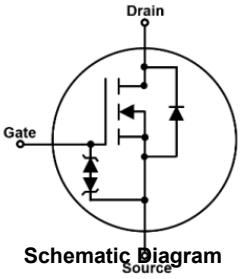
AM65R070NW

650V N-Channel S/J MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.070Ω(max)
I_D	42A
Trr	71nS(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.
- Excellent ESD robustness.

Description

AM65R070NW 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 fast switching can make applications more efficient and faster.

Applications

- Server
- EV Charging & LED Converter
- Telecom & 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}	±20	V
Continuous Drain Current, @ Steady-State	ID @ T_C = 25°C	42	A
Continuous Drain Current, @ Steady-State	ID @ T_C = 100°C	29	A
Pulsed Drain Current	I_{DM}	105	A
Power Dissipation	PD @ TC =25°C	298	W
Single Pulse Avalanche Energy[1]	E_{AS}	735	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	°C/W
Junction-to-Case	$R_{\theta JC}$	0.42	°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℃	-	-	5	μA
		VDS=650V, VGS=0V, T_J=150℃	-	350	-	μA
Gate-to-Source Forward Leakage	I_{GSS}	VDS=0V,V_{GS}=20V	-	-	1	uA
		VDS=0V,V_{GS}= -20V	-	-	-1	
Static Drain-to-Source On- Resistance	$R_{DS\ (on)}$	V_{GS}=10V, ID=21A	-	63	70	mΩ
Gate Threshold Voltage	$V_{GS\ (th)}$	V_{DS}=V_{GS}, I_D=250μA	3	4	5	V
Gate Resistance	Rg	f=1MHz	-	6.7	-	Ω
Input Capacitance	Ciss	V_{GS}=0V V_{DS}=400V,f=200kHz	-	3940	-	pF
Output Capacitance	Coss		-	60	-	
Reverse transfer capacitance	Crss		-	2.3	-	
Total Gate Charge [4,5]	Qg	I_D=21A, V_{DD}=400V,V_{GS}=10V	-	83	-	nC
Gate-to-Source Charge [4,5]	Qgs		-	24	-	
Gate-to-Drain("Miller") Charge[4,5]	Qgd		-	34	-	
Turn-on Delay Time[4,5]	td(on)	V_{DD}=325V, V_{GS}=10V, R_G=24Ω,ID=11A	-	35	-	nS
Rise Time[4,5]	tr		-	34	-	
Turn-Off Delay Time[4,5]	td(off)		-	116	-	
Fall Time[4,5]	tf		-	5	-	

Source-Drain Ratings and Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	I_S=21A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time [4]	t_{rr}	I_s=21A,V_{DD}=400V, di/dt=100A/us	-	71	-	nS
Reverse Recovery Charge [4]	Q_{rr}		-	186	-	μC
Reverse Recovery Peak Current [4]	Irrm			5.3		A

Notes:

1. L=35mH,V_{DD}=50V, I_{AS}=7A, 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}=0~400V.
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
5. Essentially Independent of Operating Temperature.

Typical Electrical and Thermal Characteristic Curves

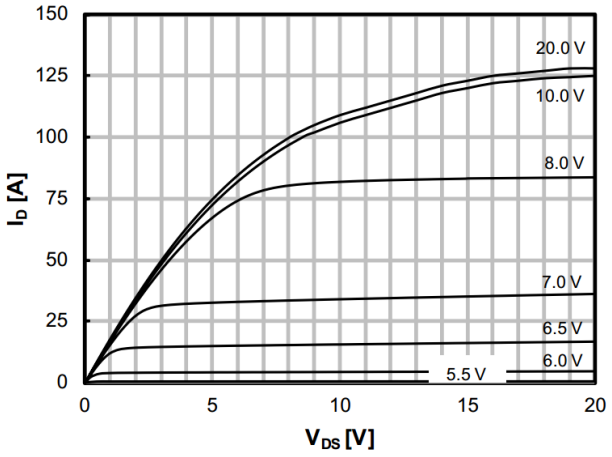


Fig. 1 Output Characteristics

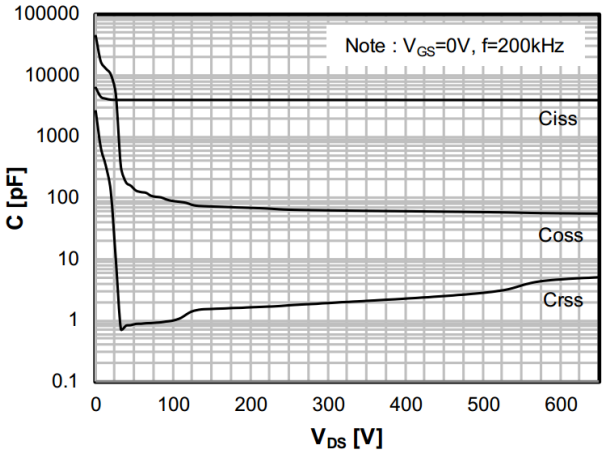


Fig. 2 Capacitances

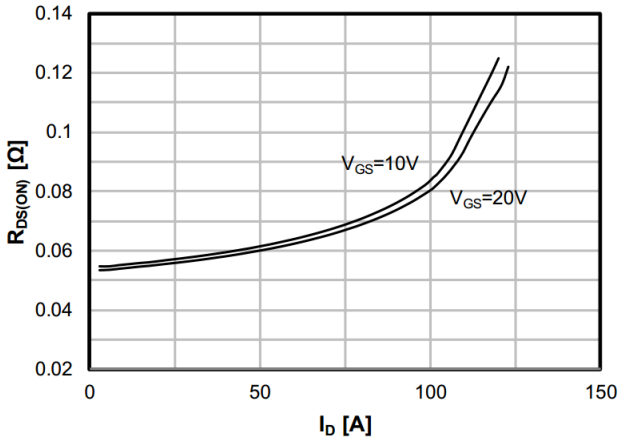


Fig. 3 On-state Resistance

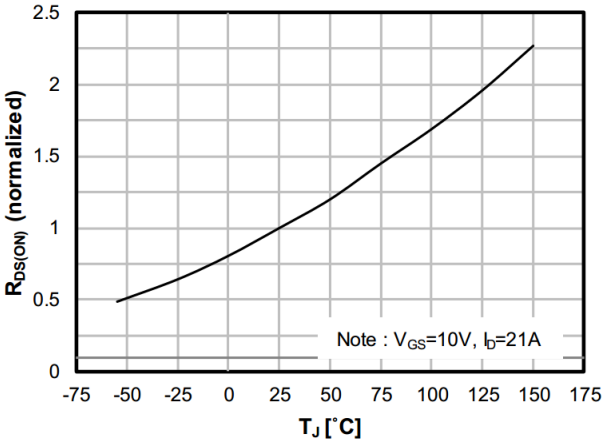


Fig. 4 On-state Resistance with Temperature

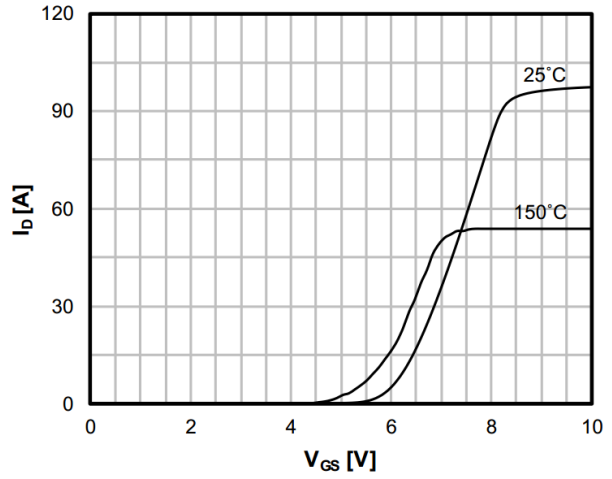


Fig 5. Transfer Characteristics

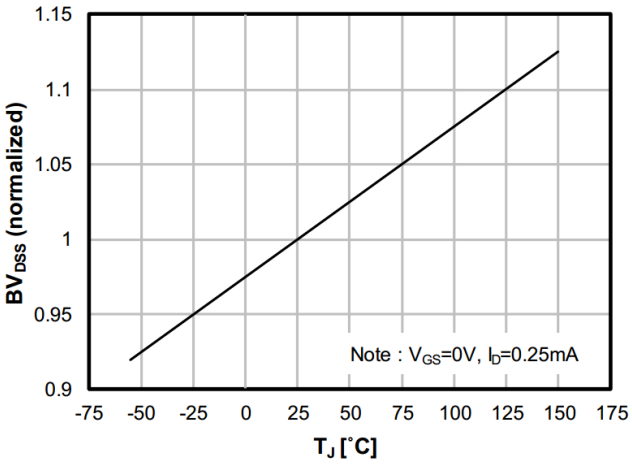


Fig 6. Breakdown Voltage with Temperature

Typical Electrical and Thermal Characteristic Curves

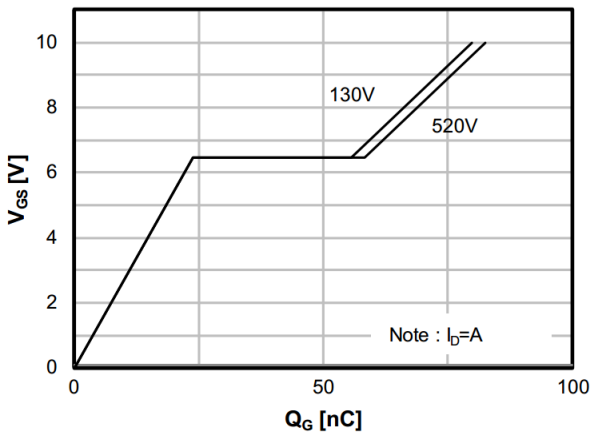


Fig 7. Gate Charge

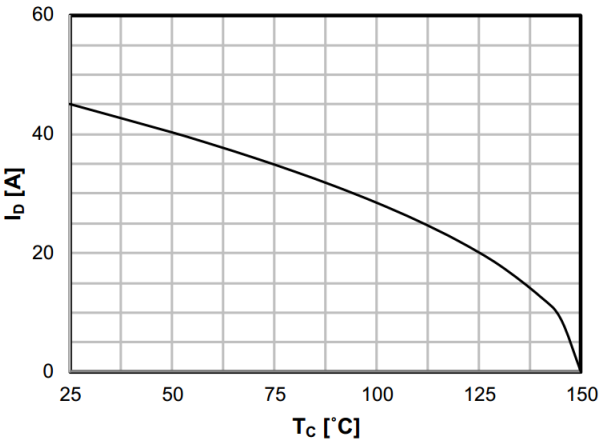


Fig 8. Maximum Drain Current

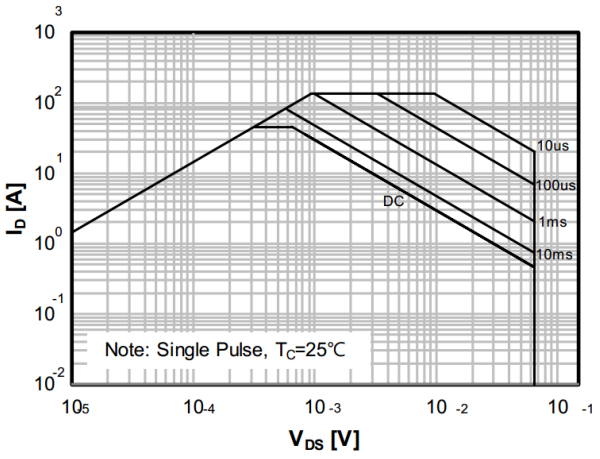


Fig 9. Safe Operating Area

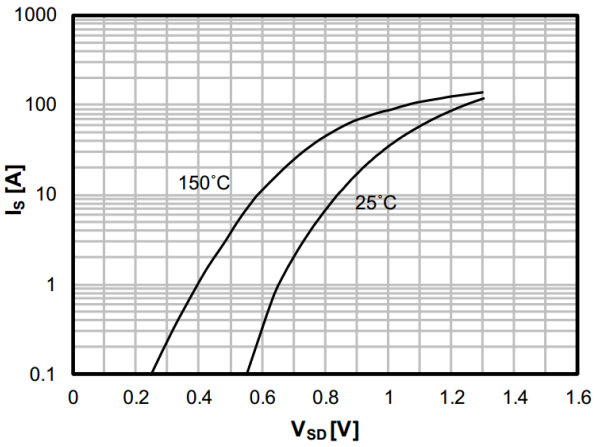


Fig 10. Body Diode Characteristics

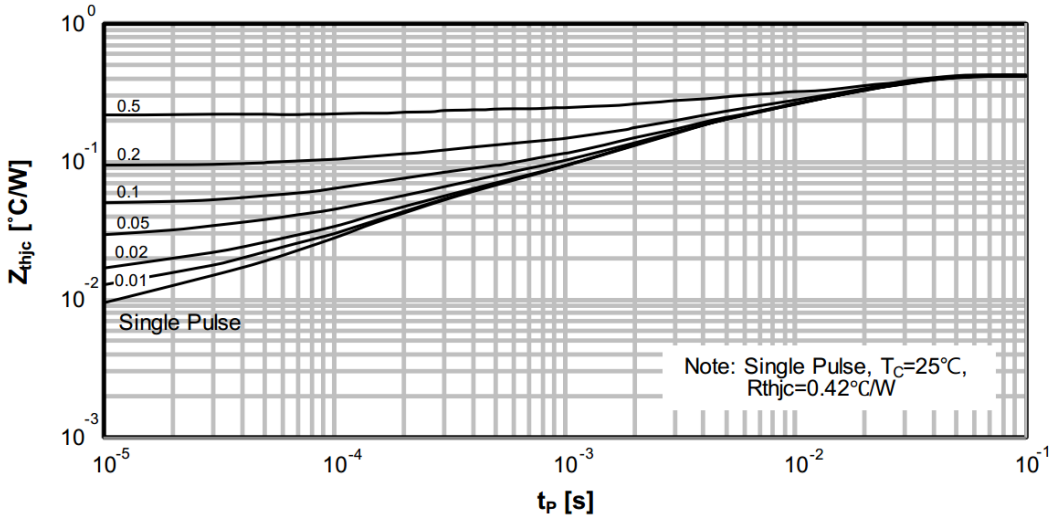


Fig 11. Maximum Transient Thermal Characteristics

Test Circuit & Waveform

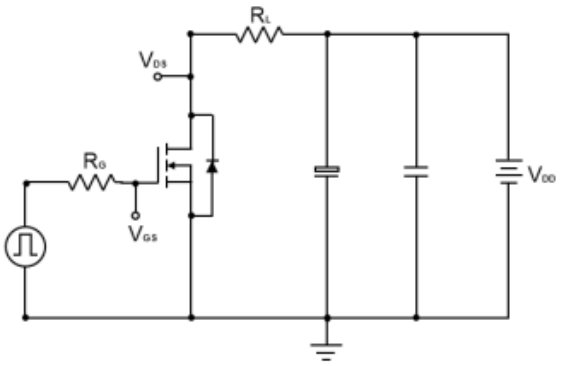


Fig 13. Test circuit for resistive load switching times

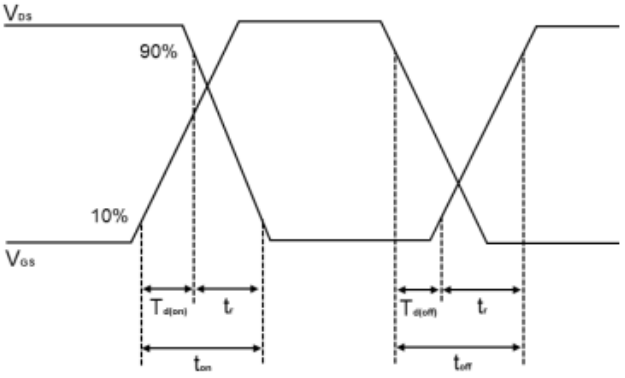


Fig 14. Switching times waveform

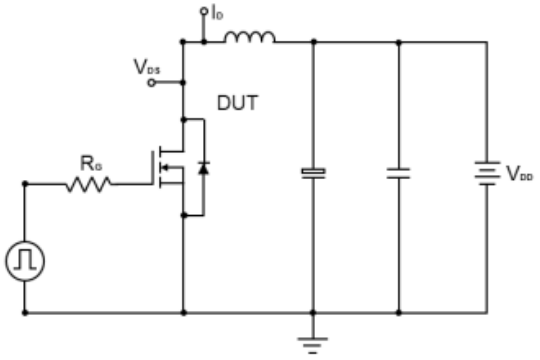


Fig 15. Test circuit for unclamped inductive load

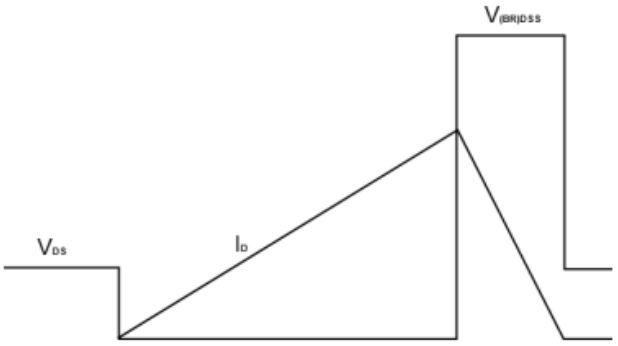


Fig 16. Unclamped inductive waveform

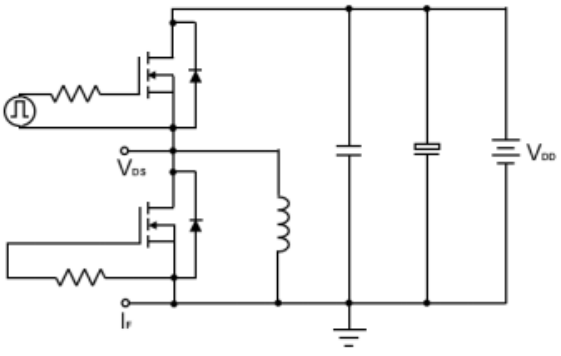


Fig 17. Test circuit for diode

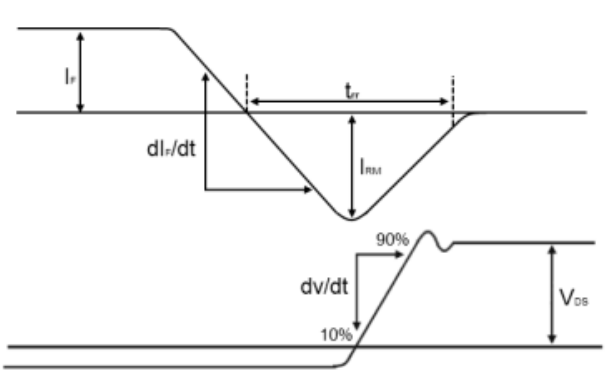
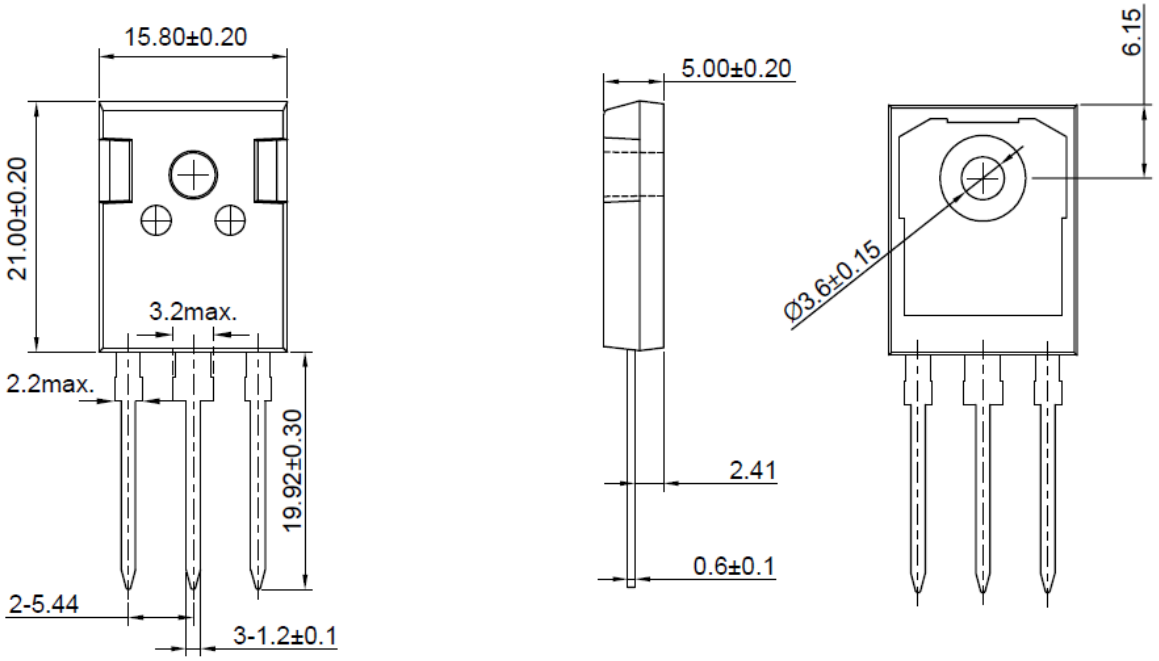


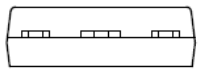
Fig 18. Diode recovery

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	2023-05-20	Initial Brief Datasheet Release
1	2023-09-02	Update Body diode Trr data

http://www.apsemi.com

IMPORTANT NOTICE

AP Semiconductor co, Ltd reserves the right to make changes without further notice to any products or specifications herein. AP Semiconductor co, Ltd does not assume any responsibility for use of any its products for any particular purpose, nor does AP Semiconductor co, Ltd assume any liability arising out of the application or use of any its products or circuits. AP Semiconductor co, Ltd does not convey any license under its patent rights or other rights nor the rights of others.

AP Semiconductor Co., Ltd

Contact. Tel 82.70.4693.2299 FAX 82.70.4000.4009

E-mail: sales@apsemi.com