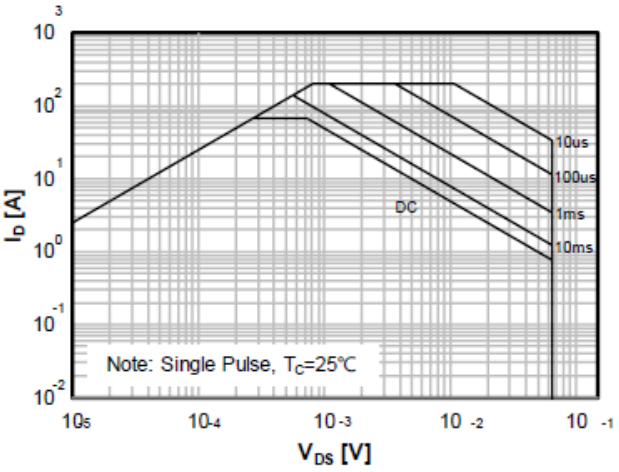


Fig. 9 Safe Operating Area

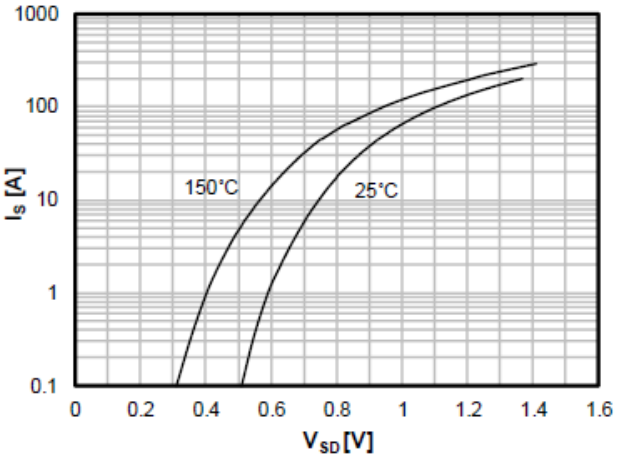


Fig. 10 Body Diode Characteristics

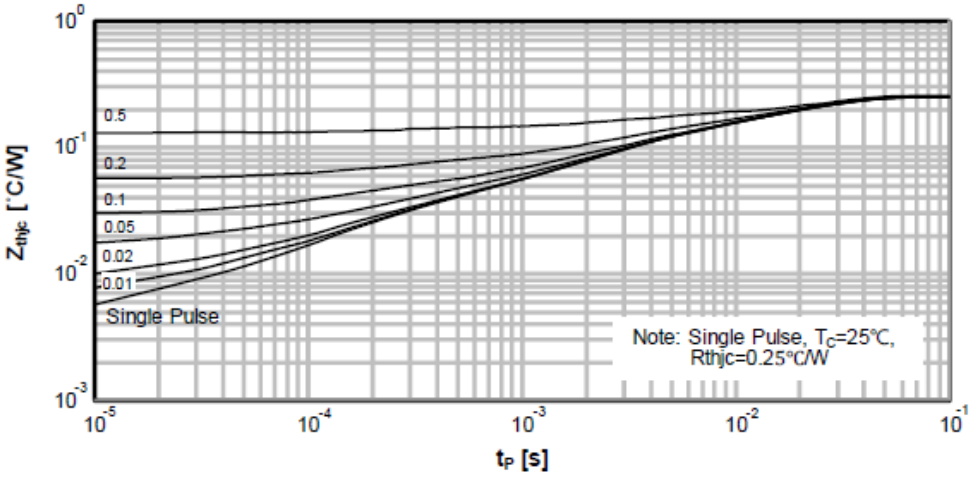


Fig. 11 Maximum Transient Thermal Characteristics

Typical Electrical and Thermal Characteristic Curves

Test Circuit & Waveform

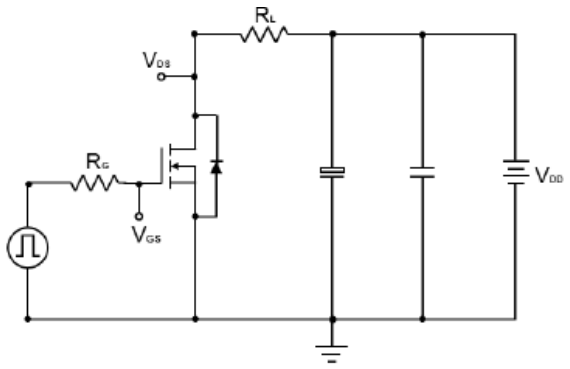


Fig. 12 Test circuit for resistive load switching times

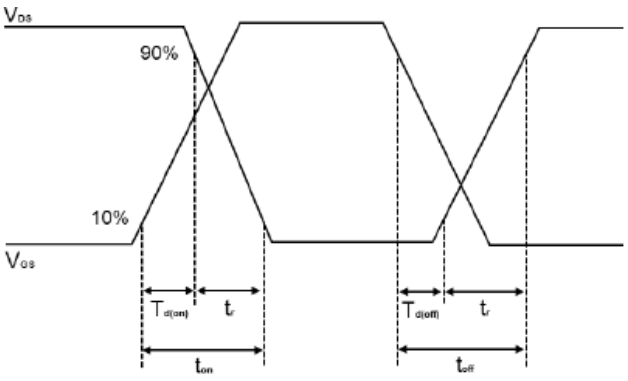


Fig. 13 Switching times waveform

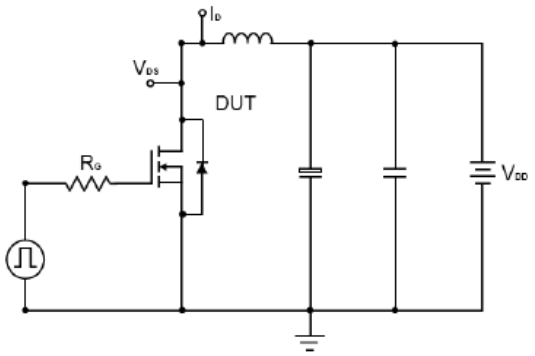


Fig. 14 Test circuit for unclamped inductive load

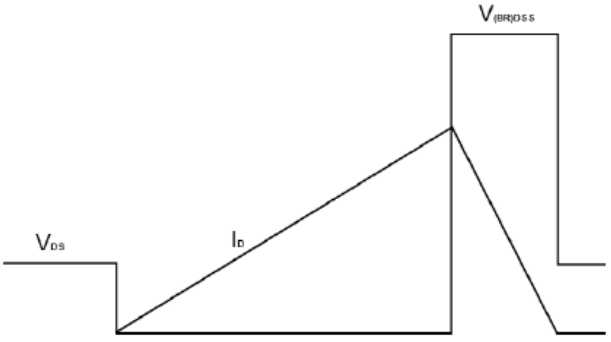


Fig. 15 Unclamped inductive waveform

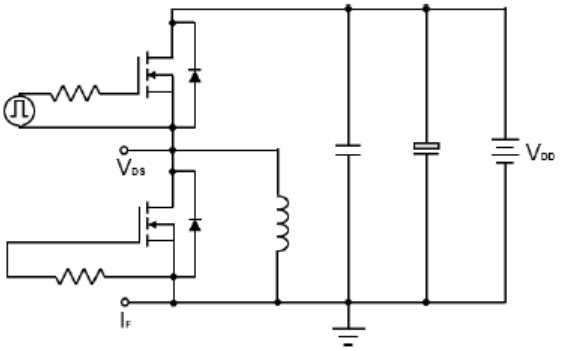


Fig. 16 Test circuit for diode characteristics

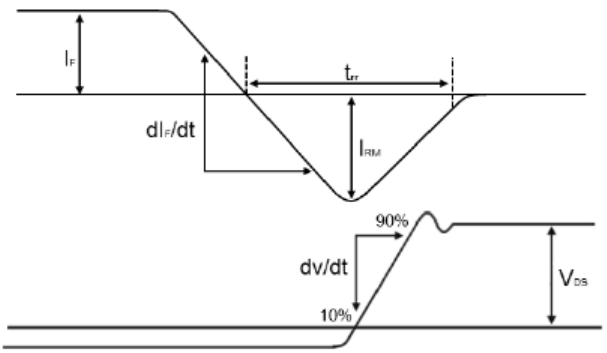
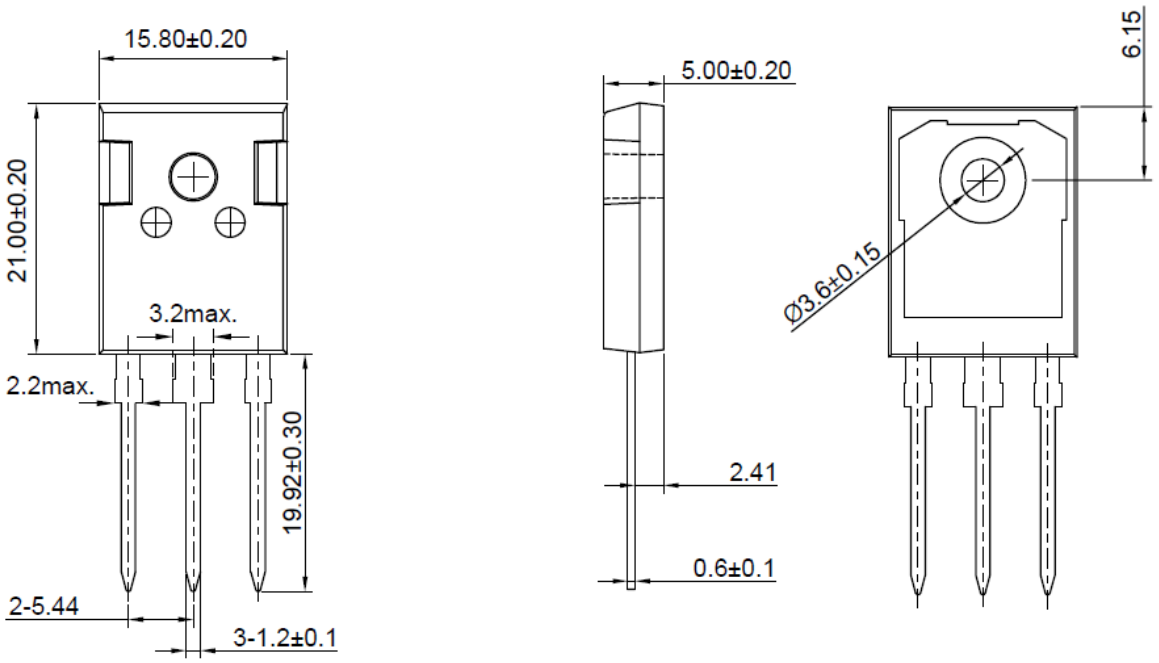


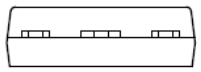
Fig. 17 Diode recovery waveform

Package Outline Dimensions

TO-247-3L

Unit : mm





Note 1. Surface Roughness Ra 1.14±0.20um

2. Unmarked Tolerance ± 0.15m

Revision History

No	Date	Contents
0	2023-08-30	Initial Brief Datasheet Release

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