

GR-20E007UG: E-mode GaN Power Transistor

Description

GR-20E007UG is an enhancement mode GaN on Silicon power transistor. GR-20E007UG provides, high current and high operating speed which is suitable for DC to DC power supply applications.

Key Specifications

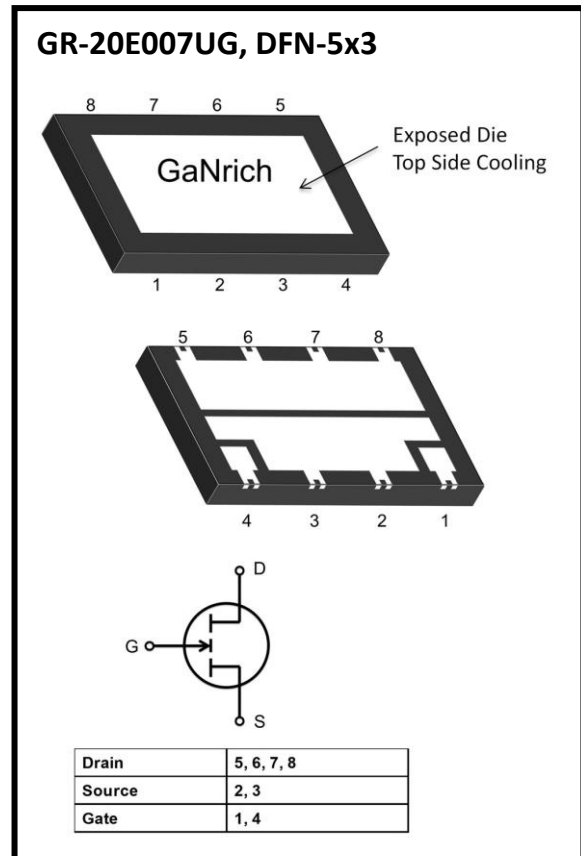
Part Number	GR-20E007UG
V_{DS} , min.	200V
I_{DS} , Pulse (25°C, TPULSE = 10μs)	104A
$R_{DS(ON)}$, typ. @Vgs=5V	7.3mΩ
Q_G , typ.	8.2nC

Features

- 200V enhancement mode power transistor
- High operating frequency
- $R_{DS(on)}$ = Typ. 7.3 mΩ
- Dual-side cooled package
- HS compliant

Applications

- High-Efficiency Synchronous Rectification (AC-DC/DC-DC)
- High-Frequency Multi-Topology DC-DC Converters
- High-Power Density DC-DC Power Modules
- Industrial & Automotive Motor Drives



1. Electrical Characteristics

➤ **Table 1 Absolute maximum ratings**

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-source voltage	200	V
$V_{(TR)DSS}$	Transient drain to source voltage ^a	240	V
V_{GSS}	Gate- source voltage	-6V ~ +6V	V
I_D	Drain current (continuous) at $T_C = 25^\circ\text{C}$ operation	33.5	A
	Drain current (continuous) at $T_C = 100^\circ\text{C}$ operation	23.1	A
$I_{D,Pulse}$	Pulsed drain current (pulse width: 10 μs , $V_{GS}=5\text{V}$) ^b	104	A
T_J	Operating temperature	-40 to +150	$^\circ\text{C}$
T_S	Storage temperature	-40 to +150	$^\circ\text{C}$

a. In off-state, spike duty cycle $D < 0.01$, spike duration $< 1\mu\text{s}$

b. Defined by product design and characterization. Value is not tested to full current in production

➤ **Table 2 Thermal Characteristics**

Symbol	Parameter	Value	Unit
$R_{\theta JC_Top}$	Thermal resistance junction-case, Top	0.50	$^\circ\text{C}/\text{W}$
$R_{\theta JC_Bot}$	Thermal resistance junction-case, Bottom	0.50	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal resistance junction-ambient	60	$^\circ\text{C}/\text{W}$

a. Tested in package DFN 5x3.

➤ **Table 3** Electrical Characteristics ($T_{CASE} = 25\text{ }^{\circ}\text{C}$ unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
V_{DS}	Drain-source voltage	$V_{GS} = 0V, I_D = 250\mu A$	200	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 1mA$	1.0	1.9	2.5	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 6V, I_D = 20A$	-	7.3	9.5	$m\Omega$
I_{DSS}	Drain-source leakage current	$V_{DS} = 160V, V_{GS} = 0V$	-	5	400	μA
I_{GSS}	Gate-to-Source Forward Leakage current	$V_{GS} = +5V, T_J = 25^{\circ}\text{C}$	-	0.04	8.0	mA
	Gate-to-Source Forward Leakage current	$V_{GS} = +5V, T_J = 125^{\circ}\text{C}$	-	0.30	9.0	mA
	Gate-to-Source Reverse Leakage current	$V_{GS} = -4V, T_J = 25^{\circ}\text{C}$	-	1.0	30.0	μA
C_{ISS}	Input capacitance	$V_{DS} = 100V, V_{GS} = 0V$	-	452	-	pF
C_{OSS}	Output capacitance		-	220	-	
C_{RSS}	Reverse transfer capacitance		-	25.3	-	
Q_G	Gate charge	$V_{DS} = 100V, V_{GS} = 5V, I_D = 20A$	-	8.2	-	nC
Q_{GS}	Gate-source charge	$V_{DS} = 100V, I_D = 20A$	-	2.95	-	
Q_{GD}	Gate-drain charge		-	1.7	-	
Q_{OSS}	Output charge	$V_{DS} = 100V, V_{GS} = 0V$	-	18	-	
Q_{RR}	Reverse recovery charge	-	-	0	-	

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

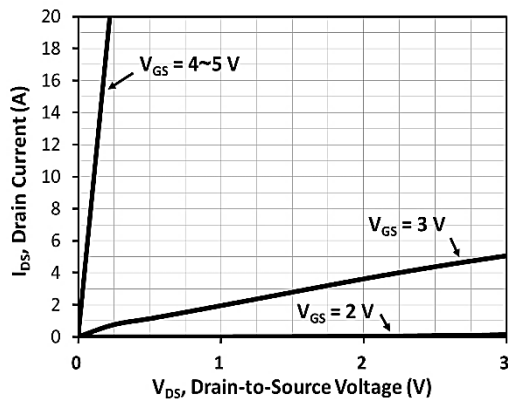


Fig 2. On-Resistance vs Drain Current and Temperature

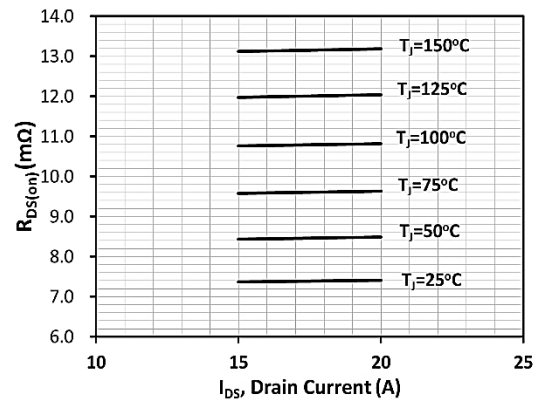


Fig 3. On-Resistance with Drain Current

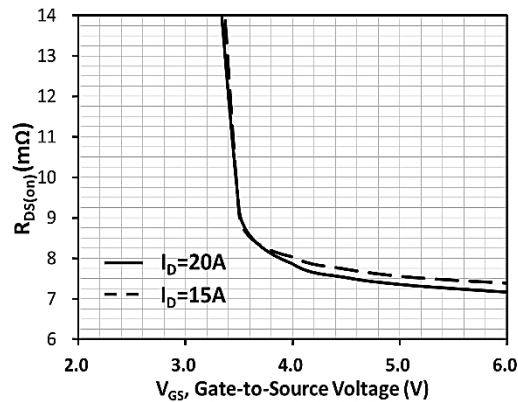


Fig 4. On-Resistance Variation with Temperature

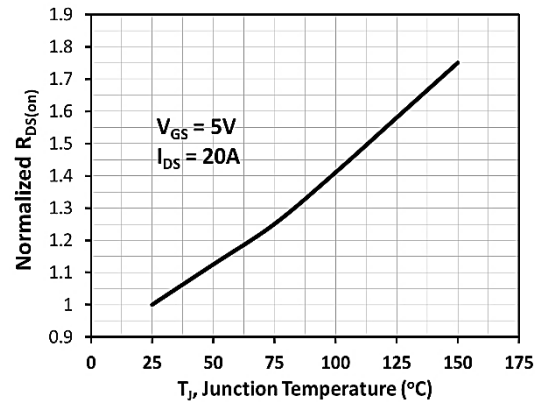


Fig 5. Threshold Voltage with Temperature

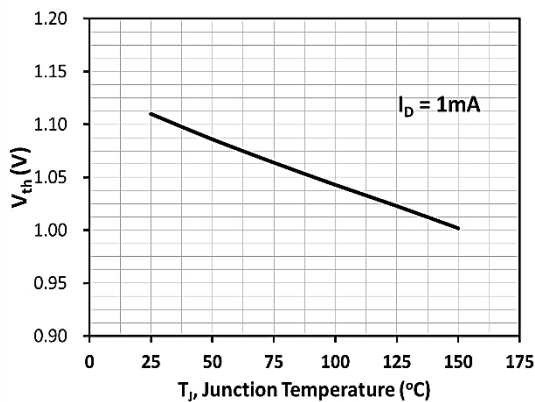


Fig 6. Capacitance Characteristics

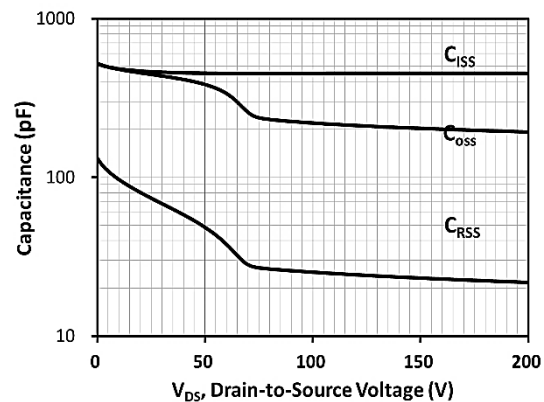


Fig 7. Gate Charge Characteristics, Qg

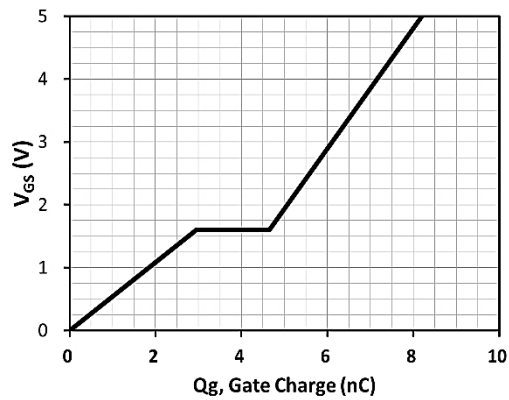
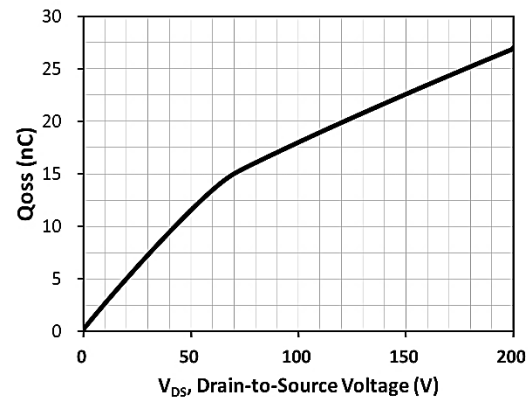


Fig 8. Capacitance Characteristics, Qoss



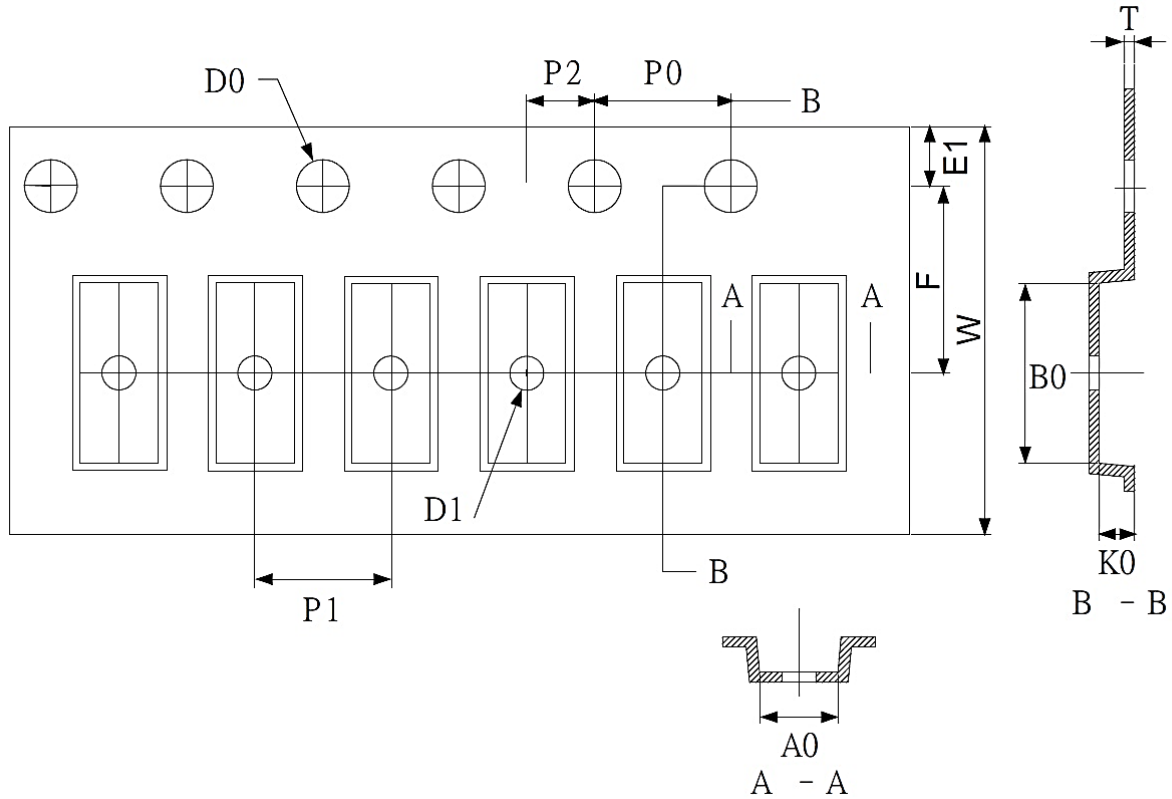
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Package outlines

PCB pad openings

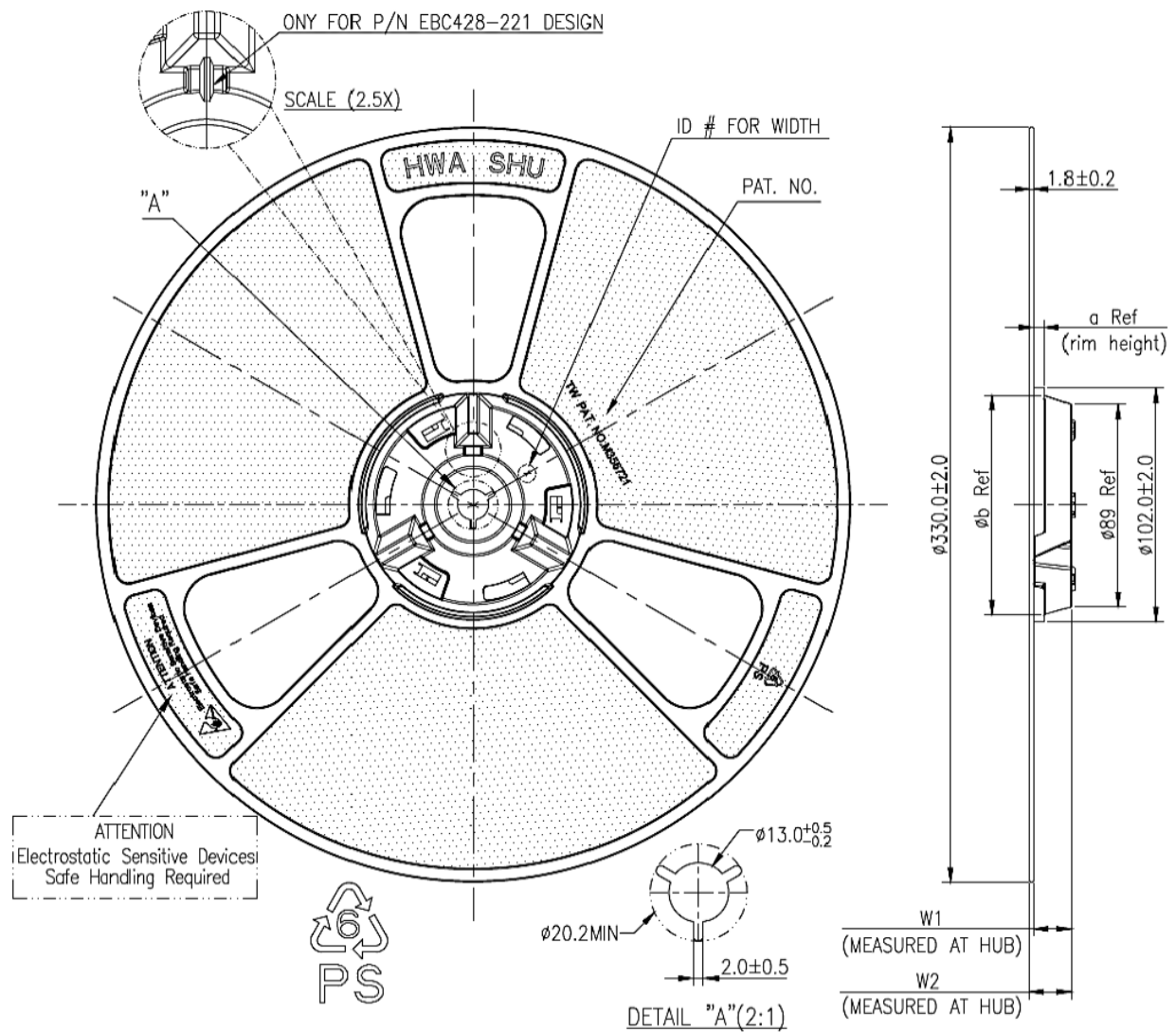
4. Tape & Reel Information

13" Reel, Carrier Tape W=12mm



Application	A	H	T1	C	d	D	W	E1	F
DFN 3x5_EP Unit: mm	180 ± 0.1	50 min.	13.2 ± 0.2	13.0 ± 0.2	1.5 min.	21.0 ± 0.4	12.0 ± 0.3	1.75 ± 0.1	5.5 ± 0.1
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.55 ± 0.1	1.0 ± 0.1	0.3 ± 0.05	2.3 ± 0.2	5.3 ± 0.2	1.0 ± 0.1

13" Reel, Carrier Tape W=12mm



5. Change Log

Version	Date	Description
0.1	Feb 05, 2025	Initial version
0.2	SEPT 26, 2025	Electrical characteristics, Curve information revised.
0.3	Apr 16, 2026	Electrical characteristics revised.

- **Note:** GaNrich semiconductor reserves the right to revise products and/or specifications without notice.