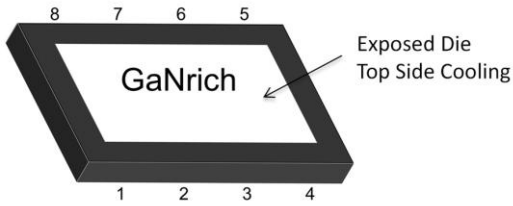
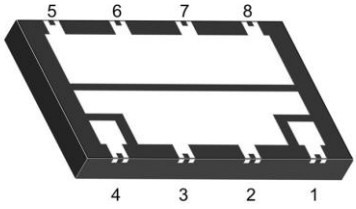
GR-10E003UG: E-mode GaN Power Transistor

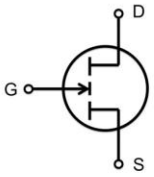
Description

GR-10E003UG is an enhancement mode GaN on Silicon power transistor. GR-10E003UG provides, high current and high operating speed which is suitable for DC to DC power supply applications.

GR-10E003UG, DFN-5x3-6L







Drain	5, 6, 7, 8
Source	2, 3
Gate	1, 4

Key Specifications

Part Number	GR-10E003UG
V_{DSS}, min.	100V
$I_{DS,\ Pulse\ (25°C,\ TPULSE\ =\ 300\ \mu s)}$	150A
$R_{DS(ON),\ typ.\ @Vgs=5V}$	3.1mΩ
Q_G, typ.	15.5nC

Features

- 100V enhancement mode power transistor
- High operating frequency
- RDS(on) = Typ. 3.1 mΩ
- Dual-side cooled package
- HS compliant

Applications

- Switch Mode Power Supplies (SMPS)
- DC-DC Converters
- Fast Battery Charging
- Appliance Motor Drives

1. Electrical Characteristics

➢ Table 1 Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-source voltage	100	V
$V_{(TR)DSS}$	Transient drain to source voltage[a]	120	V
V_{GSS}	Gate- source voltage	-6V ~ +6V	V
I_D	Drain current (continuous) at T_C = 25°C operation	55	A
	Drain current (continuous) at T_C = 100°C operation	37.9	A
$I_{D,Pusle}$	Pulsed drain current (pulse width: 300μs, Vgs=5V)[b]	150	A
T_J	Operating temperature	-40 to +150	°C
T_S	Storage temperature	-40 to +150	°C
MSL	Moisture sensitivity level	MSL3	

a. In off-state, spike duty cycle D<0.01, spike duration <1μs
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	°C/W
$R_{\Theta JC\_Bot}$	Thermal resistance junction-case, Bottom	0.50	°C/W
$R_{\Theta JA}$	Thermal resistance junction-ambient	60	°C/W

a. Tested in package DFN 5x3.

➢ **Table 3 Electrical Characteristics** (T_{CASE} = 25 °C unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
V_{DSS}	Drain-source voltage	V_{GS}= 0V, I_D= 150μA	100	-	-	V
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D= 15mA	0.8	1.7	2.3	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS}= 5V, I_D= 50A	-	3.1	4.0	mΩ
I_{DSS}	Drain-source leakage current	V_{DS}= 80V, V_{GS}= 0V	-	5.0	400	uA
I_{GSS}	Gate-to-Source Forward Leakage current	V_{GS} = +5V	-	0.08	16	mA
	Gate-to-Source Forward Leakage current	V_{GS} = +5V, T_J=125°C	-	0.75	22.5	mA
	Gate-to-Source Reverse Leakage current	V_{GS} = -4V	-	1.50	45.0	uA
C_{ISS}	Input capacitance	V_{DS}=50V, V_{GS}=0V	-	994	-	pF
C_{OSS}	Output capacitance		-	482	-	
C_{RSS}	Reverse transfer capacitance		-	55.5	-	
Q_G	Gate charge	V_{DS}= 50V, V_{GS}= 5V, I_D= 50A	-	15.5	-	nC
Q_{GS}	Gate-source charge	V_{DS}= 50V, I_D= 50A	-	5.8	-	
Q_{GD}	Gate-drain charge			2.6		
Q_{OSS}	Output charge	V_{DS}= 50V, V_{GS}= 0V	-	32.9	-	
Q_{RR}	Reverse recovery charge	-	-	0	-	

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

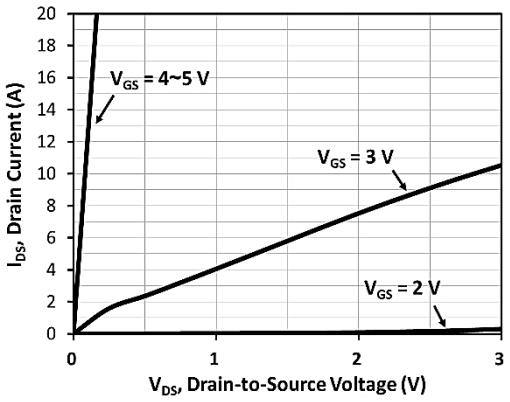


Fig 2. On-Resistance vs Drain Current and Temperature

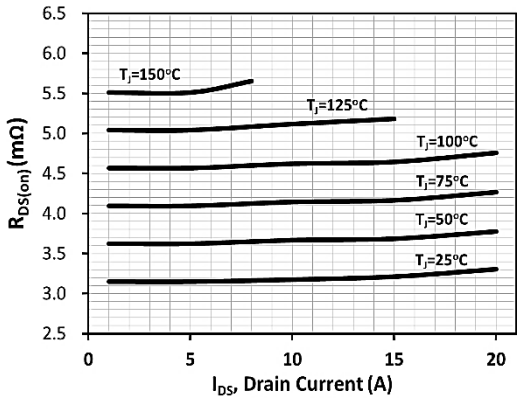


Fig 3. On-Resistance with Drain Current

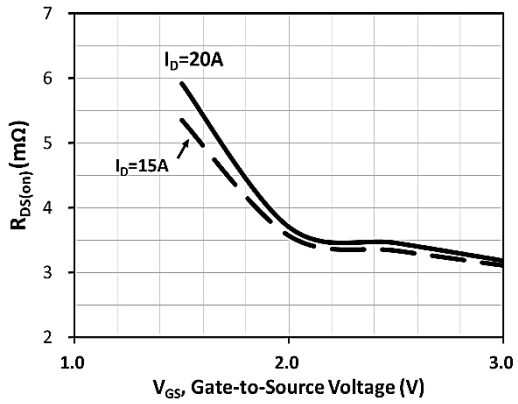


Fig 4. On-Resistance Variation with Temperature

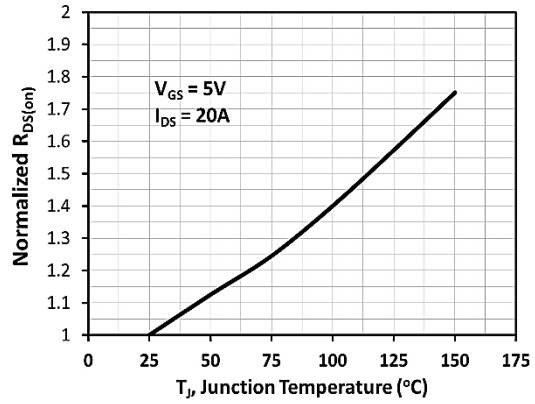


Fig 5. Threshold Voltage with Temperature

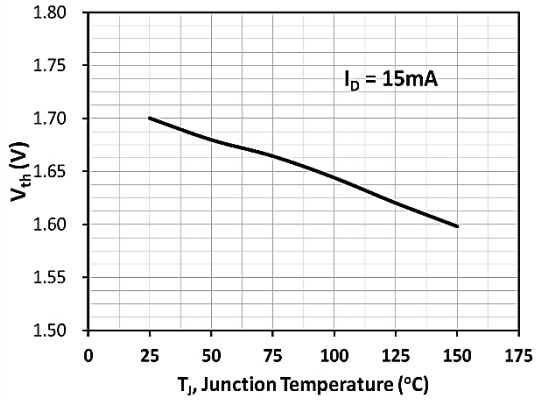
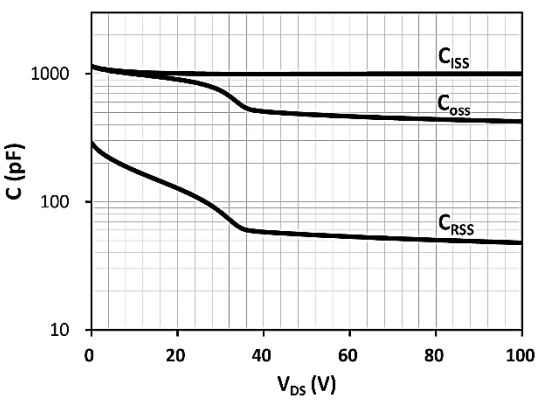


Fig 6. Capacitance Characteristics



X

Fig 7. Gate Charge Characteristics, Qg

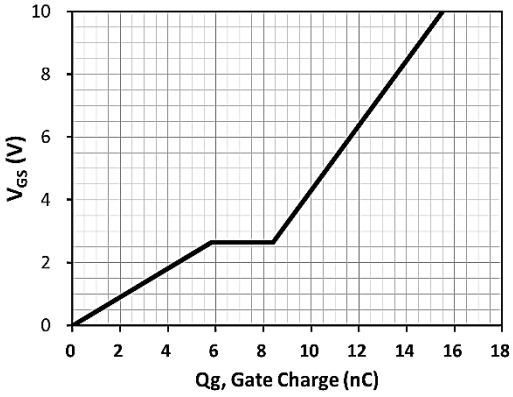
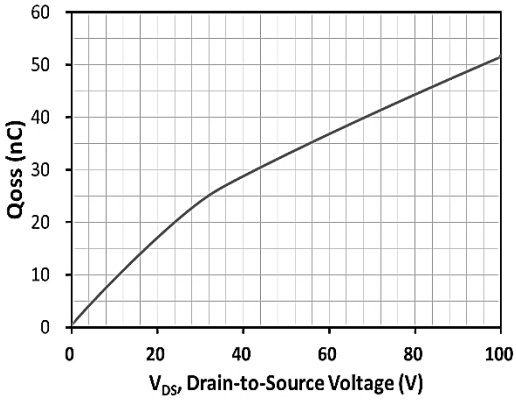
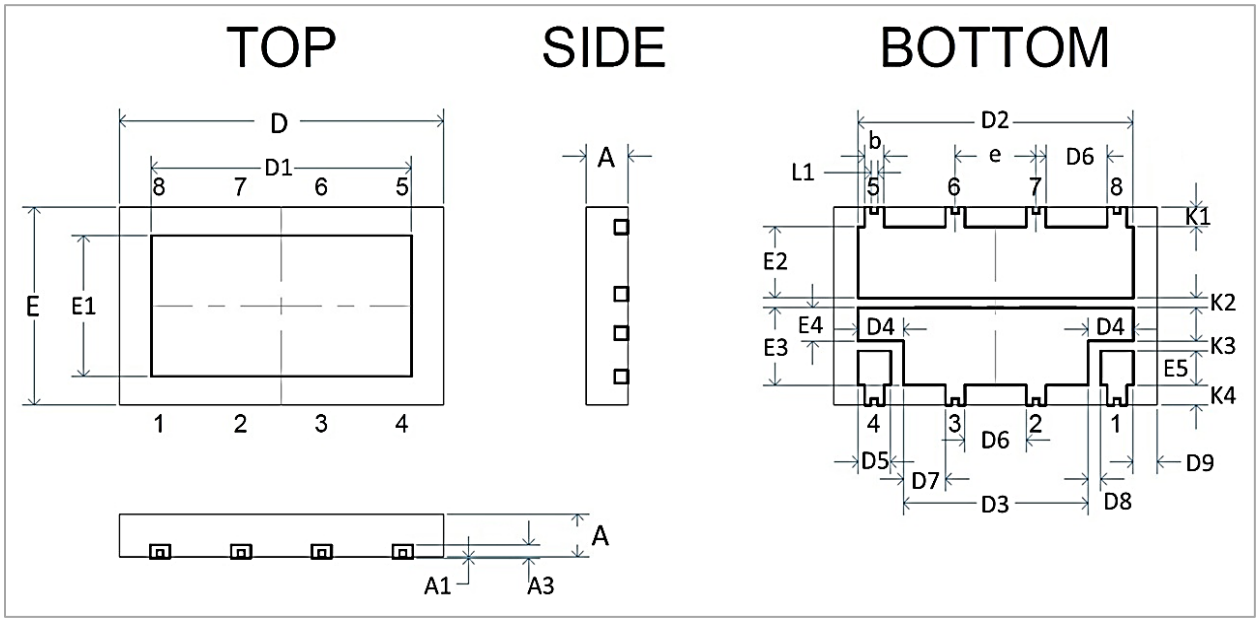


Fig 8. Capacitance Characteristics, Qoss



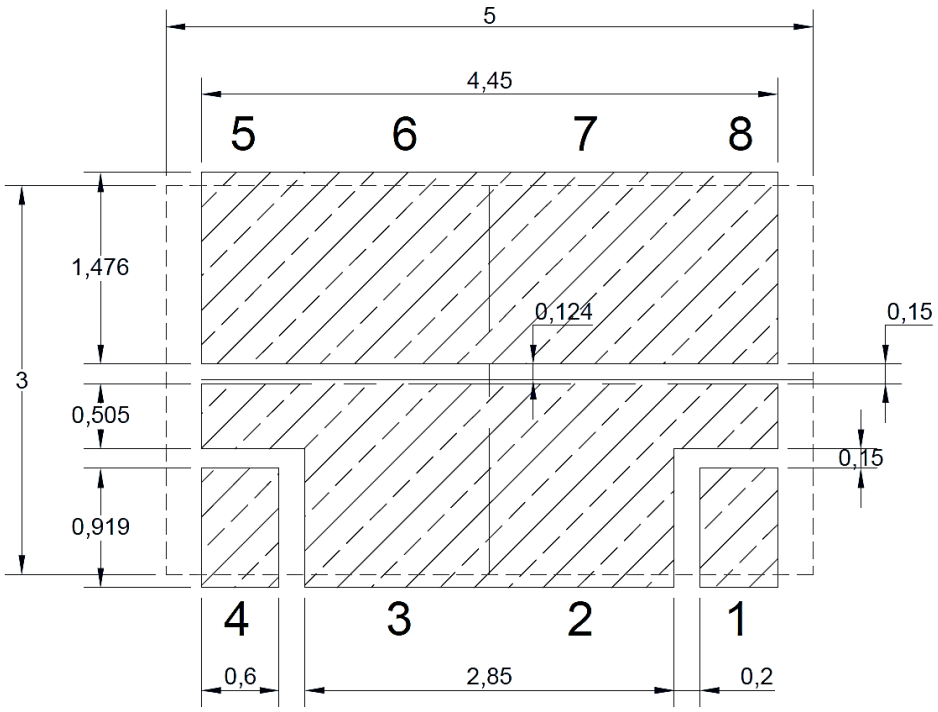
3. Package Outline Dimensions



➢ **Table 4 Dimension of GR-DFN-5x3-6L**

SYMBOL	DIMENSION (MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.60	0.65	0.70	**D7**	0.55	0.65	0.75
A2	--	0.02	0.05	**D8**	0.10	0.20	0.30
A3	0.203 REF			**D9**	0.365	0.375	0.385
D	4.90	5.00	5.10	**E1**	2.132 REF		
E	2.90	3.00	3.10	**E2**	0.976	1.076	1.176
e	1.25 BSC			**E3**	1.074	1.174	1.274
b	0.20	0.30	0.40	**E4**	0.405	0.505	0.605
D1	4.018 REF			**E5**	0.419	0.519	0.619
D2	4.15	4.25	4.35	**K1**	0.20	0.30	0.40
D3	2.75	2.85	2.95	**K2**	0.05	0.15	0.25
D4	0.60	0.70	0.80	**K3**	0.05	0.15	0.25
D5	0.40	0.50	0.60	**K4**	0.20	0.30	0.40
D6	0.85	0.95	1.05				

Recommended PCB Soldering footprint

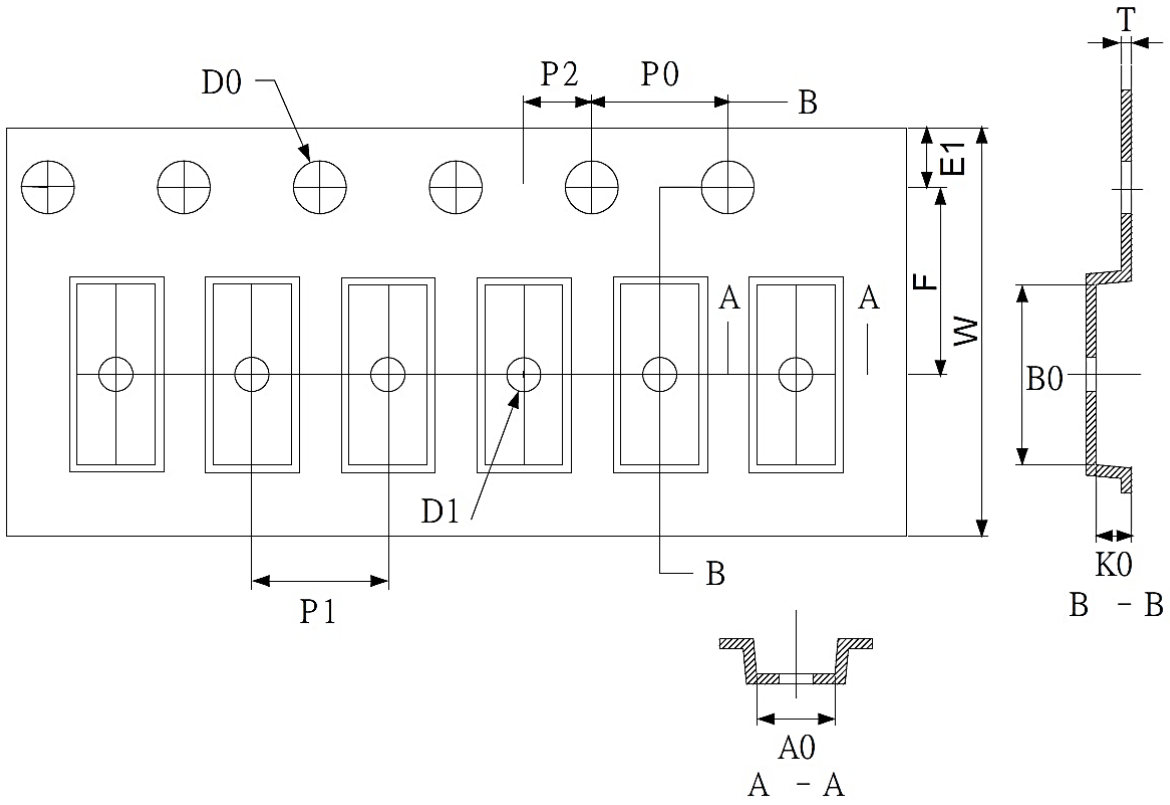


Package outlines

PCB pad openings

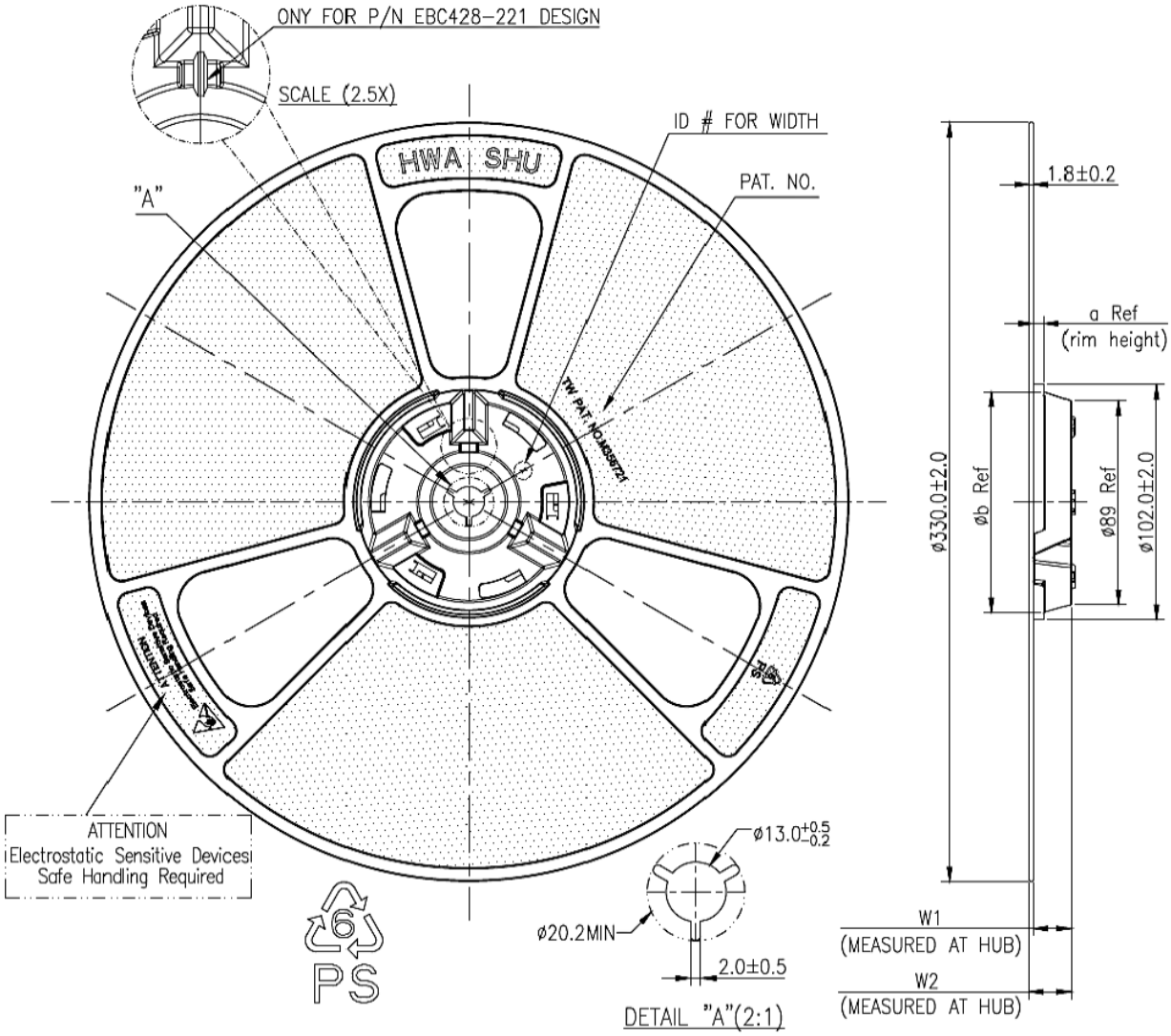
4. Tape and reel Information

13” Reel, Carrier Tape W=12mm



Application	A	H	T1	C	d	D	W	E1	F
DFN 3x5 _EP	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
Unit: mm	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.

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