

HYSOL GR300 & GR30 PRODUCT DATA

TO220 APPLICATION DATA PACKAGE –

NOVEMBER 2018



SPECIALTY CHEMICALS, ADHESIVES & PLASTICS

KEY FEATURES

Value Proposition



Excellent Reliability

- Low thermal stress and excellent electrical stability
- Excellent reliability performance on TC, PCT, etc.
- Meet with all type devices especially MOSFET, Schottky, etc.
- Good delam performance after stress test
- Good adhesion performance

Excellent Moldability

- Excellent workability - 500 shots continuous molding
- Suitable for Conventional/MGP/Auto Mold type

Environment Friendly

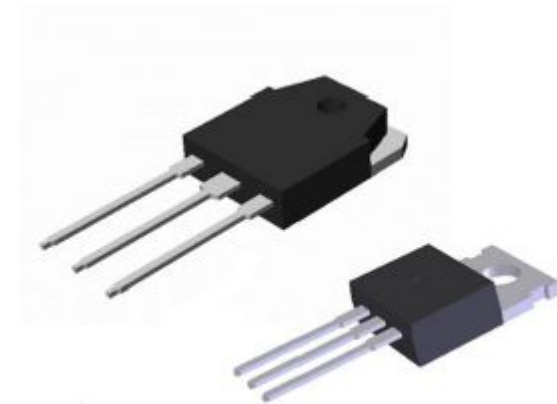
- Green material without Br/Sb comply with ROHS
- Meet UL-94 V0 flame retardant requirement

GR300 EXCELLENT RELIABILITY PERFORMANCE

Reliability test result at BETA site

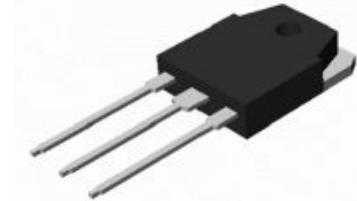


Package	TO220	TO3P
Product Function	MOSFET	MOSFET
Lead Frame Material	Lead Ni plating Cu base	Full Ni plating Pad Cu
Lead Frame Pad Size	--	9400*9400 um
Die Size	--	4700*4700 um
Die Thickness	--	118um
Die Attach	Sn65Ag25Sb10	Sn65Ag25Sb10
Wire Type	Al	Al
Wire Diameter	--	6mil + 20mil
Mold Model	Conventional	Conventional



GR300 TO3P EXCELLENT RELIABILITY PERFORMANCE

Reliability test result at BETA site

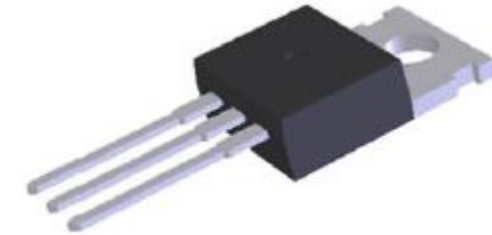


PKG:TO3P



Item	Condition	Result
TCT (Delam & E-test)	Ta=-65°C to 150°C, 500 cycles	Passed
HTRB	150 °C, Vgs=100%Spec, 1000hrs	Passed
PCT	121°C /100%RH/2atm, 96hrs	Passed

GR300 TO220 EXCELLENT RELIABILITY PERFORMANCE

Reliability test result at BETA site

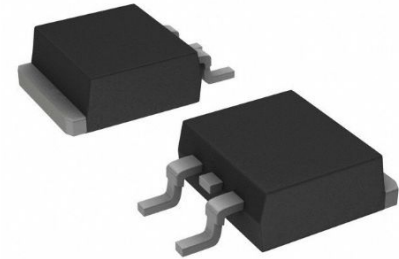


PKG:TO220

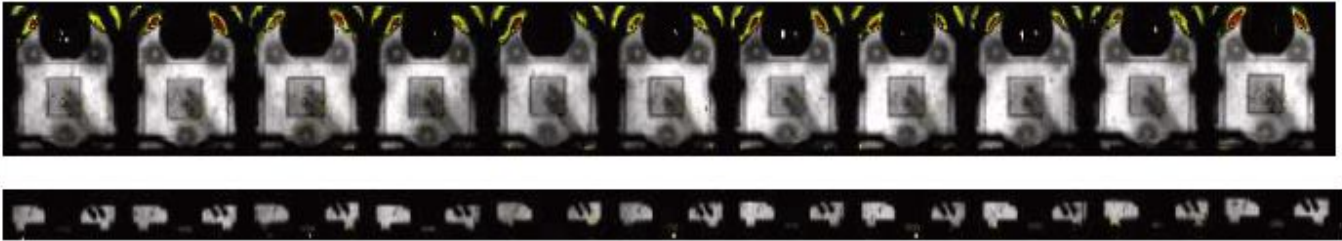
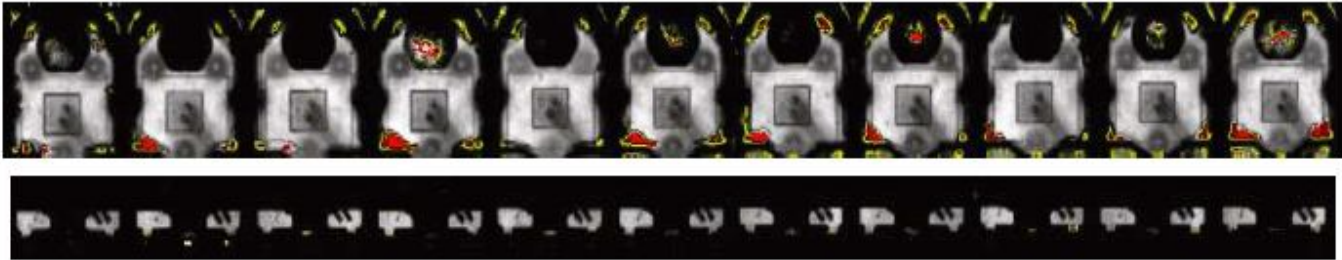
Item	Pic	Result
Delamination after TCT500		OK
Delamination after PCT96		OK

GR300 TO252 EXCELLENT RELIABILITY PERFORMANCE

Reliability test result at BETA site



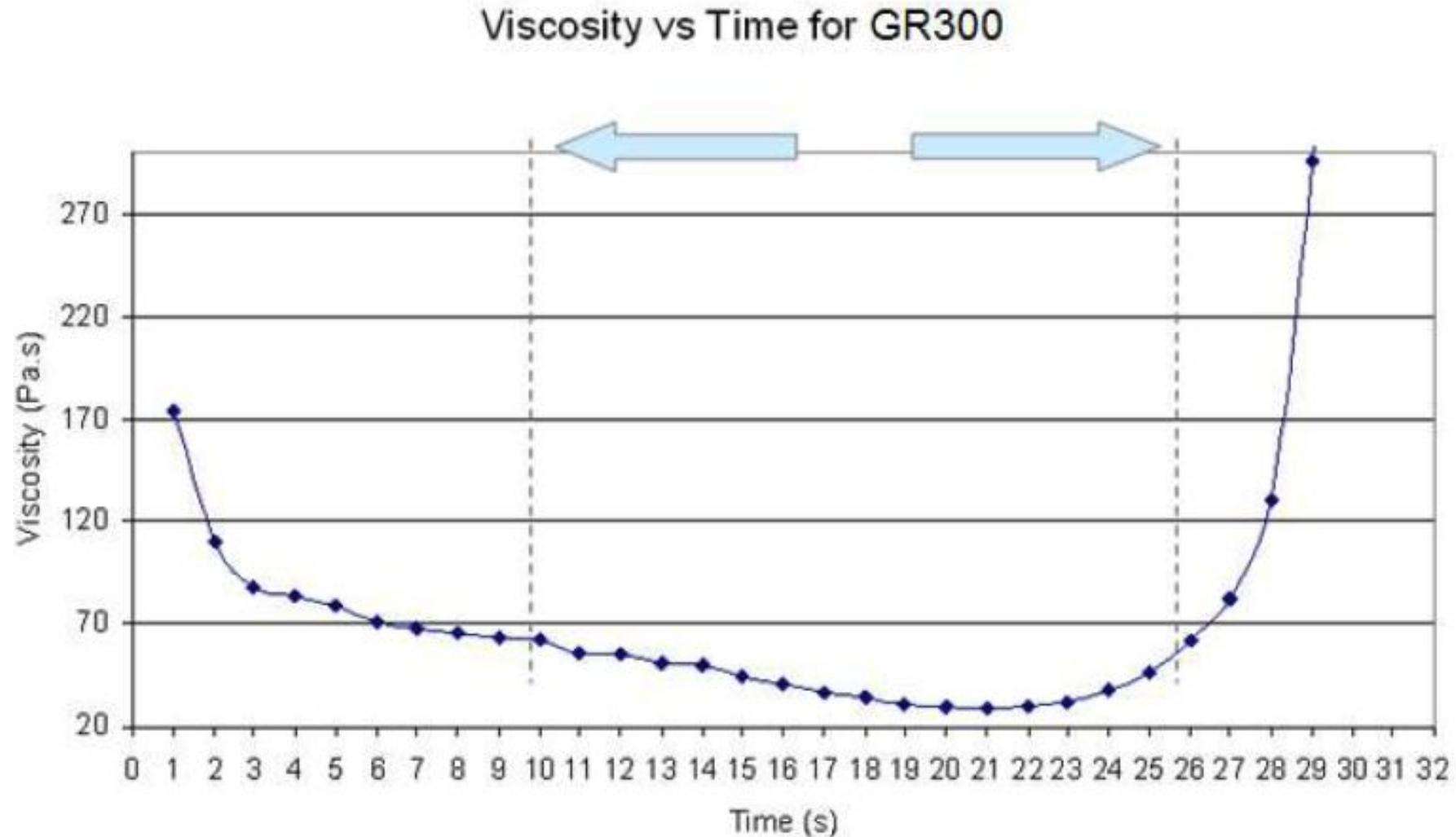
PKG:TO252

Item	Pic	Result
Delamination after TCT500		OK
Delamination after PCT96		OK

EXCELLENT WORKABILITY WITH WIDE PROCESS WINDOW

Application Data GR300

WIDE U-CURVE PROCESS WINDOW. TEST TEMPERATURE 175°C



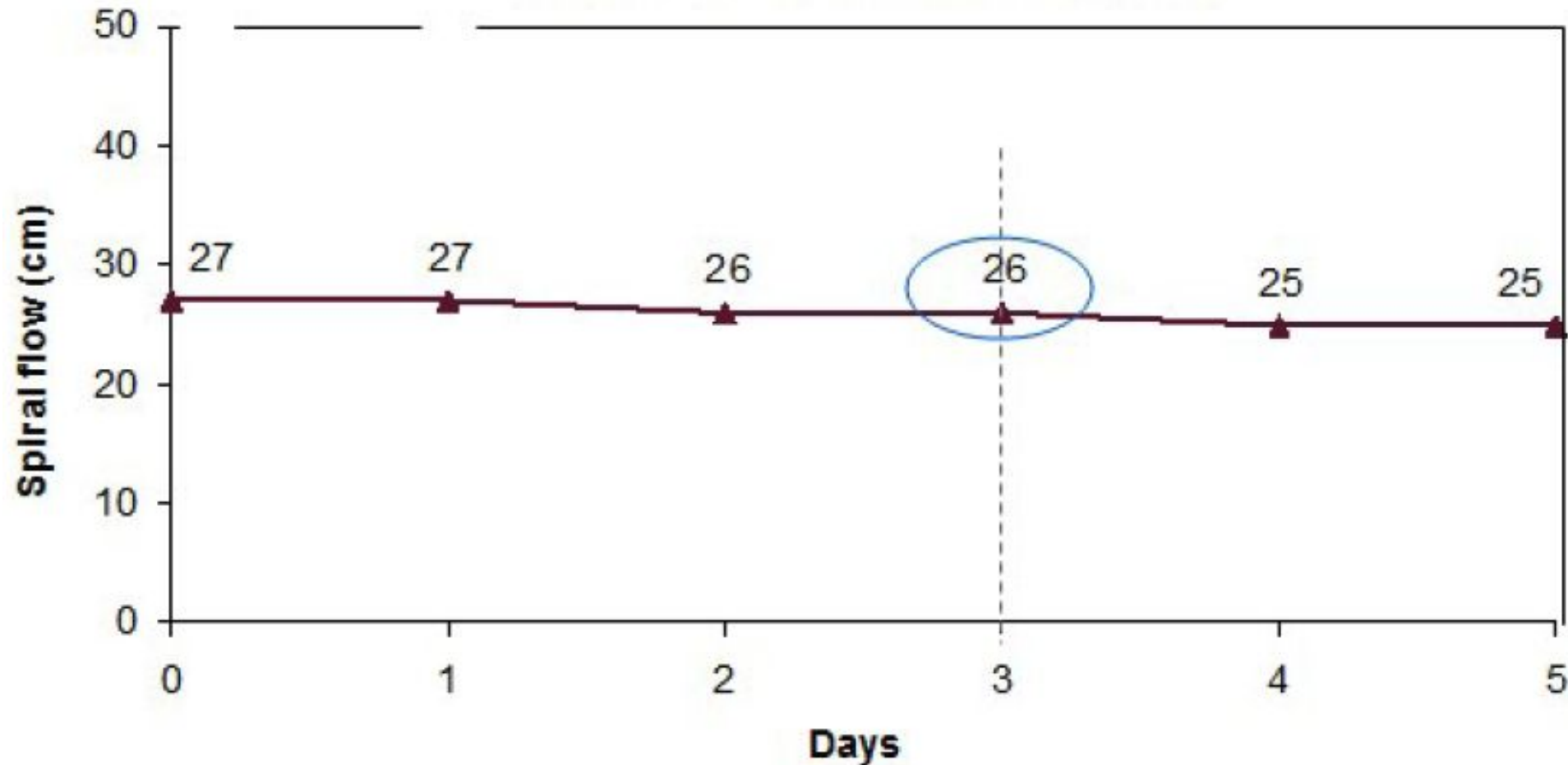
EXCELLENT WORK LIFE STABILITY

Application Data GR300



EXCELLENT WORK LIFE WITH 96% RETENTION OF SPIRAL FLOW AFTER 72HRS AT ROOM TEMPERATURE (23°C)

Work Life Stability Study @RT

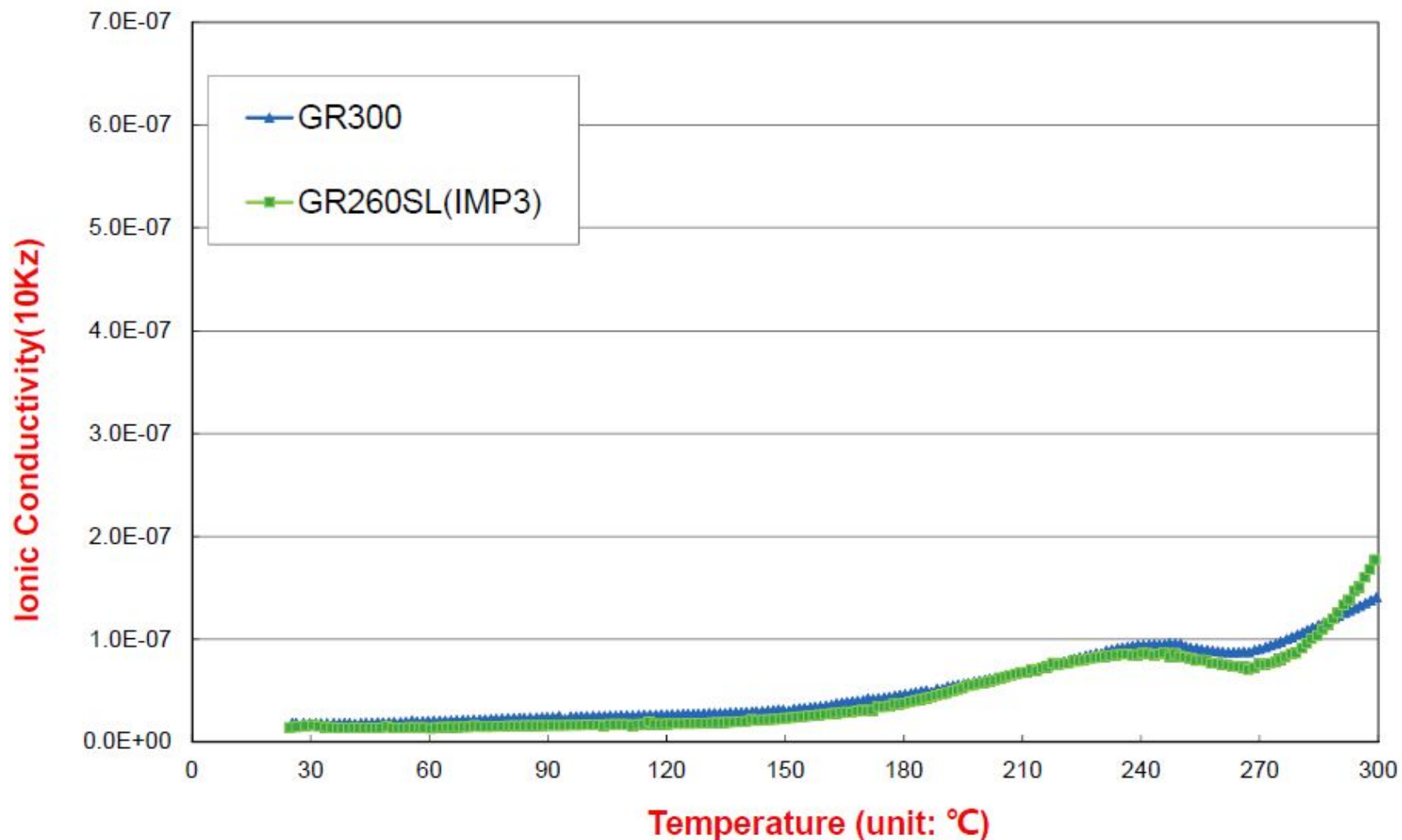


EXCELLENT RELIABILITY PERFORMANCE

Application Data GR300



LOWER CONDUCTIVITY = BETTER ELECTRONIC PERFORMANCE



GR30 & GR300 MOLDING PARAMETERS

Recommended starting parameters



Molding Equipment Startup

- Mold Cleaning: 6 shots@300sec
- Mold Conditioning: 2 shots@300sec
- Dummy run: 2 shots@100sec

Molding Conditions:

- Molding Temperature: 170°C – 180°C
- Molding Transfer Pressure: 50-100 kg/cm²
- Transfer Time
 - Conventional mold: 10-20s
 - Auto mold: 5-15s
- In mold cure time: 90s – 120s
- Post Mold Curing: 4-8hrs @ 175°C

KEY PROPERTIES



Typical Properties		Test Method	unit	GR300	GR30	GR30 (Improved)	GR30HT
Gel Time		175°C	sec	22	17		21
Spiral Flow		175°C	inch	34	24		24
Hot Hardness		90s@ 175°C	Shore D	84	84		82
Specific Gravity			Kg/m3	1.94	1.91		2.10
Viscosity		175°C, 10kg	Pa.s	21	41		39
PCT 24h			%	0.34	0.31		0.35
Tg		TMA	°C	171	178		169
CTE1			x10-6/°C	12	13		21
CTE2			x10-6/°C	51	57		56
Storage Modulus	RT	DMA	Mpa	21181	21145		18184
	175°C		Mpa	7710	5953		6688
	260°C		Mpa	1877	1098		1318
Tg (Tan Delta)			°C	185	183		186
Thermal conductivity			W/m.K	0.95	0.95		1.9
Flammability		UL94, V-0		1/8“	1/8“		1/8“
Comments				Proven for TO220/TO93/TO252 on multi gang pot & conventional mold.	Improved version of GR300: 1. Faster cure for automolds 2. Improved electrical performance 3. Higher HTRB reliability	Improved version of GR30: Address HTRB failure in TO247	High thermal conductivity version of GR30HT. Used for TO93 and other high power discrete applications.