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**Introducing:**

**High Operating Temperature (HOT)  
MWIR MCT Performance Evaluation Chip (PEC)  
Test Results  
11-09-2017**

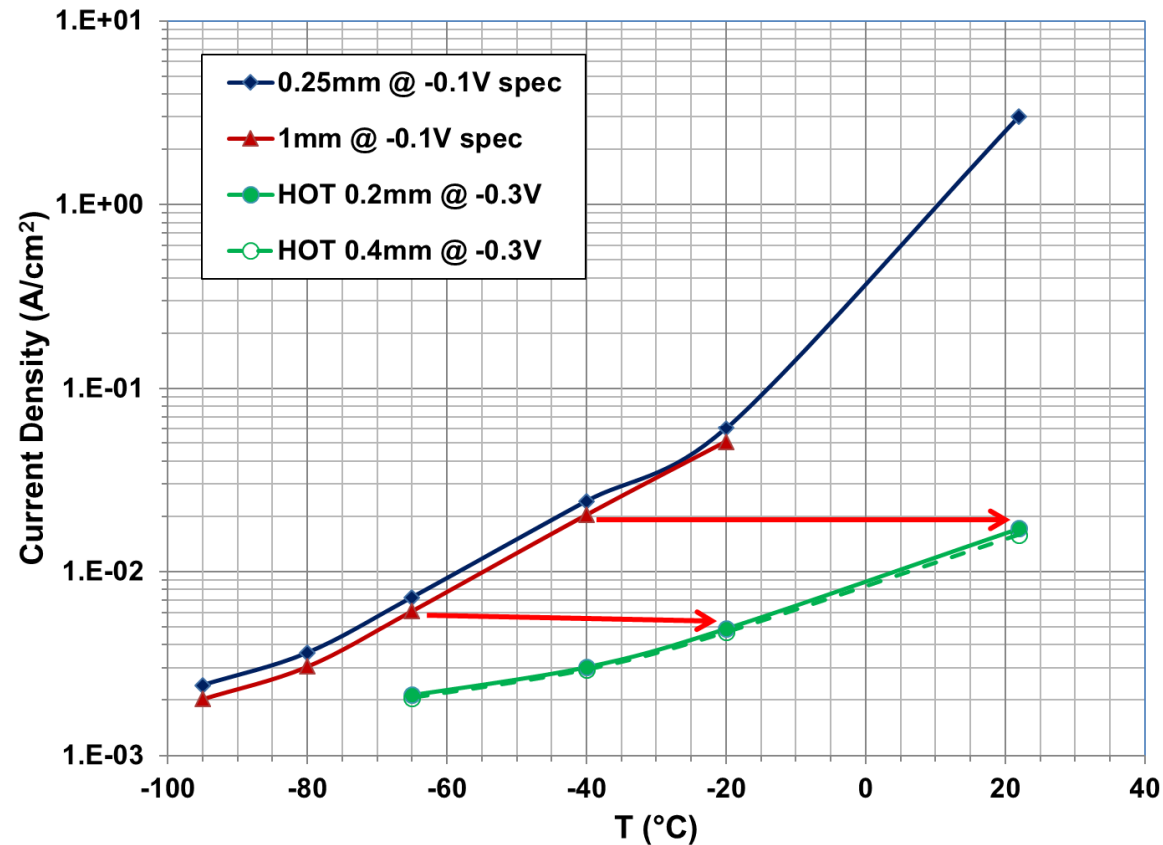
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Use and Disclosure of Data

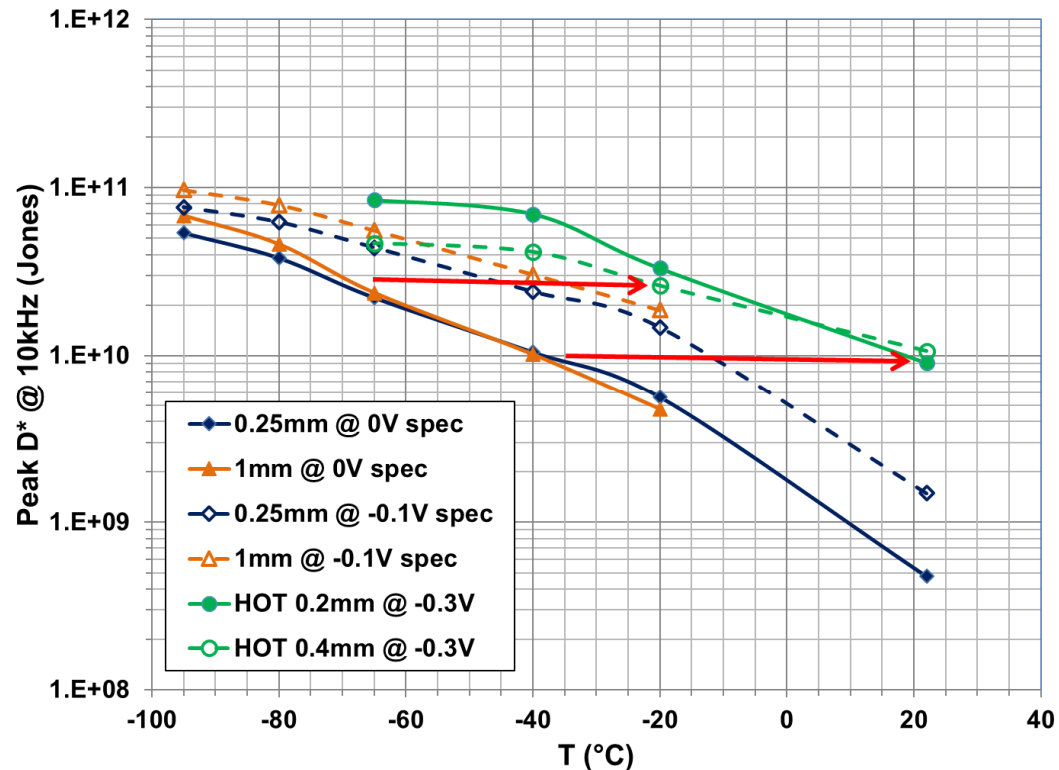
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## Current Density vs Temperature, Comparison of HOT MCT vs TJT Standard MCT Specs



- At room temperature, HOT MCT shows >100X lower dark current density than TJT standard MCT spec, based on test data for 5μm cutoff HOT MCT detectors
- At low temperatures, HOT MCT detector current is limited by background photocurrent due to FOV=180°

# Peak D\* vs Temperature, Comparison of HOT MCT vs TJT standard MCT Specs



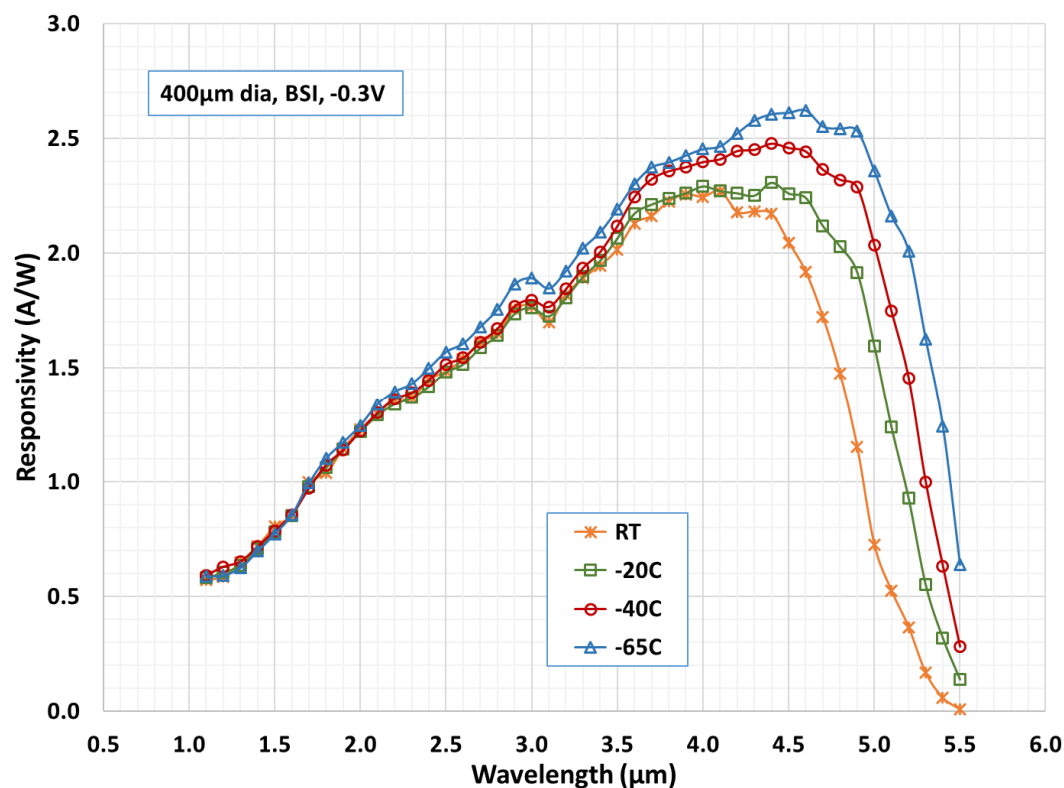
- At room temperature, HOT MCT shows >6X higher D\* at 10kHz than TJT standard MCT spec, based on measured data for 5μm cutoff HOT MCT detectors
- At low temperatures (<-40C), D\* of HOT MCT is limited by background due to FOV=180°

# MWIR HOT MCT Performance Summary

Detector Model Number	Active Size Diameter (mm)	Operating Temp. (°C)	50 % Cutoff Wavelength (μm) typ	Peak Wavelength (μm) typ	Peak Responsivity (A/W) typ	Shunt impedance (Ω) typ	Dark Current (A) typ	Peak D* (Jones) @ 10KHz typ	Max Reverse Bias (V) typ	Capacitance (pF) typ
J19:5-18C-R200U-HOT	0.20	22	4.9	4.1	2.8	>1E7	5.4E-06	9.1E+09	1	47
J19:5-18C-R400U-HOT	0.40	22	4.9	4.1	2.8	>1E7	2.0E-05	1.1E+10	1	97
J19TE1:5-37S-R200U-HOT	0.20	-20	5.1	4.3	3.0	>1E7	1.5E-06	3.3E+10	1	47
J19TE1:5-37S-R400U-HOT	0.40	-20	5.1	4.3	3.0	>1E7	5.9E-06	2.6E+10	1	97
J19TE2:5-66C-R200U-HOT	0.20	-40	5.25	4.4	2.8	>1E7	9.5E-07	7.0E+10	1	47
J19TE2:5-66C-R400U-HOT	0.40	-40	5.25	4.4	2.8	>1E7	3.7E-06	4.1E+10	1	97
J19TE3:5-66C-R200U-HOT	0.20	-65	5.4	4.5	2.8	>1E7	6.7E-07	8.4E+10	1	47
J19TE3:5-66C-R400U-HOT	0.40	-65	5.4	4.5	2.8	>1E7	2.6E-06	4.7E+10	1	97
All data are for detector operation at -0.3 V reverse bias & FOV=180 deg, unless otherwise specified.										

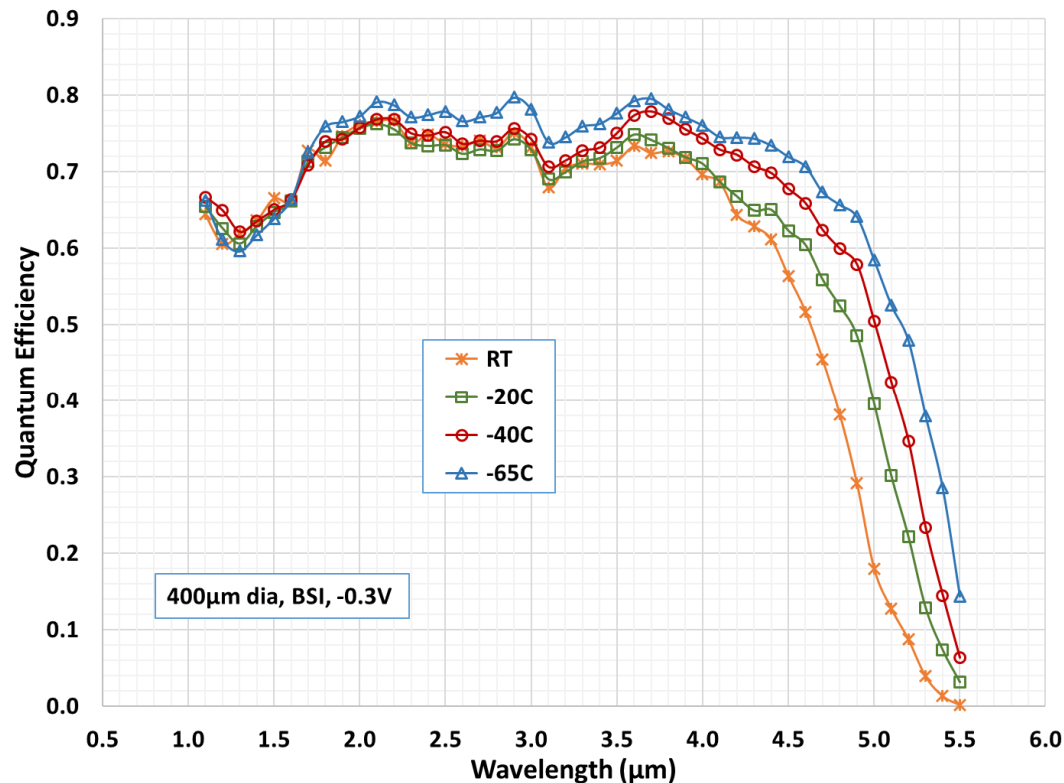


# Spectral Responsivity at Various Temperature



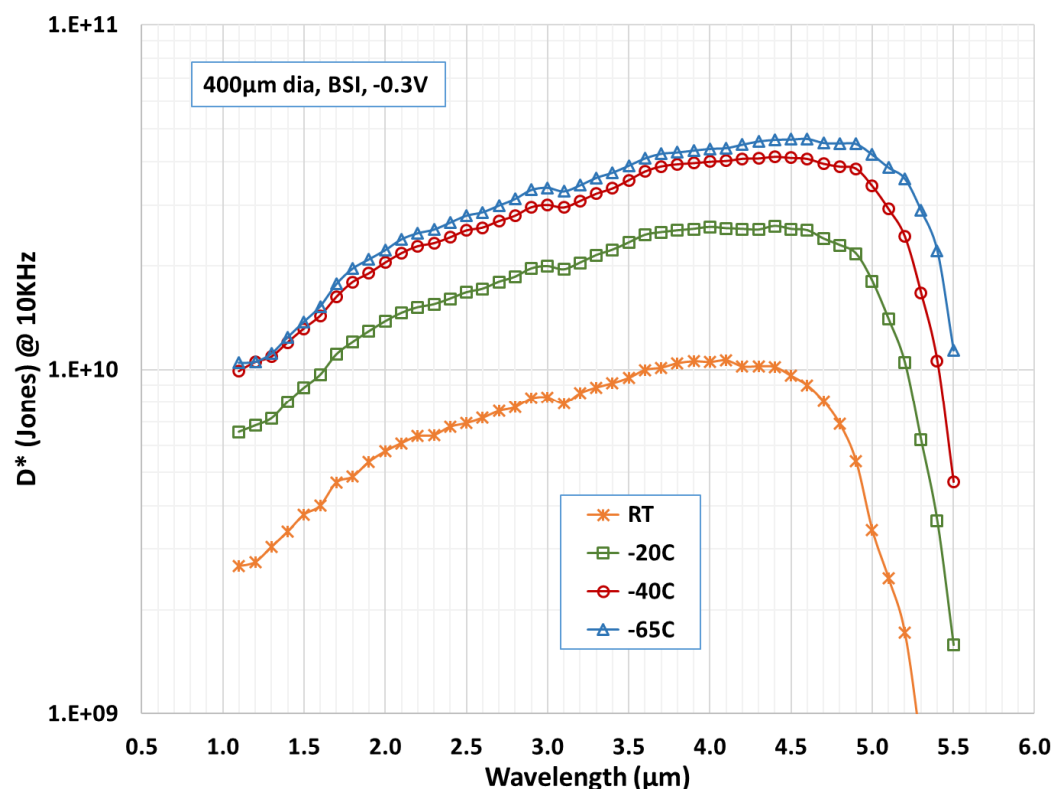
- Spectral response is similar to TJT standard MCT; cutoff shifts to shorter wavelength at higher temperatures
- Detector size 400μm diameter, backside illumination, at -0.3V bias

# Spectral QE at Various Temperature



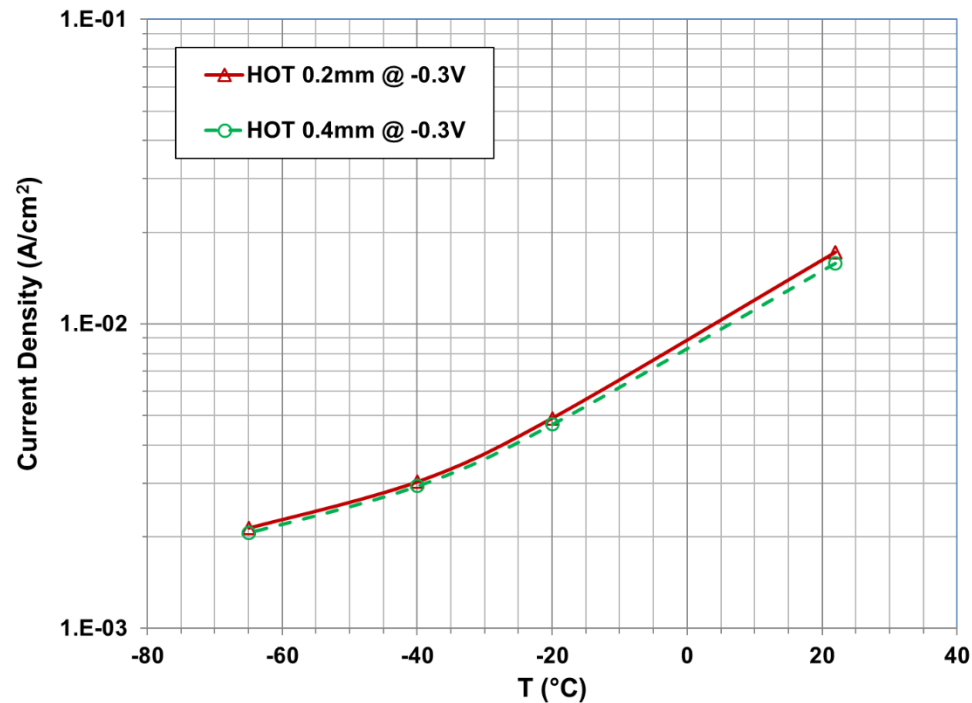
- Spectral QE is similar to TJT standard MCT; cutoff shifts to shorter wavelength at higher temperatures
- Detector size 400μm diameter, backside illumination, at -0.3V bias

# Spectral Detectivity $D^*$ at Various Temperature



- Spectral  $D^*$  is much higher than TJT standard MCT for the same temperatures
- Detector size 400 $\mu\text{m}$  diameter, backside illumination, at -0.3V bias & 10KHz

# Current density vs temperature



- Detector size 200μm and 400μm diameter, backside illumination, at -0.3V
- Dark current is much lower than TJT standard MCT





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